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ABEA BROWN BOVERI

February 28, 1992
LD-92-027

Docket No. 52-002

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: System 80+ ™ Interface Requirements

Reference: C-E Letter LD-91-054, dated October 22, 1991

Dear Sirs:

Enclosed with this letter are 1) a summary of the interface requirements for the System 80+ Standard Design and 2) the corresponding revisions to the Combustion Engineering Standard Safety Analysis Report - Design Certification. This submittal complies with the commitment in the reference letter.

Please call Mr. Stan Ritterbusch of my staff at (203) 285-5206 if you have any questions on the enclosed material.

Very truly yours,

COMBUSTION ENGINEERING, INC.

C. B. Brinkman
Acting Director
Nuclear Systems Licensing

ser/lw

Enclosures: As Stated

cc: J. Trotter (EPRI)
T. Wambach (NRC)

D032

1.2 GENERAL PLANT DESCRIPTION

1.2.1 PRINCIPAL SITE CHARACTERISTICS

1.2.1.1 Site Location

The System 80+ Standard Design is designed for use at multiple sites as described in Chapter 2. The site-specific SAR will identify the specific site for that unit. B A

1.2.1.2 Plant Surroundings

The System 80+ Standard Design is designed for use at multiple sites. The site-specific SAR will identify the specific surroundings for that unit. B

1.2.1.2.1 Meteorology

Section 2.3 of CESSAR-DC lists, for plant radiological evaluation purposes, the short-term (accident) and long-term (routine) diffusion estimates (χ/Q). Other meteorological design bases are listed in Table 2.0-1. Section 2.4 of the site-specific SAR will include data to show compliance with the design bases.

1.2.1.2.2 Hydrology

Hydrological design bases are listed in Table 2.0-1. Section 2.4 of the site-specific SAR will include data to show compliance with the design bases.

1.2.1.2.3 Geology and Seismology

The design of safety-related structures, systems, and components of the System 80+ Standard Design is consistent with the seismic envelope given in Section 2.5. Section 2.5 of the site-specific SAR will include data to show compliance with the seismic envelope. E

1.2.1.3 Plant Independence

The System 80+ Standard Design can be used at either single-plant or multiple-plant sites. At multiple-plant sites, the independence of all safety-related systems and their support systems will be maintained between (or among) the individual plants.

1.2.1.4 Site Building Arrangement

A typical layout of the System 80+ Standard Design buildings is shown in Figure 1.2-1. Sufficient open space is shown so that a facility for dry storage of spent fuel casks can be added on a site-specific basis. H

→{Insert B}

INSERT B (6 pages)

1.2.1.4.1 Site Specific Structures Description and Interface Requirements

Some structures which house non-safety related and certain safety-related systems and components are supplied by the licensee and are not included in the System 80+ design certification. To ensure that the design of such structures is compatible with the System 80+™ Standard Design, certain interface requirements must be met by the applicant (owner/operator). The following sections present the interface requirements and conceptual descriptions for the Station Services Building, Administration Building, Personnel Access Portal, Warehouse, Combustion Turbine Building and Fuel Storage Facility, the Fire Pump House and Tanks, and the Radwaste Building. In addition to lists of interface requirements, the word "shall" is used to identify interface requirements in descriptive text. The remainder of the description is conceptual and it is not intended to be binding on the COL holder.

Interface requirements for structures which are related to a specific mechanical or electrical system are covered in the appropriate CESSAR-DC chapter, e.g. the Component Cooling Water Heat Exchanger Structure is covered in Section 9.2.2, Component Cooling Water System. Section 1.9 contains an index of all interface requirements contained in CESSAR-DC.

1.2.1.4.1.1 Station Services Building

Licensee shall provide a Station Services Building(s) to house the following typical station equipment and systems:

- Station staff office space
- Plant Water Treatment (Potable and Demineralized)
- Food Service and Break Facilities for Personnel Inside the Protected Area
- Turbine Plant Locker, Shower, and Toilet Facilities
- Tool Issue and Storage Areas
- Cold Machine Shop
- Conventional Laboratory

A typical station services building is designed as non-safety related, non-seismic structure with the following conceptual features. The building is a steel-framed structure with a steel deck roof covered by non-combustible roofing. Walls are insulated metal siding or masonry. Roof drainage and clean floor drainage are discharged to the storm and waste water

1.2.1.4.1.2 Administration Building

An Administration Building shall be provided by the licensee. This building provides office and support space for station administration and management personnel who have no need to be located within the Protected Area.

A typical Administration Building is designed as non-safety related, non-seismic structure with the following conceptual features. The building is a steel-framed structure with a steel deck roof covered by non-combustible roofing. Walls are insulated metal siding or masonry. Roof drainage and clean floor drainage are discharged to the storm and waste water system. The building is located immediately outside the Protected Area fence at the entrance to the plant, near the Personnel Access Portal building. Air conditioning and heating is provided to meet normal office environment conditions.

1.2.1.4.1.3 Personnel Access Portal

The Personnel Access Portal (PAP) shall be provided by the licensee, and shall be designed to provide the following functions:

- Serve as access point through the Protected Area Boundary.
- Provide facilities to search, badge, and permit access to the Protected Area.
- Provide the Secondary Alarm Stations.
- Provide the required bullet-resistant features to support security force functions.

A typical PAP building is a masonry building with non-combustible roofing on a metal deck. The security building is located along the Protected Area fence at the entrance to the plant, near the Administration Building. A PAP building ventilation system is provided to maintain the building within design temperature limits.

1.2.1.4.1.4 Warehouse

The licensee shall provide a warehouse to accommodate the following:

- Material access to the Protected Area incorporating the Cargo Access Portal (CAP).

- Loading docks, search areas, QA inspection and QA Hold Areas, along with systems and fixtures to provide bulk storage of QA and non QA parts and supplies.

- A material issue area to control dispensing of materials for maintenance.

A typical warehouse building is founded at grade on a reinforced concrete foundation. The warehouse is typically a metal enclosed building with a structural steel frame and non-combustible roofing. The warehouse ventilation system is designed to meet the appropriate requirements of ANSI/ASME NQA-2 Part 2.2.

1.2.1.4.1.5 **Combustion Turbine Building and Fuel Storage**

The Combustion Turbine Building houses the combustion turbine-generator (CTG), which serves as the Alternate AC Power (AAC) source. This structure is a non-safety related item which is provided by the applicant. The licensee shall verify that the interface requirements listed in this section are met to ensure adequacy with the System 80+™ Standard Design.

A. The CTG shall be located in a separate building in close proximity to the normal switchgear building outside of the turbine missile impact zone. Length of electrical output leads shall be kept to a minimum.

B. All auxiliaries required for operation of the CTG shall be included in the building.

C. Arrangement of the structure and components therein shall provide for routine maintenance of the unit. This arrangement shall permit removal and replacement of the CTG as a fully assembled, skid mounted unit.

D. The building shall be constructed such that a fire within the building or the CTG does not involve other buildings or equipment, or endanger plant safety or continued operations.

E. Adequate building heating and ventilation shall be provided to maintain the building within acceptable temperature limits. Ventilation shall be sufficient to permit personnel entry into the building during CTG operation.

F. The building and related auxiliary structures shall be designed to protect the CTG against extreme weather conditions such as flood, tornado, etc.

G. Since the CTG provides backup power to station security systems, the building and related auxiliary structures shall be provided security protection as a "Vital Area".

Storage facility design for CTG fuel shall meet the following requirements at a minimum:

A. Storage tanks shall be located outside the turbine missile strike zone, or the tanks shall be hardened or otherwise shielded against missiles.

B. Fuel storage tanks shall be located and arranged such that a tank explosion does not create missiles which would strike any safety-related equipment or structures. Applicant shall consult CESSAR-DC section 3.5, Missile Protection, as a design reference.

C. Fuel storage facility design shall meet applicable federal, state and local environmental regulations.

1.2.1.4.1.6 **Fire Pump House And Tanks**

The licensee shall provide a fire pump house and two water storage tanks. The fire pump house will be for the two fire pumps and their associated controls, drivers, piping and fittings described in Section 9.5.1.5.1. The water storage tanks shall each be 300,000 gallon capacity, ground level, steel suction tanks.

The licensee shall verify that the following requirements are met in the design of the Fire Pump House:

A. The building shall be a steel-framed structure with a steel deck roof covered by non-combustible roofing. Walls shall be insulated metal siding or masonry.

B. The building may be designed as non-safety related, non-seismic.

C. The building shall be subdivided, utilizing a 3-hour rated masonry wall, into two separate fire areas, one for the diesel driven fire pump and its associated controller, fuel tank, piping, and fittings, and the other for the electric motor driven fire pump, the electric motor driven pressure maintenance pump, their associated controllers, and associated piping and fittings.

D. The building shall be provided with a heating and ventilation system to maintain the building within design temperature limits.

E. If the fuel tank for the diesel driver is required to be located inside the building for area climate reasons, a masonry containment dike shall be provided, sized to hold the full contents of the tank.

