3.8 DESIGN OF CATEGORY I STRUCTURES

This section of the U.S. EPR FSAR is incorporated by reference with the departures and supplements as described in the following sections.

3.8.1 CONCRETE CONTAINMENT

No departures or supplements.

3.8.1.1 Description of the Containment

No departures or supplements.

3.8.1.2 Applicable Codes, Standards, and Specifications

No departures or supplements.

3.8.1.3 Loads and Load Combinations

The U.S. EPR FSAR includes the following COL Item in Section 3.8.1.3:

> A COL applicant that references the U.S. EPR design certification will confirm that site-specific loads lie within the standard plant design envelope for the RCB, or perform additional analyses to verify structural adequacy.

This COL Item is addressed as follows:

{The RCB design for CCNPP Unit 3 is the standard RCB design as described in the U.S. EPR FSAR without departures. Site-specific loads are confirmed to lie within the standard U.S. EPR design certification envelope. Site-specific seismic, RSB, and buoyancy conditions are addressed in Sections 3.7.2, 3.8.4, and 3.8.5, respectively.}

3.8.1.4 Design and Analysis Procedures

No departures or supplements.

3.8.1.5 Structural Acceptance Criteria

No departures or supplements.

3.8.1.6 Materials, Quality Control, and Special Construction Techniques

No departures or supplements.

3.8.1.6.1 Concrete Materials

No departures or supplements.

3.8.1.6.2 Reinforcing Steel and Splice Materials

No departures or supplements.

3.8.1.6.3 Tendon System Materials

No departures or supplements.

3.8.1.6.4 Liner Plate System and Penetration Sleeve Materials

No departures or supplements.

3.8.1.6.5 Steel Embedments

No departures or supplements.

3.8.1.6.6 Corrosion Retarding Compounds

No departures or supplements.

3.8.1.6.7 Quality Control

The QA program for this section is discussed in Section 3.1.1.1.1.

3.8.1.6.8 Special Construction Techniques

No departures or supplements.

3.8.1.7 Testing and Inservice Inspection Requirements

No departures or supplements.

3.8.2 STEEL CONTAINMENT

No departures or supplements.

3.8.3 CONCRETE AND STEEL INTERNAL STRUCTURES OF CONCRETE CONTAINMENT

3.8.3.1 Description of the Internal Structures

No departures or supplements.

3.8.3.2 Applicable Codes, Standards, and Specifications

No departures or supplements.

3.8.3.3 Loads and Load Combinations

The U.S. EPR FSAR includes the following COL Item in Section 3.8.3.3:

> A COL applicant that references the U.S. EPR design certification will confirm that site-specific loads lie within the standard design envelope for RB internal structures, or perform additional analyses to verify structural adequacy.

This COL Item is addressed as follows:

{The Reactor Building (RB) (i.e., the Reactor Containment Building (RCB)) internal structural design is the standard design as described in the U.S. EPR FSAR without departures. Site-specific loads are confirmed to lie within the standard U.S. EPR design certification envelope. Relative site-specific conditions are addressed in Section 3.7.2.}

3.8.3.4 Design and Analysis Procedures

No departures or supplements.

3.8.3.5 Structural Acceptance Criteria

No departures or supplements.

3.8.3.6 Materials, Quality Control, and Special Construction Techniques

No departures or supplements.

3.8.3.7 Testing and Inservice Inspection Requirements

No departures or supplements.

3.8.4 OTHER SEISMIC CATEGORY I STRUCTURES

3.8.4.1 Description of the Structures

The U.S. EPR FSAR includes the following COL Items in Section 3.8.4:

> A COL applicant that references the U.S. EPR design certification will describe any differences between the standard plant layout and design of Seismic Category I structures required for site-specific conditions.
>
> A COL applicant that references the U.S. EPR design certification will address site-specific Seismic Category I structures that are not described in this section.

The COL Items are addressed as follows:

{The standard plant layout and design of other Seismic Category I Structures is as described in the U.S. EPR FSAR without departures.

The site-specific Seismic Category I structures at CCNPP Unit 3 are:

- Buried Conduit and Duct banks (Section 3.8.4.1.8).
- Buried Pipe and Pipe Ducts (Section 3.8.4.1.9).
- Forebay~~,~~ and UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ (Section 3.8.4.1.11).}

3.8.4.1.1 Reactor Shield Building and Annulus

No departures or supplements.

3.8.4.1.2 Fuel Building

No departures or supplements.

3.8.4.1.3 Safeguard Buildings

No departures or supplements.

3.8.4.1.4 Emergency Power Generating Buildings

No departures or supplements.

3.8.4.1.5 Essential Service Water Buildings

No departures or supplements.

3.8.4.1.6 Distribution System Supports

No departures or supplements.

3.8.4.1.7 Platforms and Miscellaneous Structures

No departures or supplements.

3.8.4.1.8 Buried Conduit and Duct Banks

The U.S. EPR FSAR includes the following COL Item and conceptual design information in Section 3.8.4.1.8:

> A COL applicant that references the U.S. EPR design certification will provide a description of Seismic Category I buried conduit and duct banks.
>
> [[Buried conduits are steel while conduits in encased duct banks may be poly-vinyl-chloride (PVC) or steel. Duct banks may be directly buried in the soil; encased in lean concrete, concrete, or reinforced concrete. Concrete or reinforced concrete encased duct banks will be used in heavy haul zones, under roadway crossings, or where seismic effects dictate the requirement. Encasement in lean concrete may be used in areas not subject to trenching or passage of heavy haul equipment, or where seismic effects on the conduit are not significant.]]

{This COL Item is addressed as follows, and the conceptual design information is replaced with site-specific information for CCNPP Unit 3:

Figure 3.8-1 provides an overall site plan of Seismic Category I buried duct banks. The buried duct banks run between the Nuclear Island (NI) and the Intake Structures along the utility corridor. Figure 3.8-2 provides a detail plan of Seismic Category I buried duct banks in the vicinity of the NI. No Seismic Category I buried conduits exist for CCNPP Unit 3.

Seismic Category I buried electrical duct banks traverse from:

- ~~The UHS Makeup Water Intake Structure to the UHS Electrical Building.~~
- Each Essential Service Water Building to the UHS ~~Electrical Building,~~Makeup Water Intake Structure including underneath the main heavy haul road.
- The Safeguards Buildings to the four Essential Service Water Buildings and both Emergency Power Generating Buildings.

~~For the first item, the UHS Makeup Water Intake Structure and UHS Electrical Building are discrete structures housing mechanical and electrical equipment, respectively. Buried electrical duct banks traverse the two structures to provide power to the equipment, including the UHS Makeup Water pumps.~~

Buried electrical duct banks consist of polyvinyl chloride (PVC) conduit encased in reinforced concrete. In addition to its structural function, the reinforced concrete facilitates maintenance of conduit spacing / separation requirements and protects the conduit.