F. Roof drainage and floor drainage shall be discharged to the storm and waste water system.

The licensee shall verify that the following requirements are met in the design of the Tanks:

A. The tanks may be steel and may be designed as non-safety related, non-seismic.

B. The design of the tanks shall be in accordance with National Fire Protection Association (NFPA) 22, Standard for Water Tanks for Private Fire Protection.

1.2.1.4.1.7 **Radwaste Building**

The licensee shall provide a Radwaste Building to house the following systems:

- Liquid Waste Management System (LWMS)
- Gaseous Waste Management System (GWMS)
- Solid Waste Management System (SWMS)

The licensee shall verify the following requirements are met in the design of the Radwaste Building:

A. The Radwaste Building shall be designed in accordance with Regulatory Guide 1.143 guidelines which include:

 - foundations and walls of the Radwaste Building shall be design to withstand an Operating Basis Earthquake (OBE),

 - building elements shall meet the structural requirements specified in AISC S 310 and ANSI/ACI 318-1977 for steel and concrete,

 - curbing or an elevated threshold shall be provided to prevent the uncontrolled release of liquid or solid effluent to the environment due to a LWMS or SWMS failure,

 - floor drains shall be provided to collect and route spills to the LWMS for processing,

- tanks internal to the Radwaste Building shall be designed to a sufficient height to contain the maximum expected inventory in the tank.

B. The Radwaste Building will be connected to the Nuclear Annex to preclude an uncontrolled release of effluents to the environment due to a LWMS or SWMS failure. If the Radwaste Building is not connected to the Nuclear Annex, the consequences of a LWMS or SWMS failure must be evaluated to demonstrate compliance with 10 CFR 20, Appendix B limits. This analysis requires the licensee to demonstrate that the concentration of the liquid effluent at the potable water source, released from the Radwaste Building due to a LWMS or SWMS failure, is within 10 CFR 20, Appendix B limits.

C. The Radwaste Building will be located in close proximity to the Interim Onsite Storage Facility to facilitate transport of packaged waste for interim storage prior to shipment to a licensed burial facility.

D. Adequate space shall be provided for storage and processing of radwaste.

E. Ventilation shall be provided to ensure a controlled and monitored release of gaseous effluent from the Radwaste Building.

F. The Radwaste Building sha . be equipped with area and airborne radiation monitors to provide indication of a spill and to ensure that personnel exposures are maintained ALARA.

1.9 SYSTEM 80+ STANDARD DESIGN INTERFACES

The System 80+ Standard Design includes all buildings, structures, systems, and components which can significantly affect plant safety. (Any interfaces with site-specific systems or references to design implementation documents will be identified in this section.) E

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This section provides a listing of the interface requirements as used in 10 CFR 52.47(a). The System 80+™ Standard Design includes an essentially complete nuclear plant, except for structures, systems and components which require site-specific design. These structures, systems and components are not included in the System 80+™ design certification and shall be provided by the applicant (owner/operator) during site specific engineering. To ensure that the design of these items is compatible with the System 80+™ Standard Design, interface requirements must be satisfied by the applicant. In general, interface requirements for applicant-supplied structures, systems and components which are related to a specific mechanical or electrical system are covered in the appropriate CESSAR-DC chapter, e.g. the Component Cooling Water Heat Exchanger Structure is covered in Section 9.2.2, Component Cooling Water System. (The word "shall" is used to identify interface requirements included in descriptive text.) The following table, Table 1.9-1, provides an index of all sections in CESSAR-DC containing interface requirements.

Site specific assumptions on which the System 80+™ Standard Design is based are presented in Section 1.2.1, Principal Site Characteristics, and Chapter 2.0, Site Envelope Characteristics and the applicant (owner/operator) shall verify that the chosen site is enveloped by the characteristics given in Sections 1.2.1 and 2.0. These site-specific characteristics must be compatible with the System 80+ design envelopes, but they are not considered interface requirements as used in 10 CFR 52.47(a).

Table 1.9-1
Index of System, Structure or Component Interface Requirements for System 80+™

System, Structure or Component	Section
Buildings/Structures	
Administration Building	1.2.1.4.1.2
Combustion Turbine Building and Fuel Storage	1.2.1.4.1.5
Fire Pump House and Tanks	1.2.1.4.1.6
Personnel Access Portal	1.2.1.4.1.3
Radwaste Building	1.2.1.4.1.7
Station Services Building	1.2.1.4.1.1
Switchyard	8.2
Warehouse	1.2.1.4.1.4
Decontamination Facilities	13.3.3.6
Emergency Operations Facility	13.3.3.2
Laboratory Facilities	13.3.3.4
Boric Acid Storage Tank Structure/Dike	9.3.4.1.4
Bulk Gas Storage	9.5.10.1.2
Component Cooling Water Heat Exchanger Structure	9.2.2.1.4
Condensate Storage Tank Structure/Dike	9.2.6.1.2
Diesel Fuel Tank Structure	9.5.4.1.2
Holdup Tank Structure/Dike	9.3.4.1.4
Reactor Makeup Water Tank Structure/Dike	9.3.4.1.4
Station Service Water Pump Structure	9.2.1.1.4
Ultimate Heat Sink	9.2.5.1.3
Systems	
Condenser Circulating Water System, including Normal Power Heat Sink, Pump Structure, Intake and Discharge	10.4.5.1
Offsite Power System, including Switchyard	8.1
Potable and Sanitary Water Systems, including Sewage Treatment	9.2.4.1
Security System	13.6.1
Service Water Pump Structure Ventilation System	9.4.8.1.2
Components	
Component Cooling Water Heat Exchanger Materials	9.2.2
Condenser Materials Specification	10.3.6.2,10.4.1.2

8.2 OFFSITE POWER SYSTEM

8.2.1 SYSTEM DESCRIPTIONS

Insert A →

8.2.1.1 Utility Grid System

The utility grid system, which is not within the scope of the System 80+ Standard Design, may consist of interconnected hydro, fossil fueled and nuclear plants supplying energy to the service area at various voltages. The grid transmission system is also a source of reliable and stable power for the onsite power distribution system. The grid system design must include at least two preferred power circuits, each capable of supplying the plants' necessary safety loads and other equipment.

8.2.1.2 Utility Grid and Switchyard Interconnections

The switchyard is connected to the primary transmission system by overhead transmission lines. Figure 8.2-1 depicts a typical interconnection of the switchyard and onsite power.

8.2.1.3 Station Switchyard

Transmission lines from the primary transmission system shall terminate in the switchyard with provisions for additional lines to be added in the future. Additionally, the Unit and Standby Auxiliary Transformers are tied to the switchyard by separate and independent overhead lines.

The entire switchyard, including the power circuit breakers, cabling system, AC and DC auxiliary power systems, protective relaying system, and control system shall be divided into two preferred power buses designated 1 and 2. These designations shall be consistent with the preferred power feeder designations. Additionally, the incoming transmission lines shall be also assigned to power buses in such a way as to separate the associated cabling, protective relaying, and controls for each circuit transmission line into two distinct sources of offsite power.

The switchyard design shall provide redundant offsite power feed capability to the nuclear unit.

8.2.1.3.1 Switchyard 480V AC Auxiliary Power System

A 480V AC Auxiliary Power System shall be provided in the switchyard to supply a reliable source of continuous AC power for the power circuit breaker auxiliaries, battery chargers, relay house air conditioning, and switchyard lighting.

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Insert A:

The utility grid system and switchyard(s) are out of scope and site specific items which shall be provided by the license applicant. The following sections contain a description of a typical grid system and switchyard and interface requirements which must be met to ensure adequacy with the System 80+™ Standard Design. The word "shall" is used to distinguish interface requirements which are mandatory from the text that is purely descriptive.

I. All essential SSWS components are fully protected from floods, tornado missile damage, internal missiles, pipe breaks and whip, jet impingement and interaction with non-seismic systems in the vicinity.

J. The system is designed to minimize the potential for water hammer by providing for adequate filling and high point venting.

9.2.1.1.2 Power Generation Design Basis

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Power generation design bases pertinent to the SSWS are as follows:

A. The SSWS, in conjunction with the CCWS and SCS, is designed to cool the reactor coolant from 350°F to 140°F through the shutdown cooling heat exchangers and the component cooling water heat exchangers. The reactor coolant system can be cooled to 140°F within 24 hours after reactor shutdown by first cooling the reactor coolant to 350°F through the steam generators and then cooling to 140°F by utilizing both divisions of the SCS, CCWS, and SSWS. The cooling rate of the reactor coolant does not exceed the administrative limit of 75°F/hr.

B. The SSWS, in conjunction with the CCWS, is designed to provide a maximum cooling water temperature of 120°F to the shutdown cooling system heat exchanger during a normal shutdown. E

C. The SSWS, in conjunction with the CCWS, is designed to provide a maximum component cooling water temperature of 105°F or less during normal operating modes. I

D. The SSWS through the CCWS is designed to provide cooling water to the RCPs, letdown heat exchanger, nuclear sample coolers, non-essential chillers, and other non-essential reactor auxiliary cooling loads.