Where buried safety-related electrical duct banks and the UHS makeup water pipes traversing between the UHS Makeup Water Intake Structure and the four ESWBs need to cross each other, the buried electrical duct banks are located below the pipes to facilitate future pipe maintenance. To facilitate cable pulling and routing, manholes are provided at strategic locations.

In areas where the buried electrical duct banks are below the groundwater table, the joints between buried duct banks and manholes have PVC water stops to prevent water intrusion.

Buried electrical duct banks have drain pipes at the bottom, and are constructed such that they slope from manhole to manhole. The low point manholes have a sump with a pump for collecting and disposing water.

Waterproofing membrane, as described in Section 3.8.4.6.1, is used, as necessary, to protect buried electrical duct banks from the corrosive effects of low-pH groundwater from the Surficial aquifer in the powerblock area.}

3.8.4.1.9 Buried Pipe and Pipe Ducts

The U.S. EPR FSAR includes the following COL Item in Section 3.8.4.1.9:

> A COL applicant that references the U.S. EPR design certification will provide a description of Seismic Category I buried pipe and pipe ducts.

This COL Item is addressed as follows:

{Figure 3.8-3 provides an overall site plan of Seismic Category I buried pipe. Pipes run beneath the final site grade. Buried pipe ducts are not used for CCNPP Unit 3. Two buried CCNPP Unit 3 Intake Pipes run from the CCNPP Unit 3 Inlet Area to the Unit 3 Forebay (See Figure 2.4-51). Four UHS Makeup Water pipes emanate from the UHS Makeup Water Intake Structure and terminate at the ESWBs. These pipes run within the utility corridor, shown in Figure 3.8.3, and pass under the main Haul Road which runs in the East-West direction adjacent to the North side of the CCNPP Unit 3 powerblock.

Figure 3.8-4 provides a detail plan of Seismic Category I buried ESW pipe in the vicinity of the NI. As illustrated in the figure, the Seismic Category I buried ESW piping consists of:

- Large diameter supply and return pipes between the Safeguards Buildings and the ESWBs.
- Large diameter supply and return pipes from the EPGBs which tie in directly to the aforementioned pipes.

Fire Protection pipe traverses from the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ to the vicinity of the NI, where a loop is provided to all buildings. In accordance with Section 3.2.1, Fire Protection piping to Seismic Category I structures that is classified as: 1) Seismic Category II is designed to maintain its pressure boundary after an SSE event; and 2) Seismic Category II-SSE is designed to remain functional during and following an SSE event.

The buried piping is directly buried in the soil (i.e., without concrete encasement) unless detailed analysis indicates that additional protection is required. The depth of the soil cover is generally sufficient to provide protection against frost (top surface of the pipe is below the site-specific frost depth), surcharge effects, and tornado missiles. Structural fill is used as

bedding material underneath the pipe. As an alternate, lean concrete may be used. Additionally, soil surrounding the pipe is compacted structural fill.}

3.8.4.1.10 Masonry Walls

{No departures or supplements.}

3.8.4.1.11 {Forebay~~,~~ and UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~}

{This section is added as a supplement to U.S. EPR FSAR Section 3.8.4.1.

The Seismic Category I Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ are reinforced concrete structures situated along the western shoreline of the Chesapeake Bay. As illustrated in Figure 9.2-4, the Forebay is connected to the CWS Makeup Water Intake Structure (Seismic Category II) and the Intake Pipes (Seismic Category I) from the north (plant reference) and the UHS Makeup Water Intake Structure from the south. The two intake pipes transport water (under gravitational head) from the Chesapeake Bay to the Forebay, which supplies water to both the CWS Makeup Water Intake Structure and the UHS Makeup Water Intake Structure. The UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ houses components associated with the UHS Makeup Water System, which provides makeup water to the Essential Service Water Cooling Tower basins for extended cooling that starts 72 hours after a design basis accident. Figure 3.8-1 shows the position of the Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ relative to the NI.

As illustrated in Figures 9.2-4, 9.2-5, and 9.2-6, the Forebay is a below-grade open top reinforced concrete water basin, with overall dimensions of 109 ft (33.2 m) long by 89 ft (27.1 m) wide by 39 ft (11.9 m) deep, including a 5 ft (1.5 m) thick basemat. Inside dimensions of the Forebay are 100 ft (30.5 m) long by 80 ft (24.4 m) wide, with 4.5 ft (1.4 m) thick walls. The Forebay is embedded approximately 37.5 ft (11.4 m) below the nominal grade elevation of 10 ft (3.0 m), with the top of the walls at elevation 11.5 ft (3.5 m) and the top of the basemat at elevation -22.5 ft (-6.9 m).

The UHS Makeup Water Intake Structure is a reinforced concrete structure ~~75~~93 ft (~~22.9~~28.3 m) long by ~~60~~58 ft (~~18.3~~17.7 m) wide by ~~54~~58 ft (~~16.5~~17.7 m) high, including a 5 ft (1.5 m) thick basemat that is integrally connected with the Forebay basemat. The structure consists of a below-grade water basin 59 ft (18.0 m) long by ~~60~~58 ft (~~18.3~~17.7 m) wide by 39 ft (11.9 m) deep situated approximately 37.5 ft (11.4 m) below the nominal grade elevation of 10 ft (3.0 m) and an above-grade pump house structure situated partially above the water basin and partially over structural fill.

The three main elevations of the UHS Makeup Water Intake Structure are:

- Elevation -22.5 ft (-6.9 m): Bottom of the water basin and top of the basemat. There are four independent pump bays in the water basin, separated by reinforced concrete walls.
- Elevation 11.5 ft (3.5 m): Top of the operating deck and pump house floor, which includes four make-up water pump rooms and four traveling screen rooms separated by reinforced concrete walls. Each of the four make-up water pump rooms contains a air handling unit. The pump rooms are water-tight to protect against hurricane floods.

- Elevation 26.5 ft (8.1 m): Top of the floor containing four UHS makeup water transformer rooms, each of which houses a transformer, and four air cooled condenser rooms, each of which houses an air cooled condenser.

- Elevation ~~26.5~~41.5 ft (~~8.1~~12.6 m): Top of the nominally 2 ft (0.6 m) thick, reinforced concrete roof slab.~~Water-tight equipment hatches are provided for equipment maintenance.~~

Functional components within the water basin include UHS Makeup Water pumps, UHS Makeup Water Screen Wash Pumps, intake bar screens and traveling screens to preclude debris intake, and stop logs provision to facilitate maintenance.

Exterior walls for the pump house are 2 ft (0.6 m) thick, to withstand tornado missile impact and the wave pressures of the Probable Maximum Hurricane (PMH) extreme environmental event and the Standard Project Hurricane (SPH) severe environmental event. Interior walls that are subject only to minor lateral loads are one ft (0.3 m) thick. The ~~divider and~~ exterior walls of the basin of the UHS Makeup Water Intake Structure are all 4 ft (1.2 m) thick, while the divider walls in the North-South direction are 3.3 ft (1.0 m) thick. A 2.5 ft (0.8 m) thick, inclined partial-height wall faces the Forebay.