9.2.1.1.3 Codes and Standards

The SSWS and associated components are designed in accordance with applicable codes and standards. The design conforms with General Design Criteria 2, 4, 5, 44, 45 and 46 and the intent of the Standard Review Plan. E

→ ADD INSERT 1

CESSAR-DC Attachment (Refer to page 9.2-2)

INSERT 1:

9.2.1.1.4 Interface Requirements

The Station Service Water System (SSWS) Pump Structure is an out of scope item which shall be provided by the applicant. The licensee shall verify that the following interface requirements are met to ensure adequacy with the System 80+™ Standard Design:

A. The SSWS Pump Structure shall meet Seismic Category I requirements.

B. The SSWS Pump Structure shall provide physical barriers to maintain divisional separation of SSWS components.

C. The SSWS Pump Structure shall withstand the effects of the following events:

   1. Natural phenomena, including SSE, floods, tornados, and hurricanes.

   2. Externally and internally generated missiles.

   3. Fire and sabotage.

D. The SSWS Pump Structure shall be located in the same vital protection area as the main plant and outside the turbine missile path.

E. A safety grade screen system shall be located prior to the SSWS pump inlets. The screens shall be equipped for periodic cleaning and designed to limit ingestion of biofouling, organics, and debris, consistent with the fouling design limits of the piping system and CCWS heat exchanger, and the need to limit any blockage of the pump inlets.

F. Design of the SSWS Pump Structure shall provide adequate accessibility for maintenance, inspection, and testing of components located within the structure including sufficient equipment lay down space, lifting equipment, and pathway for removal and replacement of major components.

G. The SSWS Pump Structure pump well shall be designed to prevent the formation of air vortices over the complete range of anticipated operating water levels in the pump well.

F. The non-essential cooling loop piping and components with the exception of containment isolation valves and penetration piping is composed of non-nuclear safety piping and components. The containment isolation valves and penetration piping is designed to ANSI Safety Class 2 requirements.

G. The CCWS provides protection against station service water leakage into the reactor coolant system. 1

H. The CCWS provides protection against release of radiological contamination into the environment via the UHS.

I. The CCWS is designed to minimize the effects of long-term corrosion.

9.2.2.1.3 Codes and Standards

The CCWS and associated components are designed in accordance with applicable codes and standards. The design conforms with General Design Criteria 2, 4, 5, 44, 45, and 46, and the intent of the Standard Review Plan. E

→ ADD INSERT 1B

9.2.2.2 System Description

The CCWS consists of two separate, independent, redundant, closed loop, safety related divisions. Either division of the CCWS is capable of supporting 100% of the cooling functions required for a safe reactor shutdown.

One component cooling water pump and heat exchanger (matched with operating SSWS division) is required to operate during post-LOCA. Cooling to the spent fuel pool heat exchanger(s) and the non-essential loop is isolated on a SIAS. If these headers fail to isolate, the idle component cooling water pump in the respective loop will automatically start on a low pump differential pressure signal. This assures that there is no flow degradation to the essential components. I

The CCWS operates at a higher pressure than the SSWS. This prevents the leakage of station service water into the CCWS in the event of a CCW heat exchanger tube leak.

Each division of the CCWS includes two heat exchangers, a surge tank, two component cooling water pumps, a chemical addition tank, a component cooling water radiation monitor, two sump pumps, a component cooling water heat exchanger structure sump pump, piping, valves, controls, and instrumentation. No cross connections between the two divisions exist.

CESSAR-DC Attachment (Refer to page 9.2-19)

INSERT 18

9.2.2.1.4 Interface Requirements

The Component Cooling Water (CCW) Heat Exchanger Structure is an out of scope item which shall be provided by the applicant. The licensee shall verify that the following interface requirements are met to ensure adequacy with the System 80+™ Standard Design:

A. The CCW Heat Exchanger Structure shall meet Seismic Category I requirements.

B. The CCW Heat Exchanger Structure shall withstand the effects of the following events:

 1. Natural phenomena, including SSE, floods, tornados, and hurricanes.

 2. Externally and internally generated missiles.

 3. Fire and sabotage.

C. The CCW Heat Exchanger Structure shall be located to minimize the amount of SSWS piping and equipment surfaces exposed to the corrosion and fouling effects of the service water. An evaluation shall be performed to select the preferred location based on site specific conditions.

D. The CCW Heat Exchanger Structure shall provide physical barriers to maintain divisional separation of CCWS components.

E. The CCW Heat Exchanger Structure shall provide compartmentalization of the heat exchangers such that service water leaks and spills can be kept out of floor drains which are processed through the Liquid Waste Management System.

F. Design of the CCW Heat Exchanger Structure shall provide adequate accessibility for maintenance, inspection, and testing of components located within the structure including sufficient equipment lay down space, lifting equipment, and pathway for removal and replacement of major components.

G. The CCW Heat Exchanger Structure shall be located within the plant vital protection area and outside the turbine missile path.

H. The CCW Heat Exchanger Structure shall be provided with adequate ventilation to allow personnel access for operation, maintenance, and testing activities and to ensure equipment operability during all modes of plant operation and postulated design basis accident conditions. The ventilation system shall be designed to meet the following requirements:

1. The CCW Heat Exchanger Structure Ventilation System shall be designed as Safety Class 3, Seismic Category I, with Class 1E power supplied to essential components.

2. The CCW Heat Exchanger Structure Ventilation System shall remain functional during or after any of the following events:

   a. Natural phenomena, including SSE, floods, tornados, and hurricanes.

   b. Externally and internally generated missiles.

   c. Failure of any single essential active component.

   d. Failure of non-essential portion of the system.

3. The CCW Heat Exchanger Structure Ventilation System design shall permit inservice terting and inspection of components important to safety.

4. The CCW Heat Exchanger Structure Ventilation System fresh air intakes shall be located a minimum of 20 feet above grade and away from plant discharges to minimize contaminants entering the system.

5. The CCW Heat Exchanger Structure Ventilation System shall be divisionally separated with physical barriers.

6. The CCW Heat Exchanger Structure Ventilation System shall be controlled from the main control room. Instrumentation and controls shall be provided in accordance with ANSI/ANS 59.2.

The CCW heat exchangers are also out of scope items. A reference horizontal shell and tube heat exchanger is discussed in the following sections, however a plate type heat exchanger may be substituted. Sites selecting the plate type heat exchanger shall provide strairer protection against debris or arrangements which allow backflushing on the service water side.

9.2.4 POTABLE AND SANITARY WATER SYSTEMS

Replace text with attached

The potable and sanitary water systems process water for general plant use. These systems serve no safety functions and any malfunction has no adverse effect on any safety-related system. The requirements of General Design Criterion 60 of 10 CFR 50 Appendix A are met as related to design provisions provided to control the release of liquid effluents containing radioactive material from contaminating the PSWS, as follows: E I

A. There are no interconnections between the potable and sanitary water systems and systems having the potential for containing radioactive material.

B. The potable water system is projected by an air gap, where necessary. E

9.2.5 ULTIMATE HEAT SINK

9.2.5.1 Design Bases

9.2.5.1.1 Safety Design Bases

The Ultimate heat Sink provides the source of cooling water and heat sink to the environment for the Station Service Water System (SSWS). The SSWS removes heat from the Component Cooling Water System (CCWS) through the CCW heat exchangers. The CCWS removes heat from essential and non-essential reactor auxiliary loads during all modes of plant operation as listed in Table 9.2.2-3.

9.2.5.1.2 Codes and Standards

The Ultimate Heat Sink is designed in accordance with General Design Criteria 2, 5, 44, 45 and 46 of 10 CFR 50 Appendix A and the intent of the Standard Review Plan 9.2.5 and Regulatory Guide 1.27. I

9.2.5.1.3 Interface Requirements

The Ultimate Heat Sink is an out of scope item which shall be discussed in the site-specific SAR supplement. A reference Ultimate Heat Sink is discussed in Section 9.2.5.2 below. The site-specific SAR shall verify that the following interface requirements are met to ensure adequacy with the System 80+ Standard Design:

A. The Ultimate Heat Sink shall meet the intent of Regulatory Guide 1.27.

B. The Ultimate Heat Sink shall meet Seismic Category I requirements.

Attachment to CESSAR-DC Change Package for Section 9.2.4

Replace the text of section 9.2.4 with the following (page 9.2-57):

9.2.4.1 Interface Requirements

The potable and sanitary water systems (PSWS) are out of scope systems which are licensee supplied and are site specific. The PSWS shall be designed to meet the requirements of General Design Criterion 60 of 10 CFR 50 Appendix A, as related to provisions to control the release of liquid effluents containing radioactive material from contaminating the PSWS. The following specific requirements shall be met:

A. There shall be no interconnections between the potable and sanitary water systems and systems having the potential for containing radioactive material.

B. The potable water system shall be protected by an air gap, where necessary.

Licensee shall ensure that sewage treatment facility design complies with applicable state and local regulations. Adequate treatment facility capacity shall be provided to accommodate the maximum number of personnel assigned to the site, with provisions for expansion as necessary.

9.2.4.2 System Description

The PSWS process water for general plant use. The PSWS include all components and piping from the supply connection to the municipal or other water source to all points of discharge to sewage facilities or other plant systems. These systems serve no safety functions and any malfunction has no adverse effect on any safety-related system.

9.2.6 CONDENSATE STORAGE SYSTEM

9.2.6.1 Design Bases

9.2.6.1.1 Overall Design Bases

A. The Condensate Storage System provides demineralized water for initial fill of the condensate and feedwater systems. As dictated by the Hotwell Level Control System, the Condensate Storage System provides makeup or receives excess condensate as necessary.

B. The Condensate Storage System, along with other condensate volumes such as the condensate hotwell or the deaerator storage tank, is designed to enable the RCS to be maintained at hot standby for four hours and then to be cooled down and depressurized to shutdown cooling system entry conditions in the next twenty hours. B

C. The Condensate Storage System is designed to maintain water purity and exclude oxygen.

> Insert A2

9.2.6.2 System Description

The Condensate Storage System provides a readily available source of deaerated condensate for makeup to the condenser and is one of the condensate sources of startup feedwater for makeup to the steam generators. It also serves to collect and store miscellaneous system drains. The Condensate Storage System provides condensate to or receives drains from, the following equipment:

A. Condenser Hotwell

B. Startup Feedwater Pump Suction

C. Emergency Feedwater Storage Tank

D. Emergency Feedwater Pump Turbine Steam Supply and Exhaust Drains

E. Steam Jet Air Ejector Drains E

F. Gland Steam Condenser Drains

G. Vacuum Deaerator Condensate Return

H. Auxiliary Steam Drains

I. Evaporator Condensate Return Units

Attachment to CESSAR-DC Change Package for Section 9.2.6

Insert the following into section 9.2.6.1 as indicated on page 9.2-60):

Insert A2

9.2.6.1.? **Interface Requirements**

The structure which houses the Condensate Storage Tank, located in the yard, is an out of scope item which shall be provided by the applicant. The design of the Condensate Storage Tank itself is discussed in Section 9.2.6.2. The licensee shall verify that the structural interface requirements listed in this section are met to ensure adequacy with the System 80+™ Standard Design.

A. The condensate storage tank structure shall be designed to meet the requirements of NRC Regulatory Guide 1.143, Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants. Specifically, the Condensate Storage Tank shall be located within a seismically-designed dike or retention pond of sufficient height/size capable of preventing runoff in the event of tank overflow/rupture.

B. The Condensate Storage Tank structure/dike shall be designed to accommodate tank overflow, drain, and sample lines which are routed to the Turbine Building Sump System.

C. Licensee shall ensure that structure/dike design complies with applicable state and local regulations.

To aid in maintaining the pH during system passivation, lithium in the form of lithium hydroxide, is added to the coolant and maintained within a 1-2 ppm lithium-7 range. I

At power, oxygen concentration is limited by maintaining excess dissolved hydrogen gas in the coolant. The excess hydrogen forces the water decomposition/synthesis reaction in the reactor core toward water synthesis rather than hydrogen and oxygen decomposition. Oxygen added via makeup water is removed in this way.

In order to minimize the effect of crud deposition on the reactor core heat transfer surfaces, lithium-7 hydroxide additions are made. Lithium-7 hydroxide produces pH conditions within the reactor coolant at operating temperature that reduce the corrosion product solubility and, hence, the dissolved crud inventory in the circulating reactor coolant. The elevated pH promotes conditions within the coolant for selective deposition of corrosion products on cooler surfaces (steam generators) rather than hotter surfaces (core). An additional advantage is the formation of a more stable and tenacious passive oxide layer on out-of-core system surfaces. The lithium concentration is maintained within a 0.2-2.2 ppm lithium-7 range during operation. I

9.3.4.1.3.3 Reactivity Control

Boron concentration is normally controlled by feed-and-bleed. To change concentration, the makeup system supplies either reactor makeup water or boric acid to the VCT, and the letdown stream is diverted to the holdup tank via the pre-holdup ion exchanger and the gas stripper. Toward the end of a fuel cycle, with low boric acid concentration in the coolant, feed-and-bleed to further reduce boron concentration becomes inefficient and the deborating ion exchanger is used. The deborating ion exchanger contains an anion resin initially in the hydroxyl form, which is converted to a borate form as boron is removed from the reactor coolant.

ADD INSERT 1 →

9.3.4.2 System Description

9.3.4.2.1 System

The normal reactor coolant flow path through the CVCS is indicated by the heavy lines on the flow diagrams (Figure 9.3.4-1, Sheets 1 through 4). Design parameters for the major components are shown in Table 9.3.4-4. Normal operating parameters for the CVCS are listed in Table 9.3.4-5. Process flow data is shown in Table 9.3.4-6. B I

CESSAR-DC Attachment (Refer to page 9.3-34)

INSERT 1:

9.3.4.1.4 Interface Requirements

The structures housing the Boric Acid Storage Tank, the Reactor Makeup Water Tank, and the Holdup Tank are out of scope items which shall be provided by the applicant. The licensee shall verify that the structural interface requirements listed in this section are met to ensure adequacy with the System 80+™ Standard Design.

A. The structures housing the tanks shall be designed to meet the requirements of NRC Regulatory Guide 1.143, Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants. Specifically, the tanks shall be located within a seismically-designed dike or retention pond of sufficient height/size capable or preventing runoff in the event of tank overflow/rupture.

B. All three tanks may be located within a common structure designed to contain the maximum combined liquid inventory in the tanks.

C. The licensee shall ensure that the structure/dike design complies with applicable state and local regulations.

The Station Service Water Pump Structure Ventilation System is located completely within a Seismic Category I structure and all essential components are fully protected form tornado missile damage. E

The location of the station service water pump structure ventilation system intakes are such to minimize the ingress of dust. All electrical cabinets located in the station service water pump structure are provided with features (e.g., cabinet gaskets) to prevent dust ingress. I

This system is designed in accordance with the requirements of General Design Criteria 2, 4, 5, 17, and 60.

9.4.8.1.1 Codes and Standards

Equipment, work, and materials utilized conform to the requirements and recommendations of the codes and standards listed below:

A. Fan ratings conform to the Air Moving and Conditioning Association (AMCA) Standards. E

B. Fan motors conform to applicable standards of the National Electrical Manufacturers Association (NEMA) and the Institute of Electrical and Electronic Engineers (IEEE).

C. Essential equipment, fans, dampers, and ductwork will be manufactured in accordance with ASME/ANSI AG-1-1988.

D. Ventilation ductwork conforms to applicable standards of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA). I

E. Applicable components and controls conform to the requirements of IEEE, Underwriter's Laboratories (UL) and NEMA.

ADD INSERT 1

9.4.8.2 System Description E

The Station Service Water Pump Structure Ventilation System consists of two 100% capacity essential vane-axial supply fans with associated dampers, ductwork, supports and control systems per pump compartment. A non-essential vane-axial fan is provided to supply ventilation air to the pool area below the pumps when maintenance or inspection is performed in this area.

CESSAR-DC Attachment (Refer to page 9.4-35)

<u>INSERT 1:</u>

9.4.8.1.2 Interface Requirements

The Station Service Water Pump Structure Ventilation System is an out of scope item which shall be provided by the applicant. The licensee shall verify that the following interface requirements are met to ensure adequacy with the System 80+™ Standard Design:

A. The Station Service Water Pump Structure Ventilation System shall be designed as Safety Class 3, Seismic Category I, with Class 1E power supplied to essential components.

B. The Station Service Water Pump Structure Ventilation System shall remain functional during or after any of the following events:

   1. Natural phenomena, including SSE, floods, tornados, and hurricanes.

   2. Externally and internally generated missiles.

   3. Failure of any single essential active component.

   4. Failure of non-essential portion of the system.

C. The Station Service Water Pump Structure Ventilation System design shall permit inservice testing and inspection of components important to safety.

D. The Station Service Water Pump Structure Ventilation System fresh air intakes shall be located a minimum of 20 feet above grade and away from plant discharges to minimize contaminants entering the system.

E. The Station Service Water Pump Structure Ventilation System shall provide a suitable environment ensuring the safety and comfort of plant personnel and operability of plant equipment during normal operating and postulated design basis accident conditions.