~~The Seismic Category I UHS Electrical Building is 33 ft (10 m) wide by 74 ft (22 m) long by 21 ft (6.4 m) deep including a 5 ft (1.5 m) thick basemat. It is constructed entirely of reinforced concrete and contains four electrical rooms, each of which houses: a transformer, a motor control center, and associated cooling equipment. To mitigate the effects of the PMH wave pressures, the UHS Electrical Building is almost entirely embedded in the surrounding soil, with its roof situated at Elevation 10.5 ft (3.2 m), or 6 in (15 cm) above grade, and top of the basemat situated at Elevation -5.5 ft (-1.7 m). A 10 ft (3.0 m) high reinforced concrete enclosure above the roof protects the access stairs.~~

~~The UHS Electrical Building has 2 ft (0.6 m) thick exterior walls, interior walls, and roof slab. The walls are sized to provide sufficient dead load to oppose the significant buoyant forces during the PMH and SPH events. The roof slab is sized and reinforced to protect against external hazards (e.g., tornado missile impact). Water-tight equipment hatches are provided for equipment maintenance.~~}

3.8.4.2 Applicable Codes, Standards, and Specifications

No departures or supplements.

3.8.4.3 Loads and Load Combinations

The U.S. EPR FSAR includes the following COL Item in Section 3.8.4.3:

> A COL applicant that references the U.S. EPR design certification will confirm that site-specific loads lie within the standard design envelope for other Seismic Category I structures, or perform additional analyses to verify structural adequacy.

This COL Item is addressed as follows:

{Table 2.0-1 provides a comparison of CCNPP Unit 3 site parameters to the parameters defining the basis of the U.S. EPR FSAR design loads. Site-specific load parameters, except the site-specific safe shutdown earthquake (SSE), are bounded by the parameters defined for the U.S. EPR FSAR.

As described in Section 3.7.2.5.2, in-structure response spectra (ISRS) for the EPGB and ESWB based on the site-specific SSE exceed the ISRS based on the certified seismic design response spectra (CSDRS) for frequencies approximately below 0.3 Hz. The maximum spectral acceleration below 0.3 Hz is 0.07g. The structural reconciliation of EPGB and ESWB confirms that the structures as designed in U.S. EPR FSAR are adequate for site-specific SSE loading.

Design loads and load combinations for site-specific Seismic Category I structures are addressed in Section 3.8.4.3.1 and 3.8.4.3.2, respectively.}

3.8.4.3.1 Design Loads

{Design loads defined in the U.S. EPR FSAR Section 3.8.4.3.1 are applicable for the design of site-specific Seismic Category I structures, with the following exceptions:

- Live loads (L) - Design live load due to rain, snow and ice is based on the normal and extreme winter precipitation events described in Section 2.3.1.2.2.12.
- ~~Thermal loads (To) - Thermal loads during normal operation are negligible based on site-specific temperature parameters (i.e., thermal gradient and uniform temperature change) and the guidelines provided in Section 1.3 of ACI 349.1R-07 (ACI, 2007).~~
- Soil loads and lateral earth pressure (H) - Static lateral soil pressure is calculated based on site-specific soil parameters and groundwater elevation. Design unit weight for the structural fill (95% Modified Proctor) used in the intake area is as follows:
  - Moist unit weight: 149 pcf
  - Saturated unit weight: 153 pcf

Lateral earth pressure coefficients are defined in Table 2.5-58. A coefficient of 0.5 is used conservatively for the structural fill for at-rest condition. The groundwater table in the intake area is at about Elevation 3 ft. A normal surcharge load of 500 psf minimum is considered for calculating the lateral earth pressures. Lateral pressures due to compaction associated with structural fill are also considered.

- Safe shutdown earthquake (E') -
  - Site-specific SSE is defined in Section 3.7.1.1.1.1, which has a peak ground acceleration of 0.15 g, as shown in Figure 3.7-1.
  - Dynamic soil pressure: Effects of dynamic soil pressure on the intake structures are captured by the SSI analysis described in Section 3.7.2.4.
- Abnormal loads - Abnormal loads generated by a postulated high-energy pipe break accident are not applicable, since such pipes are not present in the subject structures.
- Operating basis earthquake (OBE) - OBE is defined in Section 3.7.1.1.1.1 and shown in Figure 3.7-6, which is essentially one-third of the site-specific SSE. As such, OBE loads are not explicitly considered for the design of the site-specific Seismic Category I structures.

Additional design loads for site-specific Seismic Category I structures include the severe and extreme environmental loads associated with the postulated standard project hurricane (SPH) and probable maximum hurricane (PMH) events, respectively.

The hurricane wave pressure on the exterior walls of the UHS Makeup Water Intake Structure ~~and the UHS Electrical Building~~ is obtained using the methodology presented in Chapter 5 of ASCE 7-05 (ASCE, 2006) ~~the Coastal Engineering Manual (USACE, 2006)~~. The total wave pressure is equal to the sum of hydrostatic pressure and hydrodynamic wave pressure. The hydrostatic pressure is calculated based on the storm surge still water level of ~~14.1~~13.65 ft (~~4.3~~4.16 m) and ~~21.7~~17.6 ft (~~6.6~~5.35 m) NGVD 29 for SPH and PMH, respectively. ~~The hydrodynamic wave pressure is calculated based on the 0.15% exceedance Rayleigh distributed wave height for the east and north exterior walls by plant reference direction.~~ The wave pressures on the north and west walls are calculated based on the breaking wave heights corresponding to the still water depths.

~~For structures that remain submerged under the storm surge still water level during a SPH or a PMH event (i.e., roof of the UHS Electrical Building, Forebay walls, and operating deck of the UHS Makeup Water Intake Structure), the dynamic wave pressure is calculated based on the stream function wave theory (Dean, 1974) for breaking wave conditions for wave steepness that provide the maximum dynamic pressures on these structures.~~

Concurrent hurricane wind speeds based on the 3 second wind gust at 32.8 ft (10 m) high are 110 mph (177 km/hr) and 195 mph (314 km/hr) for SPH and PMH, respectively. Conservatively, the concurrent hurricane wind pressure for design of site-specific Seismic Category I structures is based on the U.S. EPR standard design wind speeds of 145 mph (233 km/hr) and 230 mph (370 km/hr), for SPH and PMH respectively, utilizing the procedures presented in Chapter 6 of ASCE 7-05 (ASCE, 200~~5~~6).

Due to much higher grade elevation, structures in the powerblock area are not affected by the wave pressure associated with the postulated hurricanes. Concurrent hurricane wind loads are enveloped by the wind and tornado wind loads presented in the U.S. EPR FSAR Sections 3.3.1 and 3.3.2, respectively.