F. The Station Service Water Pump Structure Ventilation System shall be divisionally separated with physical barriers.

G. The Station Service Water Pump Structure Ventilation System shall be controlled from the main control room. Instrumentation and controls shall be provided in accordance with ANSI/ANS 59.2 and be designed such that the following operational criteria are met:

1. Fans shall be automatically started whenever a pump associated with that particular division is started.

2. Fans shall always be stopped manually.

3. A manual start shall be provided for fans for use during testing and maintenance.

9.5.4 DIESEL GENERATOR ENGINE FUEL OIL SYSTEM

9.5.4.1 Design Bases

9.5.4.1.1 Safety Design Bases

The Diesel Generator Engine Fuel Oil System is designed to provide for storage of a seven-day supply of fuel oil for each diesel generator engine and to supply the fuel oil to the engine, as necessary, to drive the emergency generator. The system is designed to meet the single failure criterion, and to withstand the effects of natural phenomena without the loss of operability. E

All components and piping are located in a Seismic Category I structure (diesel generator building) except for the fuel oil storage tanks and a portion of the piping from the fuel oil storage tanks to the day tank, which is seismically qualified and protected. All essential components and piping are fully protected from floods, tornado missile damage, internal missiles, pipe breaks and whip, jet impingement and interaction with non-seismic systems in the vicinity. I

ADD INSERT 1

9.5.4.2 System Description

The Diesel Generator Engine Fuel Oil System is shown in Figure 9.5.4-1 (Sheets 1 and 2).

9.5.4.2.1 General

A separate and complete fuel oil storage and transfer system is provided for each diesel generator engine. Two underground storage tanks provide fuel oil for each engine, which is sufficient to operate at full load for a period of time no less than seven days plus a margin to allow periodic testing. E

Typically, this requires a combined usable volume of 135,000 gallons. The site-specific SAR shall verify that this is adequate for the diesel generators purchased.

Fuel oil is transferred by the fuel oil transfer pump from the storage tanks to the day tank which is located within retaining walls inside the diesel generator building. The fuel oil transfer pump is also located in the diesel generator building and is typically sized for 75 gpm. The day tank has a sufficient capacity of fuel oil to operate the diesel generator engine in excess of 60 minutes at full load. Typically, this requires a day tank of 900 gallons. The site-specific SAR shall verify that fuel oil transfer pump flow and day tank capacity are adequate for the diesel generators purchased. I

CESSAR-DC Attachment (Refer to page 9.5-51)

INSERT 1:

9.5.1.4.2 Interface Requirements

The Diesel Fuel Storage Structure is an out of scope item which shall be provided by the applicant. A reference fuel oil structure is discussed in the following sections. The licensee shall verify that the following interface requirements are met to ensure adequacy with the System 80+™ Standard Design:

A. The Diesel Fuel Storage Structure shall meet Seismic Category I requirements.

B. The Diesel Fuel Storage Structure shall withstand the effects of the following events:

   1. Natural phenomena, including SSE, floods, tornados, and hurricanes.

   2. Externally and internally generated missiles.

   3. Fire and sabotage.

C. If located within 50 feet of any building containing safety-related equipment, the Diesel Fuel Storage Structures shall have a minimum fire resistance rating of 3 hours.

D. The Diesel Fuel Storage Structure design shall meet requirements set forth in applicable state and local environmental regulations concerning the containment of fuel oil leaks and spills in and around the structure.

E. The Diesel Fuel Storage Structure shall be located within the plant vital protection area and outside the turbine missile path.

F. Means shall be provided to ensure that the stored fuel oil is maintained at a temperature above the fuel oil cloud point (i.e., above the temperature at which the separation of wax becomes visible) such that fuel oil can be supplied and ignited at all times under the most severe environmental conditions expected at the site. For structures housing steel tanks, this can be accomplished by provided unit heaters supplied with Class 1E power to maintain the building at a temperature above the fuel oil cloud point. All buried piping shall be installed below the frost line.

G. For a structure housing steel tanks, the following requirements shall be met:

1. A ventilation system shall be provided to allow personnel access during all modes of plant operation. The ventilation system shall be designed as non-safety, non-seismic except for portions which may interact with safety-related piping or components which shall be designed to Seismic Category II requirements.

2. Design of the Diesel Fuel Storage Structure shall provide adequate accessibility for maintenance, inspection, and testing of components located within the structure.

H. Concrete tanks with steel liners designed in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code may be used. For sites selecting such tanks, adequate protection against missiles and natural phenomena shall be provided for safety-related piping and components external to the tank.

9.5.10 COMPRESSED GAS SYSTEMS

9.5.10.1 Design Bases

9.5.10.1.1 Overall Design Bases

The compressed gas supply systems are provided to supply various gases for equipment and instrumentation cooling, purging, diluting, inerting, and welding. The major items of equipment are the high pressure gas cylinders and pressure regulators to control the pressure and distribution of the various gases used throughout the plant. These compressed gas supply systems are non-safety-related and any failure does not jeopardize the operation of any safety-related components or systems.

ADD INSERT 1 →

9.5.10.2 System Description

The compressed gas systems are arranged into the following separate and isolated subsystems:

A. N_2 System

High pressure Bulk Storage cylinders and High usage LN_2 evaporators.

B. H_2 System

High pressure cylinders. H_2 Leak Detection system required. E

C. O_2 System

High pressure cylinders. All distribution hardware shall be oil free with no combustibles and specifically rated for O_2 service.

D. CO_2 System

High pressure cylinders. CO_2 Leak Detection system required.

E. Argon/Methane

High pressure cylinders for use in radiation detection equipment.

F. Acetylene System

High pressure cylinders for use in welding service applications.

9.5.10 COMPRESSED GAS SYSTEMS

9.5.10.1 Design Bases

9.5.10.1.1 Overall Design Bases

The compressed gas supply systems are provided to supply various gases for equipment and instrumentation cooling, purging, diluting, inerting, and welding. The major items of equipment are the high pressure gas cylinders and pressure regulators to control the pressure and distribution of the various gases used throughout the plant. These compressed gas supply systems are non-safety-related and any failure does not jeopardize the operation of any safety-related components or systems.

ADD INSERT 1 →

9.5.10.2 System Description

The compressed gas systems are arranged into the following separate and isolated subsystems:

A. N_2 System

High pressure Bulk Storage cylinders and High usage LN_2 evaporators.

B. H_2 System

High pressure cylinders. H_2 Leak Detection system required. E

C. O_2 System

High pressure cylinders. All distribution hardware shall be oil free with no combustibles and specifically rated for O_2 service.

D. CO_2 System

High pressure cylinders. CO_2 Leak Detection system required.

E. Argon/Methane

High pressure cylinders for use in radiation detection equipment.

F. Acetylene System

High pressure cylinders for use in welding service applications.

CESSAR-DC Attachment (Refer to page 9.5-78)

INSERT 1:

9.5.10.1.2 Interface Requirements

Bulk storage of high pressure gas cylinders is an out of scope item which shall be provided by the applicant. The licensee shall verify that the following interface requirements are met to ensure adequacy with the System 80+™ Standard Design:

A. Bulk storage of gas cylinders shall be located in areas which contain no safety-related equipment such that rupture of a cylinder does not adversely affect the operability of any safety-related component or system.

B. Storage of flammable and combustible gases shall be located in accordance with applicable requirements of local, state, and Federal regulations and the NFPA Fire Code.

C. Hazardous gases shall not be stored in close proximity to any HVAC system fresh air in-take, the control room, or the compressed air system in-takes.

D. Bulk storage of gas cylinders shall be located away from high traffic areas to the maximum extent pratical and outside the turbine missile path.

E. Storage locations shall provide adequate protection of high pressure gas cylinders from the environment.

10.4.5 CONDENSER CIRCULATING WATER SYSTEM

10.4.5.1 Design Basis

10.4.5.1.1 Overall Design Basis

The Condenser Circulating Water System provides cooling water for the turbine condensers and rejects heat to the atmosphere via the cooling towers. NOTE: Cooling towers are specified for the reference plant; however, other alternate heat sinks can be utilized for specific sites. [Insert A] These shall be discussed in the site-specific SAR supplement. Tower sizing is such that full unit load can be maintained with one tower out of service except during the three hottest summer months of the year. The towers are capable of supporting full reactor thermal output at site 0% exceedance atmospheric conditions. Pump head, piping size, and cooling tower height are optimized based on capital and pumping cost. Pumps are sized such that full load can be maintained with one pump down except during the three hottest summer months of the year.

> Insert B

10.4.5.2 System Description

The condenser circulating water pumps circulate cooling tower basin water through the turbine condensers. Water chemistry is maintained by blowdown and chemical addition. Basin level is maintained with makeup water.

The towers may be natural or mechanical draft for a particular site. (A single natural draft tower may be used where prescribed maintenance can be accomplished during the specified refueling time period.) Valving is provided such that each tower can be isolated during normal power operation. The towers contain no wooden components exposed to circulating water. Tower design allows complete drainage, silt removal, and good access to the fans (if applicable) for inspection and maintenance. Tower icing during subfreezing conditions is prevented by fill bypass system which diverts a portion of the total hot water flow to the basin, louvers to restrict air flow, an ice prevention ring which distributes a portion of the total hot water flow across tower inlet air, and a fill zoning subsystem which diverts water to limited locations in the tower.