In addition, ~~both~~ the UHS Makeup Water Intake Structure ~~and UHS Electrical Building are~~is designed to withstand a peak positive incident overpressure (due to postulated explosions) of at least 1 psi without loss of function based on the guidance in RG 1.91, Rev. 1 (NRC, 1978a).}

3.8.4.3.2 Loading Combinations

{The following additional factored load combinations apply to the reinforced concrete design of the Forebay, UHS Makeup Water Intake Structure, ~~UHS Electrical Building,~~ and Seismic Category I buried electrical bank and piping in the intake area:

- Severe Environment SPH:

  $U = 1.4\ (D + F) + 1.7\ (L + H + R_o + SPH)$

- Extreme Environment PMH:

  $U = D + F + L + H + R_o + PMH$

These two load combinations are in addition to the load combinations specified in U.S. EPR FSAR Section 3.8.4.3.2.

For all the load combinations, according to ACI 349-01 (ACI, 2001a), if any load reduces the effects of other loads, the corresponding load factor is taken as 0.9 if that load is always present or occurs simultaneously with the other loads. Otherwise, the factor for that load is taken as zero.}

3.8.4.4 Design and Analysis Procedures

No departures or supplements.

3.8.4.4.1 General Procedures Applicable to Other Seismic Category I Structures

No departures or supplements.

3.8.4.4.2 Reactor Shield Building and Annulus, Fuel Building, and Safeguard Buildings – NI Common Basemat Structure

No departures or supplements.

3.8.4.4.3 Emergency Power Generating Buildings

No departures or supplements.

3.8.4.4.4 Essential Service Water Buildings

No departures or supplements.

3.8.4.4.5 Buried Conduit and Duct Banks, and Buried Pipe and Pipe Ducts

The U.S. EPR FSAR includes the following COL Items in Section 3.8.4.4.5:

> A COL applicant that references the U.S. EPR design certification will describe the design and analysis procedures used for buried conduit and duct banks, and buried pipe and pipe ducts.
>
> A COL applicant that references the U.S. EPR design certification will use results from site-specific investigations to determine the routing of buried pipe and pipe ducts.
>
> A COL applicant that references the U.S. EPR design certification will perform geotechnical engineering analyses to determine if the surface load will cause lateral or vertical displacement of bearing soil for the buried pipe and pipe ducts and consider the effect of wide or extra heavy loads.

The COL Items identified above are addressed as follows:

{The analysis and design of Seismic Category I, buried electrical duct banks, buried Essential Service Water pipes, buried UHS Makeup Water Pipes, and buried CCNPP Unit 3 Intake Pipes (hereafter in this section referred to as buried duct banks and buried pipes) for all the imposed loads, follows the procedures outlined in U.S. EPR FSAR Section 3.8.4.4.5. The analysis and design of the buried pipes also follow the procedures described in Section 3.10 of the AREVA NP Topical Report ANP-10264NP-A (AREVA, 2008).

The design of buried duct banks and buried pipes demonstrates sufficient strength to accommodate:

- Strains imposed by seismic ground motion.

- Static surface surcharge loads due to vehicular loads (AASHTO HS-20 (AASHTO, 2002) truck loading, minimum, or other vehicular loads, including during construction) on designated haul routes.
- Static surface surcharge loads during construction activities, e.g., for equipment laydown or material laydown.
- Tornado missiles and, within their zone of influence, turbine generated missiles.
- Groundwater effects.

Terrain topography and the results from the CCNPP Unit 3 geotechnical site investigation will be used as design input to confirm the routing of buried pipe and duct banks reflected in Figures 3.8-1 through Figure 3.8-4.

The seismic design of buried duct banks and buried pipe is discussed in Section 3.7.3. Other loads are addressed in this section, but are combined with seismic effects of the aforementioned section.

Soil overburden pressures on buried duct banks and buried pipes typically do not induce significant bending or shear effects, because the soil cover and elastic support below the buried duct banks and buried pipes are considered effective and uniform over the entire length of the buried duct bank and buried pipe. When this is not the case, vertical soil overburden pressure is determined by the Boussinesq method.

Transverse stirrups used to reinforce the concrete duct banks are open ended to mitigate magnetic effects on the electrical conduits. Distribution of transverse and longitudinal steel reinforcement is sufficient to maintain the structural integrity of the electrical duct bank, for all imposed loads, in accordance with ACI 349-01 (ACI, 2001a) (with supplemental guidance of Regulatory Guide 1.142 (NRC, 2001)).

As noted in Section 3.8.4.1.9, buried pipes are located such that the top surface of the pipe is below the site-specific frost depth, with additional depth used to mitigate the effects of surcharge loads and tornado or turbine generated missiles. In lieu of depressing the pipes in the soil beyond that required for frost protection, i.e., to obviate the risk of tornado or turbine generated missile impacts, permanent protective steel plates, located at grade, may be designed.

Bending stresses in buried pipe due to surcharge loading are determined via manual calculations, treating the flexible pipe as a beam on an elastic foundation. Resulting stresses are combined with operational stresses, as appropriate.}

3.8.4.4.6 Design Report

{Design reports for the Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ are presented in Appendix 3E.4.}

3.8.4.4.7 {Forebay~~,~~ and UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~

This section is added as a supplement to U.S. EPR FSAR Section 3.8.4.4.

The Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ are reinforced concrete shear wall structures. Vertical loads are transferred to the foundation basemat through the reinforced concrete walls before being transferred to the supporting soil through bearing pressure. Lateral loads, including those that are seismically induced, are transferred to the supporting soil by the foundation basemats and below-grade walls through friction, adhesion, and passive soil pressure, if necessary.

A finite element (FE) model was created for the Seismic Category I Forebay, UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ and Seismic Category II CWS Makeup Water Intake Structure, using ~~GT STRUDL (version 29.1)~~STAAD Pro (Version 8i). The CWS Makeup Water Intake Structure is included in the FE model since it is integrally connected to the Forebay, shown in Figure 9.2-4. Since the CWS Makeup Water Intake Structure, Forebay, and UHS Makeup Water Intake Structure share a common basemat, they are also known as the Common Basemat Intake Structures (or CBIS).

~~GT STRUDL~~STAAD Pro is a commercial structural engineering computer program developed by Bentley Systems, Inc~~Georgia Tech~~. QA and QC requirements for safety-related structures are documented in the vendor's validation and verification manuals. The program is accepted for use in accordance with ~~Bechtel's~~RIZZO's engineering department and QA procedures. The program is in compliance with the requirements of ASME NQA-1-1994 (ASME, 1994). The ~~GT STRUDL~~STAAD Pro FE model is converted to a SASSI model using ~~Bechtel computer code SASSI 2000, version 3.1~~RIZZO computer code SASSI, version 1.3a, to perform soil-structure interaction (SSI) analysis. SSI analysis is discussed in Section 3.7.2. Due to the SASSI limitation in node numbers, a symmetric plane in the FE model had to be considered for the SSI analysis.

The ~~GT STRUDL~~STAAD Pro FE model is also used to conduct static analysis under non-seismic loads to compute the structural responses, generate results for the design of reinforced concrete structural elements, and perform static stability and bearing pressure evaluations. The finite element analysis results from the SSI analysis and the static analysis are combined to determine the reinforced concrete design forces and moments under seismic load cases.