The six condenser circulating water pumps are motor-driven, high flow, low head pumps. Valving is provided such that each pump can be isolated during normal operation. Suction screens prevent debris ingestion. Pump material selection is based on compatibility with circulating water chemistry and tested for acceptability. Pump location is such that the available NPSH exceeds the required NPSH by at least 10 feet, and flooding of one pump will not affect any of the other pumps. Seal water for

Attachment to CESSAR-DC Change Package for Section 10.4.5

Insert the following into section 10.4.5 (locations as indicated on page 10.4-12):

Insert A

as long as they also meet the interface requirements given in section 10.4.5.1.2.

Insert B

10.4.5.1.2 Interface Requirements

The Condenser Circulating Water System is an out of scope item which shall be provided by the applicant. A reference circulating water system is discussed in the sections immediately following 10.4.5.2. The licensee shall verify that the interface requirements listed in this section are met to ensure adequacy with the System 80+™ Standard Design.

General requirements for the Condenser Circulating Water System which must be met are as follows:

A. The Condenser Circulating Water System shall provide non-safety cooling water for the main steam turbine condenser over the full range of normal plant operations.

B. The Condenser Circulating Water System shall be an open loop cooling water system with no safe shutdown or accident mitigation functions.

C. The Condenser Circulating Water System shall be designed with a single division. Operational flexibility shall be provided by the use of redundant components within the division.

D. Cooling towers, where employed, shall be capable of supporting full reactor thermal output at site 0% exceedance atmospheric conditions. Each cooling tower shall be provided with two 100% capacity makeup pumps. Cooling tower basin level shall be monitored and used to control makeup flow. Makeup water flow to the cooling tower basin(s) shall be initiated automatically by low basin water level and shall be continued until normal water level is established.

E. Multiple cooling towers and/or cells shall be provided where forced draft cooling towers are used. Forced draft cooling towers/cells shall be sized such that full unit

load can be maintained with one tower out of service except during the three hottest summer months.

F. Multiple motor-driven, high flow, low head circulating water pumps shall be provided to allow for full power operations with one pump shut down throughout the year except the three hottest summer months. The required circulating water system head versus flow requirements shall be determined concurrently with the cooling tower pumping head requirements using hydraulic analyses.

G. The hydraulic grade from the cooling tower basins to the circulating water pumps shall be sufficient to ensure that available NPSH for the circulating water pumps exceeds the required NPSH with margins as follows:

- The minimum available NPSH shall be the smaller of 25% greater than or 10 feet greater than the required NPSH specified by the pump vendor

- The available NPSH shall be calculated at the highest expected operating temperature and flow and at the normal water elevation with all margins. For raw water pumps with traveling screens installed upstream, the available NPSH shall be calculated assuming the screen is 50% clogged.

- For pumps that draw from surface water sources, the licensee shall ensure that the available NPSH exceeds the required NPSH for worst case surface water elevations for all operation, flow, and temperature conditions.

H. Trash racks shall be provided at the intakes of circulating water pumps to prevent debris from entering the circulating water pumps.

I. Condenser Circulating Water piping and components shall meet the requirements of ANSI/ASME B31.1.

J. Means shall be provided to prevent or detect and control flooding of safety related areas so that the intended safety functions of a system or component will not be precluded due to leakage from the Condenser Circulating Water System. Malfunction or failure of a component or piping of the system shall not have unacceptable adverse effects on the functional performance capabilities of safety related systems or components.

K. Flooding protection shall be provided to ensure that large leaks from circulating water piping do not result in the loss of all circulating water pumps.

L. Condenser Circulating Water System shall be designed to minimize the potential for water hammer by providing for adequate filling and high point venting. Valve opening/closing times shall be selected to minimize water hammer effects.

The following chemistry and metallurgy requirements shall be met:

A. Water treatment for the Condenser Circulating Water System shall be based on site makeup water chemistry, blowdown requirements, environmental regulations, and system materials.

B. Provisions shall be provided for water quality sampling as recommended in EPRI report CS-2276, Design and Operating Guidelines Manual for Cooling Water Treatment. As a minimum, sample collection points shall be provided and located as indicated in the report.

C. The wetted surfaces of the Condenser Circulating Water System shall be of materials compatible with circulating water chemistry.

D. The circulating water system shall be designed giving full consideration to the need for biogrowth control, pH control, and scale buildup.

E. Blowdown flow rates shall be determined according to Chapter 5, Subsections 4 and 5 of EPRI report CS-2276. Blowdown flow shall be adjusted manually as required to maintain desired water chemistry.

F. Acid shall be injected in the cooling tower inlet header.

G. Biocide and scale inhibitor shall be injected into cooling tower basins.

H. Use of copper-based materials shall be prohibited.

The following operability and maintainability requirements shall be met:

A. Accessibility for maintenance during normal operating conditions shall be considered in the design and arrangement of the Condenser Circulating Water System.

B. Provisions shall be provided to drain system piping, pumps, and condenser waterboxes within four hours.

C. Means shall be provided for entering and cleaning circulating water piping and condenser waterboxes within one eight-hour shift.

D. Condenser Circulating Water System piping shall permit isolation and draining of one condenser tube bundle within four hours to allow for condenser tube plugging during normal operation.

E. Piping arrangement and isolation valve placement shall permit circulating water pump repair and/or replacement during full power operation.

The following instrumentation and controls requirements shall be met:

A. Local temperature gauges and pressure test points shall be provided for temperature and pressure determination.

B. Pressure shall be measured at each circulating water pump suction and discharge.

C. Differential pressure shall be monitored across each pump.

D. Temperature shall be measured at the condenser inlet and outlet.

E. The circulating water shall be monitored for pH and conductivity.

F. To measure individual circulating pump flow and total flow to the main condenser, access ports shall be provided to allow temporary flow meters to be installed in the main circulating water piping.

G. Valving and controls shall be provided such that each cooling tower can be isolated during normal power operation

H. Valving and controls shall be provided such that each of the condenser circulating water pumps can be isolated during normal operation.

I. Valving and controls shall be provided such that each of the condenser waterbox sections can be isolated and the unit operated at partial load.

J. An interlock shall be provided to prohibit a condenser circulating water pump from starting should it be in reverse rotation or its discharge valve open.

A. Plant systems variables.

B. In-plant radiological variables.

C. Meteorological information.

D. Offsite radiological information.

Trend information display and time-history display capability is provided in the TSC to give the TSC personnel a dynamic view of the plant status during abnormal operating conditions. The TSC displays are designed so that callup, manipulation, and presentation of data is easily performed. The TSC data display format presents information that is easily understood by the TSC personnel performing analyses.

The Data Processing System (DPS) data set associated with plant safety status is displayed in the TSC. This duplication will improve the exchange of information between the control room and the TSC. The total TSC data system reliability is designed to achieve an operational unavailability goal of 0.01 during all plant conditions above cold shutdown. Operational unavailability is defined as DOWN TIME divided by OPERATING TIME.

13.3.3.1.9 Records Availability

The TSC includes provisions for a complete and up-to-date repository of plant records and procedures at the disposal of TSC personnel to aid in their technical analysis and evaluation of emergency conditions. E

13.3.3.2 Emergency Operations Facility

> Insert A

13.3.3.2.1 Summary Description

The Emergency Operations Facility (EOF) is a nearsite support facility for the management of overall licensee emergency response (including coordination with Federal, State, and local officials), coordination of radiological and environmental assessments, and determination of recommended public protective actions. The EOF has appropriate technical data displays and plant records as discussed in the site-specific SAR.

When the EOF is activated, the functions of providing overall emergency response management, monitoring and assessing radiological effluent and the environs, making offsite dose projections, providing recommendations to State and local officials, and coordinating with Federal officials shift to the EOF in accordance with site procedures. ~~See Table 13.3.3-1 for~~

Insert B

Attachment to CESSAR-DC Change Package for Section 13.3.3.2

Insert A

Insert the following into section 13.3.3.2, Emergency Operations Facility, as indicated on page 13.3-7:

The Emergency Operations Facility (EOF) is an out of scope item which shall be provided by the license applicant and is site specific. The following sections contain a description of a typical EOF and interface requirements which must be met to ensure adequacy with the System 80+™ Standard Design. The word "shall" is used to distinguish interface requirements that are mandatory from text that is purely descriptive.

Insert B

Insert the following into section 13.3.3.2, Emergency Operations Facility, as indicated on page 13.3-7:

Transfer of emergency response functions from the control room to the EOF under the various emergency classes shall be accomplished as outlined in Table 13.3.3-1. The EOF shall be designed to the habitability criteria given in Table 13.3.3-2.

~~an outline of the transfer of emergency response functions from the control room to the EOF under the various emergency classes. The habitability criteria for the EOF are given in Table 13.3.3-2.~~

13.3.3.2.2 Functions

The EOF is a licensee controlled and operated offsite support center. The EOF ~~has~~ shall have facilities for:

A. Management of overall licensee emergency response.

B. Coordination of radiological and environmental assessment.

C. Determination of recommended public protective actions.

D. Coordination of emergency response activities with Federal, State, and local agencies.

When the EOF is activated, it is staffed by licensee, Federal, State, local and other emergency personnel designated by the emergency plan to perform these functions. It is the location where the licensee provides overall management of licensee resources in response to an emergency having actual or potential environmental consequences.