The FE model is described in detail in Section 3.7.2.3. Figure 3.7-26 and Figure 3E.4-8 depicts the FE model for the static analysis of the CBIS. The entire CBIS is modeled, without assuming a symmetry plane, and the UHS MWIS is modelled in greater detail~~CBIS and the UHS Electrical Building~~. ~~Note that only one half of the structures are modeled since the structures are symmetric about their North-South (N-S) centerline. Depending on the symmetry of the applied loads, either symmetric or anti-symmetric boundary conditions (defined in Table 3.7-9) are used for the nodes in the plane of symmetry. For applied loads that are symmetric about the N-S centerline, results are calculated using the symmetric boundary conditions. For applied loads that are anti-symmetric about the N-S centerline, results are calculated using the anti-symmetric boundary conditions.~~

For the static analysis, the soil medium below the foundation basemat is represented by soil spring elements. The modulus of subgrade reaction for the soil spring elements is based on the site-specific soil properties presented in Section 2.5.4. ~~The modulus of subgrade reaction is calculated using an iterative process until soil pressures at the soil-structure interface converge.~~

~~Since only half of the structures are modeled, reactions on the full basemat are determined using the following equations:~~

~~Symmetric loads~~	~~Anti-Symmetric loads~~
~~R'x = Rx~~	~~R'x = -Rx~~
~~R'y = Ry~~	~~R'y = -Ry~~
~~R'z = -Rz~~	~~R'z = Rz~~

~~where Rx, Ry, and Rz are the reactions in GT STRUDL global coordinate system calculated from FE analysis and R'x, R'y, and R'z are the corresponding reactions for the remaining half of the structure not included in the FE model.~~

Effects of the following loads are calculated from the static analysis: dead loads, live loads (including snow loads), hydrostatic loads, lateral earth pressure loads (including groundwater effects), wind loads, tornado loads (including wind pressure and differential pressure effects), SPH and PMH loads (including hydrostatic pressure, buoyancy, wave pressure, and concurrent wind pressure effects).

During maintenance of the UHS Makeup Water Intake Structure, when stop logs are installed, interior or exterior below-grade cells may be empty. The exterior embedded walls, with the empty adjacent cell, are subject to lateral soil pressure, surcharge and hydrostatic pressure from a normal groundwater level of +3 ft (0.9 m) NVGD 29. This postulated maintenance condition is considered in the FE model for designing the side walls of the UHS Makeup Water Intake Structure.

Seismic induced hydrodynamic loads associated with the water contained in the CBIS are calculated according to the provisions of ACI 350.3-06 (ACI, 2006). Effects of the impulsive and convective components of the hydrodynamic loads are calculated in the SSI analysis by including the corresponding water mass and springs in the SASSI model. ~~Effects of the convective component are negligible for both global and local responses, except for the local response of the front wall of the UHS Makeup Water Intake Structure facing the Forebay, which will be considered during detailed design.~~

~~As described earlier, finite element forces and moments from the aforementioned SSI and~~ The accelerations determined from the SSI analysis are applied to the FE model and combined with other static analyses ~~are combined~~ to generate design forces and moments for load combinations involving seismic effects, in accordance with Section 3.8.4.3.2. Seismic accelerations ~~moments and forces~~ for a particular earthquake direction are computed by ~~enveloping the forces and moments for that~~ adding the accelerations of three directions at a given location using the Square Root of the Sum of the Squares (SRSS) method. Accelerations are then enveloped for a particular direction for all soil profiles (i.e., UB, BE, LB described in Section 3.7.1.3.3).

~~Enveloped~~Following application of the SASSI ~~results~~accelerations from the three components of earthquake motions to the static model, the results are combined using the 100-40-40 percent rule, as described in Section 3.7.2.6. The design forces and moments from seismic and non-seismic load combinations are used to design reinforced concrete shear walls and slabs according to the provisions of ACI 349-01 (ACI, 2001a) (with supplemental guidance of Regulatory Guide 1.142 (NRC, 2001)). Results of the reinforced concrete design are provided in Appendix 3E Section 3E.4.5.

The evaluation of slabs and walls for external hazards (e.g., tornado generated missiles) is performed by local analyses, following the procedure outlined in U.S. EPR FSAR Section 3.8.4.4.1. Procedures for stability evaluation and bearing pressure calculation are discussed in Section 3.8.5.4.6.}

3.8.4.5 Structural Acceptance Criteria

The U.S. EPR FSAR includes the following COL Item in Section 3.8.4.5:

> A COL applicant that references the U.S. EPR design certification will confirm that site-specific conditions for Seismic Category I buried conduit, electrical duct banks, pipe, and pipe ducts satisfy the criteria specified in Section 3.8.4.4.5 and those specified in AREVA NP Inc., U.S. Piping Analysis and Support Design Topical Report.

This COL Item is addressed as follows:

Design of all safety-related, Seismic Category I buried electrical duct banks and pipe meet the requirements specified in U.S. EPR FSAR Section 3.8.4.4.5 and the Areva NP Topical Report ANP-10264NP-A (AREVA, 2008).

Acceptance criteria for the buried electrical duct banks are in accordance with IEEE 628-2001(R2006) (IEEE, 2001), ASCE 4-98 (ASCE, 2000) and ACI 349-01 (ACI, 2001a), with supplemental guidance of Regulatory Guide 1.142 (NRC, 2001).

{Acceptance criteria for the buried UHS Makeup Water Pipes and CCNPP Unit 3 Intake Pipes are identical to that stated above. Member stresses are maintained lower than allowable stresses. When allowable stresses are exceeded, joints are added as required to increase flexibility and hence, to mitigate member stresses.

Acceptance criteria for the reinforced concrete design of site-specific Seismic Category I Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ are identical to those described in the U.S. EPR FSAR Section 3.8.4.5.}

3.8.4.6 Materials, Quality Control, and Special Construction Techniques

No departures or supplements.

3.8.4.6.1 Materials

{As discussed in Section 2.5.4.2.5.2, all natural soils at the site are considered aggressive to concrete. However, structures and buried duct banks and pipes will be surrounded and supported by non-aggressive structural fill obtained from off-site borrow sources. Hence, the durability requirements of below-grade concrete walls and buried duct banks and pipes are based on the chemical properties of groundwater.

There are two hydrogeologic units of groundwater affecting the CCNPP Unit 3 structures and buried utilities - the Surficial aquifer, which is present in the powerblock area only, and the upper Chesapeake unit, which underlies both the intake and the powerblock areas. Observed groundwater chemical properties (pH, sulfates and chlorides) for the Surficial aquifer and the Upper Chesapeake unit are provided in Table 3.8-5.

Comparing the observed pH, sulfate, and chloride values with the SRP 3.8.4 (NRC, 2007) acceptance criteria for aggressive groundwater, i.e., pH < 5.5, chlorides > 500 parts per million (ppm), and/or sulfates > 1500 ppm, groundwater from the Surficial aquifer in the powerblock

area is considered aggressive due to its low pH-value. Groundwater in the intake area is considered non-aggressive.

As stated in Section 2.4.12.5, the post-development groundwater elevation in the powerblock area is at about 30 ft (9.1 m) below the finished site grade level of 85 ft (25.9 m). The NI common basemat structures are embedded approximately 40 ft (12.2 m) below the finished grade. Therefore, the lower portions of the NI common basemat structures are submerged in the low-pH groundwater from the Surficial aquifer. Other Seismic Category I structures in the powerblock area, i.e., the EPGBs and ESWBs, are located above the post-development groundwater level and are not affected by the low-pH groundwater.

A waterproofing system is provided to protect the reinforced concrete NI common basemat structures from the corrosive effects of low-pH groundwater. As illustrated in Figure 3.8-6, the waterproofing system consists of a primary geomembrane envelope located under the NI common basemat and mud mat between two sand layers and attached to the below-grade walls, extending up to Elevation 57'-0" (17.4 m) NGVD 29, or about 2 ft (0.6 m) above the highest projected post-development groundwater level. Secondary waterproofing starts at the bottom of the below-grade walls, continues above the groundwater level and terminates at about 1 ft (0.3 m) above the finished grade level. A groundwater monitoring system (consisting of risers and drain sumps) is provided inside the geomembrane envelope within the sand layer to monitor and pump out any water that may leak through the primary geomembrane. A vertical drainage layer is placed between the primary and secondary waterproofing membranes to facilitate the flow of any leaked groundwater down to the sumps.

A majority of the buried electrical duct banks are located above the post-development groundwater level in the powerblock area and are not affected by the low-pH groundwater. For the duct banks in the utility corridor that may be exposed to the low-pH groundwater, liquid-applied or geomembrane waterproofing is applied for protection against prolonged exposure to the groundwater. Protective measures for buried pipe include protective wrapping and/or coatings that are acid-resistant.

Since the groundwater is non-aggressive in the intake area, waterproofing is not needed for the protection of concrete structures or duct banks. ~~However, due to a high groundwater table, a waterproofing membrane is provided for the UHS Electrical Building to protect the enclosed electrical equipment from water intrusion.~~

As noted in Table 3.8-5, the maximum observed sulfate concentration in the groundwater is 365 ppm. According to ACI 349-01 (ACI, 2001a) Table 4.3.1, this concentration is considered a moderate exposure (also identified as "Class 1 Exposure" in ACI 201.2R-01 (ACI, 2001b)) and requires the use of ASTM C150 (ASTM, 2009) Type II or equivalent cement, a maximum water-cementitious materials ratio of 0.5, and a minimum concrete compressive strength of 4000 psi.

Additionally, for concrete structures subject to the brackish water from the Chesapeake Bay, Table 4.2.2 of ACI 349-01 (ACI, 2001a) requires the use of a maximum water-cementitious materials ratio of 0.4 and a minimum specified compressive strength of 5000 psi.

Based on aforementioned requirements, concrete mixtures for Seismic Category I Forebay, UHS Makeup Water Intake Structure~~, UHS Electrical Building,~~ and buried utilities (i.e., buried concrete electrical duct banks and pipes) will have a maximum water-cementitious materials ratio of 0.4 and a minimum specified compressive strength of 5000 psi. A maximum water-cementitious materials ratio of 0.4 is also specified for the Essential Service Water

Buildings as they can also be exposed to the brackish water. Concrete mixtures for other Seismic Category I structures will have a maximum water-cementitious materials ratio of 0.45.

For improved resistance to sulfate attack and chloride ion penetration, about 20-25% of the total weight of the cementitious materials in all concrete mixtures will be replaced with fly ash (conforming to ASTM C618 (ASTM, 2005) Class F) to limit temperature gain, thus reducing peak hydration temperature and permeability of the concrete.}

3.8.4.6.2 Quality Control

No departures or supplements.

3.8.4.6.3 Special Construction Techniques

{Special construction techniques are not expected to be used for the Seismic Category I Emergency Power Generating Buildings, Essential Service Water Buildings, Forebay, UHS Makeup Water Intake Structure~~, UHS Electrical Building~~ and buried utilities.}

3.8.4.7 Testing and Inservice Inspection Requirements

{As discussed in Section 3.8.4.6.1, although the CCNPP Unit 3 in-situ soil is aggressive to concrete, it will be replaced by non-aggressive structural fill under and around the structures and buried duct banks and buried pipes. In addition, Seismic Category I structures and buried utilities in the powerblock area are protected by waterproofing or coating, if submerged in the low-pH groundwater from the Surficial aquifer. As a result, the structures and buried utilities are not directly exposed to the in-situ soil or the low-pH groundwater.

For normally inaccessible below-grade concrete walls and foundations and buried utilities that are not exposed to low-pH groundwater, the inservice inspection program is limited to examination of the exposed portions of below-grade concrete walls and buried utilities for signs of degradation, when excavated for any reason. Exposed geomembrane and related waterproofing systems are also inspected during the excavation.

For the NI common basemat structures, in-service inspection utilizes a groundwater monitoring system consisting of risers and drain sumps. The risers and sumps will be subject to periodic monitoring to confirm that groundwater leaking through the geomembrane envelope is being effectively removed and is not ponded against the concrete structure. Such monitoring will:

- Occur at multiple locations in the monitoring system;
- Be performed on a frequency based on the leakage rate through the primary geomembrane. The leakage rate will be determined by monitoring water levels in the risers and drain sumps. Initially the monitoring frequency is expected to be high until the performance of the geomembrane is established. As the operation proceeds, the monitoring interval will be expanded, possibly to once per cycle;
- Utilize manual techniques or electronic water level sensors.

The buried duct banks have shallow embedment depth. Therefore, the condition of the buried concrete duct banks in the utility corridor that may be exposed to low-pH groundwater of the Surficial aquifer will be monitored by excavating the surrounding soil. The frequency of this monitoring will be determined based on the groundwater level and pH values recorded by the groundwater monitoring program described in Section 3.8.5.7.

Groundwater levels throughout the powerblock area will also be monitored to confirm that no other below-grade concrete requires dewatering provisions to protect it from prolonged exposure to the low-pH groundwater from the Surficial aquifer. The groundwater chemical properties are monitored through the monitoring program described in Section 3.8.5.7.

The in-service inspection program and performance monitoring will be designed and conducted in conformance with the requirements of 10 CFR 50.65 (CFR, 2008) and Regulatory Guide 1.160 (NRC, 1997). The in-service inspection program for the UHS Makeup Water Intake Structure and the Forebay are developed and conducted in accordance with Regulatory Guide 1.127 (NRC, 1978b). The in-service program includes below-grade walls and buried utilities addressed in this section, as well as foundations addressed in Section 3.8.5.}

3.8.5 FOUNDATIONS

3.8.5.1 Description of the Foundations

The U.S. EPR FSAR includes the following COL Item in Section 3.8.5.1:

> A COL applicant that references the U.S. EPR design certification will describe site-specific foundations for Seismic Category I structures that are not described in this section.