Facilities ~~are~~ shall be provided in the EOF for the acquisition, display, and evaluation of all radiological, meteorological, and plant system data pertinent to determine offsite protective measures. These facilities are used to evaluate the magnitude and effects of actual or potential radioactive releases from the plant and to determine offsite dose projections. Facilities used in performing essential EOF functions ~~are~~ shall be located within the EOF complex; however, supplemental calculations and analytical support of EOF evaluations may be provided from facilities outside the EOF. The licensee also may use the EOF as the post-accident recovery management center. E

The EOF allows the licensee to coordinate emergency response activities with local, State, and Federal agencies, including the NRC. Licensee personnel in the EOF use the evaluations of offsite effects to make protective action recommendations for the public to State and local emergency response agencies.

State and local agencies are responsible for implementing emergency response actions involving the general public. The State and local agencies may operate from the EOF or from their own control centers at other locations, dependent upon the site-specific provisions of the emergency plan at each plant.

~~Reference the site-specific SAR for additional details concerning the EOF.~~

13.3.3.2.3 Staffing and Training

The licensee shall ~~site-specific SAR~~ address~~es~~ all staffing and training issues.

13.3.3.2.4 Size

The EOF building or building complex shall be ~~is~~ large enough to provide the following:

A. Working space for the personnel assigned to the EOF as specified in the licensee's emergency plan, including State and local agency personnel, at the maximum level of occupancy without crowding (minimum size of working space provided is approximately 75 sq ft/person).

   The EOF working space is sized for at least 35 persons, including 25 persons designated by the licensee, 9 persons from NRC, and 1 person from FEMA. This minimum size is increased if the maximum staffing levels specified in the licensee's emergency plan, including representatives from State and local agencies, exceed 25 persons.

B. Space for EOF data system equipment needed to transmit data to other locations.

C. Sufficient space to perform repair, maintenance, and service of equipment, displays, and instrumentation.

D. Space for ready access to communications equipment by all EOF personnel who need communications capabilities to perform their functions. E

E. Space for ready access to functional displays of EOF data.

F. Space for storage of plant records and historical data or space for means to readily acquire and display those records.

G. Separate office space to accommodate at least five NRC personnel during periods that the EOF is activated for emergencies.

13.3.3.2.5 Radiological Monitoring

To ensure adequate radiological protection of EOF personnel, radiation monitoring* shall be ~~is~~ provided in the EOF. These systems shall continuously indicate radiation dose rates and airborne

radioactivity concentrations inside the EOF while shall it is in use during an emergency. These monitoring systems shall include local alarms with trip levels set to provide early warning to EOF personnel of adverse conditions that may affect the habitability of the EOF. Detectors to distinguish the presence or absence of radioiodines at concentrations as low as 10^{-7} microcuries/cc shall be provided.

13.3.3.2.6 Communications

The EOF ~~has~~ shall have reliable voice communications facilities to the TSC, the control room, NRC, and State and local emergency operations centers. The normal communication path between the EOF and the control room ~~is~~ shall be through the TSC. The primary functions of the EOF voice communications facilities are:

A. EOF management communications with the designated senior licensee manager in charge of the TSC.

B. Communications to manage licensee emergency response resources.

C. Communications to coordinate radiological monitoring.

D. Communications to coordinate offsite emergency response activities.

E. Communications to disseminate information and recommended protective actions to responsible government agencies.

The EOF voice communications facilities shall include reliable primary and backup means of communication. Voice communications ~~will~~ shall include private telephones, commercial telephones, radio networks, and intercommunications systems as appropriate to accomplish the EOF functions during emergency conditions. The licensee shall provide~~s~~ a means for EOF telephone access to commercial telephone common-carrier services that bypasses any local telephone switching facilities that may be susceptible to loss of power during emergencies. The licensee shall ensure~~s~~ that spare commercial telephone lines to the plant are available for use by the EOF during emergencies.

The EOF voice communications equipment shall include~~s~~:

A. Hotline telephone (located in the NRC office space) on the NRC Emergency Notification System (ENS) to the NRC Operations Center.

B. Dedicated telephone (located in the NRC office space) on the NRC Health Physics Network (HPN).

C. Dedicated telephones for management communications with direct access to the TSC and the control room.

D. Dial telephones reserved for EOF use to provide access to onsite and offsite locations.

E. Intercommunications systems between work areas of the EOF, if needed, for EOF functional performance or if the EOF is comprised of separate functional areas or separate buildings.

F. Radio communications to licensees mobile monitoring teams.

G. Communications to State and local operations centers.

H. Communications to facilities outside the EOF used to provide supplemental support for EOF evaluations.

The EOF communication system also includes designated telephones (in addition to the ENS and HPN telephones) for use by NRC personnel.

Facsimile transmission capability between the EOF, the TSC, and the NRC Operations Center is provided.

13.3.3.2.7 Technical Data and Data System

The EOF technical data system receives, stores, processes and displays information sufficient to perform assessments of the actual and potential onsite and offsite environmental consequences of an emergency condition. Data providing information on the general condition of the plant also is available for display in the EOF for utility resource management.

The EOF data set includes radiological, meteorological, and other environmental data as needed to:

A. Assess environmental conditions.

B. Coordinate radiological monitoring activities.

C. Recommend implementation of offsite emergency plans.

The EOF data system equipment performs these functions independently from actions in the control room and without degrading or interfering with control room and plant functions.

EOF instrumentation, data system equipment, and power supplies shall ~~are~~ not be safety grade. Similarly, control room and other plant functions do not degrade or interfere with the EOF functions.

The sensor data of the Type A, B, C, D, and E variables specified in Regulatory Guide 1.97, Revision 3 and of those meteorological variables specified in proposed Revision 1 to Regulatory Guide 1.23, "Meteorological Measurements Programs in Support of Nuclear Power Plants," and in NUREG-0654, Revision 1, Appendix 2, shall be ~~are~~ available for display in the EOF. All data that is available for display in the TSC, including data transmitted from the plant to NRC, shall be ~~is~~ part of the EOF data set.

The accuracy of data in the EOF shall be ~~is~~ consistent with the data accuracy needed to perform the EOF functions. The accuracy of data displays in the EOF shall be ~~is~~ equivalent to that for the data displayed in the TSC. The time resolution of data requisition shall be ~~is~~ sufficient to provide data without loss of information during transient conditions. The time resolution required for each sensor signal depends on the potential transient behavior of the variable being measured. The EOF data displays of Regulatory Guide 1.97 variables meet the criteria for EOF data but are not required to meet the design and qualification criteria in Regulatory Guide 1.97 for display of those variables in the control room.

Data storage capability shall be ~~is~~ provided for the EOF data set. At least 2 hours of pre-event data and 12 hours of post-event data shall be ~~is~~ recorded. The sample frequency shall be ~~is~~ chosen to be consistent with the use of the data. Capacity to record at least two weeks of additional post-event data with reduced time resolution shall be ~~is~~ provided. Archival data storage and the capability to transfer data between active memory and archival data storage without interrupting EOF data acquisition and displays shall be ~~are~~ provided for all EOF data. Data display devices shall be ~~are~~ provided in the EOF to allow all EOF personnel to perform their assigned tasks with unhindered access to alphanumeric and/or graphical representations of: | E

A. Plant systems variables.

B. In-plant radiological variables.

C. Meteorological information.

D. Offsite radiological information.

Trend-information display and time-history display capability shall be ~~is~~ provided in the EOF to give EOF personnel a dynamic view of plant systems, radiological status, and environmental status during an emergency. The EOF displays shall be ~~are~~ designed so that callup, manipulation, and presentation of data is easily performed. The displays shall be ~~are~~ partitioned to facilitate the retrieval of information by the different functional groups in the EOF.

The DPS data set associated with plant safety status shall be ~~is~~ displayed in the EOF. This duplication provides licensee management and NRC representatives information about the current reactor systems status and will facilitate communications among the control room, TSC, and EOF. The total EOF data system shall be ~~is~~ designed to achieve an operational unavailability goal of 0.01 during all plant operating conditions above cold shutdown. Operational unavailability is defined as DOWN TIME divided by OPERATING TIME. E

13.3.3.2.8 Records Availability

The EOF shall have ~~has~~ ready access to up-to-date plant records, procedures, and emergency plans needed to exercise overall management of licensee emergency response resources.