This COL Item is addressed as follows:

{The foundations for the site-specific Seismic Category I Forebay~~,~~ and UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ are discussed in Section 3.8.5.1.4.}

3.8.5.1.1 Nuclear Island Common Basemat Structure Foundation Basemat

No departures or supplements.

3.8.5.1.2 Emergency Power Generating Buildings Foundation Basemats

No departures or supplements.

3.8.5.1.3 Essential Service Water Buildings Foundation Basemats

No departures or supplements.

3.8.5.1.4 {Forebay~~,~~ and UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ Basemats

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

Plans, sections and details for the Seismic Category I Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ are provided in Figures 9.2-4, 9.2-5 and 9.2-6. A general description of the structures, including descriptions of all functional levels, is provided in Section 3.8.4.1.11. Figure 3.8-1 shows the position of the Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ relative to the NI.

As shown in Figure 9.2-4, Seismic Category II CWS Makeup Water Intake Structure and Seismic Category I Forebay and UHS Makeup Water Intake Structure share a 5 ft (1.5 m) thick common basemat, with its top elevation at -22.5 ft (-6.9 m). ~~The UHS Electrical Building sits on a separate 5 ft (1.5 m) thick basemat, with its top elevation at -5.5 ft (-1.7 m).~~

The reinforced concrete basemat for the Forebay is 109 ft (33.2 m) long by 89 ft (27.1 m) wide. The reinforced concrete basemat for the UHS Makeup Water Intake Structure is ~~59~~89 ft (~~18.0~~27.1 m) long by ~~60~~58 ft (~~18.3~~17.7 m) wide~~, while that for the UHS Electrical Building is 33 ft (10.1 m) long by 74 ft (22.6 m) wide~~. Concrete walls bearing on the foundation basemats of Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ are described in Section 3.8.4.1.11 and shown on Figures 3E.4-1 and 3E.4-2.

Lateral loads, including those that are seismically induced, are transferred to the supporting soil by the foundation basemats and below-grade walls through friction, adhesion, and passive soil pressure, if necessary. Vertical forces from the super structures are transferred to the foundation basemat through the bearing walls, before being transferred to the supporting soil through bearing pressure.}

3.8.5.2 Applicable Codes, Standards, and Specifications

No departures or supplements.

3.8.5.3 Loads and Load Combinations

{Structural loads and load combinations for reinforced concrete basemat design of site-specific Seismic Category I structures are defined in Sections 3.8.4.3.1 and 3.8.4.3.2.

Load combinations for stability evaluation, including sliding, overturning, and floatation, are described in U.S. EPR FSAR Section 3.8.5.3. Additional stability load combinations for sliding and overturning evaluations include:

- D + H + SPH
- D + H + PMH

These load combinations are analogous to the stability load combinations for wind and tornado loading.

Load combinations for bearing pressure evaluation are as follows:

Service loads

- D + L + F

Severe environmental loads

- D + L + F + W
- D + L + F + SPH

Extreme environmental loads

- D + L + F + Wt
- D + L + F + E'
- D + L + F + PMH

~~Buoyancy due to groundwater reduces bearing pressure and is neglected from above load combinations.~~}

3.8.5.4 Design and Analysis Procedures

No departures or supplements.

3.8.5.4.1 General Procedures Applicable to Seismic Category I Foundations

No departures or supplements.

3.8.5.4.2 Nuclear Island Common Basemat Structure Foundation Basemat

No departures or supplements.

3.8.5.4.3 Emergency Power Generating Buildings Foundation Basemats

No departures or supplements.

3.8.5.4.4 Essential Service Water Buildings Foundation Basemats

No departures or supplements.

3.8.5.4.5 Design Report

{Design reports for the Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ basemats are presented in Appendix 3E.4.}

3.8.5.4.6 {Forebay~~,~~ and UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ Basemats

This section is added as a supplement to U.S. EPR FSAR Section 3.8.5.4.

As shown in Figure 3.7-26, the foundation basemats are part of the finite element model used for the analysis and design of the Seismic Category I Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~. The finite element mesh of the basemats is shown in Figure 3.8-5. Note that only half of the basemat is modeled because of symmetry. Analysis and critical section design procedures for these structures are presented in Section 3.8.4.4.7.

To ensure the stability of the structures during various design basis events, the Common Basemat Intake Structures (CBIS) ~~and the UHS Electrical Building~~ are checked for sliding, overturning, and flotation using the stability load combinations described in Section 3.8.5.3.

Static and dynamic bearing pressures are calculated and compared with the bearing capacities defined in Table 2.5-65. ~~Both average pressure and pressure at the basemat corner points (toe pressure) are calculated and checked.~~

Results from the SASSI analysis are used to calculate sliding forces and overturning moments for seismic loads, as described in Section 3.7.2.14.~~2~~3. The loads contributing to the structural mass in the SSI analysis are used to calculate the resistance to sliding and overturning. These loads include the self weight of the structure, weight of the permanent equipment and contained water during normal operation, 25% of the design live load and 75% of the design snow load. The design model in STAAD Pro is also checked for the sliding and overturning conditions for the SSE case. The STAAD Pro model for the SSE case contains the conservatively applied acceleration obtained from the SASSI SSI analysis and it does not contain the live and

snow loads. The reaction forces from the STAAD Pro SSE model are used for stability evaluation and the results are reported in Table 3.8-2.

For the non-seismic loads, basemat reactions from ~~GT STRUDL~~STAAD Pro analysis are used to calculate sliding forces and overturning moments. The dead load used to calculate the resistance to sliding and overturning includes the self weight of the structures, permanent equipment and water inside structures during the normal operation, SPH and PMH conditions.

Flotation is checked under normal operation, SPH, and PMH conditions, including the draw-down condition during a PMH event, with the water inside the CBIS at the minimum design level of -8 ft (-2.4 m). Resistance to flotation is provided by dead load.

Sliding is checked at various sliding interfaces below the foundation basemats. The CBIS sits on top of a mud mat, which is placed directly on the in-situ soil stratum IIc (Chesapeake clay/silt). Therefore, resistance to sliding is provided by friction between the basemat and the mud mat and friction and adhesion between the mud mat and soil stratum IIc. Friction (traction) between the below-grade walls and structural fill is also utilized for SSE loads. Passive soil pressure is not utilized for the stability of the CBIS. The static coefficients of friction for various sliding interfaces are presented in Table 3.8-1.

~~The UHS Electrical Building is surrounded by structural fill and sits on top of a mud mat. To prevent water intrusion, waterproofing membrane is utilized between two sand layers below the mud mat, with a configuration similar to that shown in Figure 3.8-6. The bottom sand layer is underlain by structural fill. Resistance to sliding is provided by friction across the various interfaces. In addition, passive soil pressure is utilized to prevent the building from sliding under SSE and PMH loads.~~

~~The static coefficients of friction for various sliding interfaces are presented in Table 3.8-1. When passive resistance is utilized for the UHS Electrical Building, the static coefficient of friction is conservatively reduced by 25% to estimate dynamic coefficient of friction based on the triaxial laboratory test results performed on the soils.~~

Frictional resistance is reduced by the effects of any upward forces, such as upward seismic forces and buoyancy. Overturning resistance is reduced by buoyancy.