13.3.3.4 Add section from attached pages.

13.3.3.4 <u>Laboratory Facilities</u>

13.3.3.4.1 **Summary Description**

The Laboratory Facilities are out of scope items which shall be provided by the license applicant. Consistent with the requirements stated in NUREG-0654, II.H.9 and NUREG-0737, II.B.3, the System 80' Standard Plant design makes provisions for inclusion of both hot and conventional Laboratory Facilities. Hot facilities are currently located in the Nuclear Annex; additional hot facilities should be located in a Radwaste Building. Space for a large conventional laboratory should be provided in the Station Services Building. Locations for other, smaller lab facilities are allocated at various places throughout the plant. The facilities themselves shall be designed according to particular owner preference, but they shall support efforts to monitor plant systems and environmental samples for compliance with technical specifications. Complete descriptions of the facilities shall be provided by the licensee.

The following sections contain interface requirements which must be met to ensure adequacy with the System 80+™ Standard Design. The word "shall" is used to distinguish interface requirements that are mandatory from text that is purely descriptive.

13.3.3.4.2 **Function**

The laboratory facilities shall provide for the following primary functions:

- to provide plant support services for routine analyses required for personnel protection, surveys, and related health physics functions.
- to provide normal and post-accident cold chemical analyses on required plant chemistry samples.
- to provide routine and post-accident counting on all plant radioactivity samples.
- to provide grab sample analyses used as a check on the accuracy of the continuous on-line process monitoring instrumentation.
- to provide a facility to store and secure radioactive calibration and check sources and instruments undergoing calibration, maintenance, or repair.

13.3.4.3 **Location**

The hot laboratory facilities are currently shown to be located in the Nuclear Annex, and should be included in the Radwaste Building

design. Space for a large conventional laboratory should be provided in the station service building. Radiation counting rooms and instrument calibration areas are located at elevation 115+6 in the Nuclear Annex Outage/Maintenance Area. Locations for other, smaller lab facilities are provided at various places throughout the plant. Locations for these facilities are provided to assure that all critical onsite sampling capabilities (see Regulatory Guide 1.97) can be performed to the required accuracy at the plant site, and such that ALWR normal and post-accident sampling requirements are met.

13.3.3.4.4 **Features**

In order to meet the intent of the ALWR Requirements Document and the aforementioned government regulations, the laboratory facilities shall be designed with the following features:

- adequate space for expansion to accommodate changes in available technology and equipment.

- radiation counting rooms, instrument calibration areas and checkout areas located in low radiation zones and provided with shielding to reduce background radiation "noise."

- secured access to radioactive calibration and check sources.

Liquid wastes from laboratory drains shall be processed by the Liquid Waste Management Systems (LWMS) described in Section 11.2. Types of waste shall be segregated at the point of origin and routed to the appropriate LWMS subsystem, e.g., chemical drains accept non-detergent cleaning solutions, chemical sample solutions, etc., whereas liquid waste from reactor grade lab drains would be routed to the Equipment Drain Tank. Due to the cost and complexity of waste disposal considerations the generation of mixed waste shall be avoided whenever possible.

Sampling methods and instrumentation shall be described in plant operations manuals provided by the licensee. General maintenance shall be described in other licensee plant operating documents.

13.3.3.6 Onsite Decontamination Facilities

13.3.3.6.1 Summary Description

The Onsite Decontamination Facilities (ODF), located in the Nuclear Annex (el. 91+9) and in the Radwaste Facility, are out of scope items which shall be provided by the license applicant. These facilities shall be provided to remove or reduce radioactive contaminants from plant equipment, protective clothing, and personnel. These facilities shall be designed according to particular owner preference, but shall be supplied by the major decontamination equipment, including various spray nozzle assemblies, chemical and/or abrasive supply systems, collection and storage tanks, high pressure pumps, filters, demineralizers and piping connections to waste processors. Complete descriptions of the facilities shall be provided by the licensee.

The following sections contain a description of a typical ODF and interface requirements which must be met to ensure adequacy with the System 80+™ Standard Design. The word "shall" is used to distinguish interface requirements that are mandatory from text that is purely descriptive.

The ODF shall include the hot laundry facilities, hose washdown stations, personnel decontamination fixtures, hot shower, radiation detection equipment and personnel decontamination supplies. Also equipment necessary to decontaminate small tools and instruments as well as larger tools and pieces of equipment shall be provided.

These facilities shall be designed to meet the requirements as stated in 10 CFR 50 Appendix E, IV.E.3; and 10 CFR 50.47 (b) (8). The role(s) of the Onsite Decontamination Facilities in the event of a plant emergency shall be described in the emergency planning documents provided by the licensee.

13.3.3.6.2 Function

The Onsite Decontamination Facilities shall provide for the following functions:

- To facilitate equipment disposal by reducing contamination and radiation levels to releasable limits.
- To facilitate equipment repair by reducing contamination and radiation levels consistent with ALARA guidelines.
- To provide location and supplies for personnel decontamination.

13.3.3.6.3 Location

Onsite Decontamination Facilities shall be located as follows:

- Personnel Decontamination Facilities - Personnel

decontamination areas shall be located in the Nuclear Annex. There shall be facilities at both the upper and lower personnel access portals to the containment.

- Equipment Decontamination Facilities - Equipment decontamination facilities shall be located in the Nuclear Annex (el. 91+9) and the Radwaste Facility (RWF). The hot laundry facilities shall be located in the RWF.

13.3.3.6.4 **Features**

The Onsite Decontamination Facilities shall be designed in full compliance with the intent of 10 CFR 50, Appendix E, IV.E.3 and 10 CFR 50.47 and the guiding principles of ALARA considerations. As such, the following shall be included in the design of the facilities:

- Sinks, workbenches, and decontamination supply cabinets
- Alarmed radiation monitors near tanks, filters, demineralizers, etc. which are used in the decontamination processes
- Clean, adequate areas and provisions for staging, decontamination and checkout for applying and removing protective materials

Liquid wastes shall be processed by the Liquid Waste Management Systems (LWMS) described in Section 11.2. Types of waste shall be segregated at the point of origin and routed to the appropriate LWMS subsystem, e.g., chemical drains accept non-detergent cleaning solutions, etc., whereas liquid waste from personnel decontamination would be routed to the detergent drains. Due to the cost and complexity of waste disposal considerations, the generation of mixed waste shall be avoided whenever possible.

13.3.3.6.5 **Decontamination Methods and Procedures**

Selection of decontamination methods to be employed in the Onsite Decontamination Facilities at a specific generating plant is the responsibility of the individual licensee. Some of the decontamination requirements may be met by using portable of otherwise transportable facilities at the discretion of the individual licensee. Description of those methods and rationale for their selection shall be provided by the licensee.

Decontamination and radwaste control procedures are considered to be a fundamental part of the plant operations documentation. The licensee plant operations documents shall contain these detailed procedures.

All decontamination methods and procedures should be consistent with accepted industry practice, and shall meet the intent of the referenced section of the Code of Federal Regulations.

13.6 INDUSTRIAL SECURITY

Information concerning the site operator's industrial security is within the site operator's scope and will be presented by the site operator in a separate document. E

INSERT 1

Insert 1

13.6.1 INTERFACE REQUIREMENTS

Site security is an out of scope item which shall be provided by the applicant. The licensee (applicant) shall verify that the following interface requirements are met to ensure adequacy with the System and Standard Design.

A. The design of the physical security system shall be in conformance with 10 CFR Part 73, §73.55 including:

1. 10 CFR Part 73, §73.55 in its entirety and part 73 Appendices B and C
2. 10 CFR Part 25 and 10 CFR Part 95
3. Regulatory Guide 5.44
4. NUREG-0674
5. ANSI N18.17, Paragraph 4.3 Employee Screening
6. 10 CFR Part 50, §50.70(b)(3)
7. Regulatory Guide 5.12
8. Regulatory Guide 5.20

B. A comprehensive listing and evaluation of all vital equipment, vital piping, vital power sources, vital water storage facilities, etc., shall be developed. This Listing and evaluation should include all support functions vital to equipment operation (e.g. diesel generation cooling water, D/G fuel, HVAC considerations for vital electrical equipment, cooling water for component cooling, etc.). This listing and evaluation shall be controlled in accordance with current security safeguards information (SGI) procedures and guidelines.

C. The design of the security system shall include an evaluation of its impact on plant operation, testing, and maintenance. This evaluation shall assure that the security restrictions for access to equipment and plant regions are compatible with required operator actions during all operating and emergency modes of operation (i.e., loss of off-site power, access for fire protection, health physics, maintenance, testing and local operator).

D. Security system facilities and equipment (e.g. PAP, CAP, security computer(s), security communications (fixed and portable) equipment, security power system, etc.) shall be located within the protected area to assure that the security force can respond to security events.

E. The security communications subsystem shall meet the following requirements:

- Each on-site security officer, watchman, or armed response individual shall be provided with continuous communications with an individual in each continuously manned alarm station (i.e., CAS, SAS, PAP). This may be accomplished by using multi-frequency radio or microwave transmitted two-way voice communications.
- Communications shall be provided between the main plant control room and nuclear plant CAS and SAS (i.e., dedicated telephone service that does not have any terminations outside the protected area boundary, radio, etc.).