The factors of safety from aforementioned stability evaluations are compared with the minimum required factors of safety specified in U.S. EPR FSAR Table 3.8-11. The minimum required factors of safety for sliding and overturning associated with SPH and PMH are the same as those for wind and tornado, respectively. The minimum required factor of safety for flotation, including SPH and PMH conditions, is 1.1.

Results of the stability and bearing pressure evaluations are presented in Section 3.8.5.5.4.}

3.8.5.5 Structural Acceptance Criteria

The U.S. EPR FSAR includes the following COL Item in Section 3.8.5.5:

> A COL applicant that references the U.S. EPR design certification will evaluate site-specific methods for shear transfer between the foundation basemats and underlying soil for soil parameters that are not within the envelope specified in Section 2.5.4.2.

This COL Item is addressed as follows:

{For the Nuclear Island (NI) common basemat structures, Emergency Power Generating Buildings (EPGBs), and Essential Service Water Building (ESWBs), U.S. EPR FSAR Section 2.5.4.2 specifies a coefficient of friction of 0.7 beneath their basemats. As identified in Table 2.5-58, the geotechnical site investigation for CCNPP Unit 3 indicates a coefficient of friction between 0.35 and 0.45 for underlying soil layers. This represents a departure from the friction coefficient of 0.7 specified in the U.S. EPR FSAR.

A site-specific sliding evaluation for SSE loads is performed to confirm the sliding stability of NI common basemat structures, EPGBs, and ESWBs. These structures are located in the powerblock area, which will be excavated and backfilled. Mud mats are used under the basemat of each structure to facilitate construction. As described in Section 3.8.4.6.1, a waterproofing system is used to protect the NI common basemat structures from the low-pH groundwater, as illustrated in Figure 3.8-6. The potential sliding interfaces down to the natural soils under the NI common basemat structures are:

- Basemat - mud mat
- Mud mat - sand
- Sand - waterproofing membrane
- Sand - structural fill
- Structural fill - soil stratum IIb

No waterproofing is used for the EPGBs and ESWBs because they are located above the post-development groundwater table. Therefore, the potential sliding interfaces under the EPGBs and ESWBs are:

- Basemat-mud mat
- Mud mat-structural fill
- Structural fill - soil stratum IIb

Frictional parameters at the various sliding interfaces are presented in Table 3.8-1. Based on these frictional parameters, factors of safety against sliding and overturning associated with the site-specific SSE loads are presented in Table 3.8-4 for the NI common basemat structures, EPGBs, and ESWBs. The minimum required factor of safety of 1.1 is achieved for all the buildings. Note that passive soil pressure is not utilized for the sliding evaluation.}

3.8.5.5.1 Nuclear Island Common Basemat Structure Foundation Basemat

{The following departure is taken from U.S. EPR FSAR Section 3.8.5.5.1.

The standard design of Seismic Category I foundations for the U.S. EPR is based on a maximum differential settlement of ½ inch in 50 ft in any direction across the foundation. These standard design values are specified in the U.S. EPR FSAR Sections 2.5.4.10.2 and 3.8.5.5.1, and tabulated in U.S. EPR FSAR Tier 1 Table 5.0-1. The expected site-specific values for settlement of the CCNPP Unit 3 NI Common basemat foundation are in the range of 1/600 (1 inch in 50 ft) to 1/1200 (½ inch in 50 ft) as stated in Section 2.5.4.

To account for the Calvert Cliffs site-specific expected differential settlement values, an evaluation of differential settlements up to 1 inch in 50 ft was performed. A static analysis was performed of the foundation structures assuming this site-specific differential settlement value. The static analysis was performed using the same finite element model developed by AREVA for the standard plant differential settlement criteria of ½ inch in 50 ft. The finite element model is analyzed using the QA verified software ANSYS V10.0 SP1.

The evaluation consisted of a static finite element analysis of the foundation structures which considered the effects of the higher expected displacement (tilt) on the foundation bearing pressures and basemat stress due to structural eccentricities resulting from a uniform rotation of the foundation mat along the axis of the NI Common basemat. The evaluation assumed no changes in the soil stiffness or increased flexure due to differential settlement consistent with the design analysis for the standard U.S. EPR design. The evaluation considered Soil Case SC15, from the U.S. EPR FSAR standard design, which represented the softest soil condition used in the U.S. EPR standard plant design and exhibits the largest differential displacements of the basemat.

The displacement is defined per length of the structure, 1 inch in 50 ft. The displacement of the NI common basemat is greatest along the North/South axis at the Fuel Building (FB) and least along this axis at Safeguard Building 2 and 3 (SB 2/3). Therefore, the NI model is rotated around the X-axis (West/East axis). The overall length of the NI basemat from the North end to the South end is approximately 344 ft (105 m). Since an initial settlement of 1 inch in 50 ft is considered, the NI structure has an initial displacement of approximately 7.0 inches (17.8 cm), or approximately 0.1 degrees.

Results from the evaluation indicate there is negligible difference in both the soil bearing pressures and the stresses in the concrete basemat structure when the NI is subjected to an initial settlement of 1 inch in 50 ft as compared to an initial settlement of ½ inch in 50 ft established in the U.S. EPR standard plant.

There is a negligible difference in both the bearing pressures and the stresses in the basemat when the NI is subjected to structural eccentricities associated with a 7 inch (17.8 cm) basemat differential displacement representing a settlement value of 1 inch in 50 ft. Therefore, the site-specific departure in differential settlement values is structurally acceptable.}

3.8.5.5.2 Emergency Power Generating Buildings Foundation Basemats

{The following departure is taken from U.S. EPR FSAR Section 3.8.5.5.2.

Section 2.5.4.10.2 of the U.S. EPR FSAR states that:

> "The design of Seismic Category I foundations for the U.S. EPR is based on a maximum differential settlement of ½ inch per 50 ft in any direction across the basemat."

The U.S. EPR FSAR maximum allowable differential settlement of ½ inch per 50 ft may also be expressed as a fraction, i.e., 1/1200. According to Section 2.5.4.10.2, the estimated site-specific differential settlement is 1/1166, which is about 3% higher than the allowable value described in the U.S. EPR FSAR.

A finite element analysis of the entire EPGB structure, including CCNPP Unit 3 site-specific soil springs, indicates the maximum differential settlement within the confines of the EPGB basemat is 1/2714, or substantially less than the allowable value of the U.S. EPR FSAR. The variation of the finite element analysis differential settlement (1/2714) with the estimated

differential settlement value of 1/1166 is attributed to the conventional geotechnical treatment of the foundation as a flexible plate, a condition much more conservative than the actual 6 ft thick reinforced concrete basemat.

To verify the finite element analysis results, a manual calculation is performed for a selected beam strip (1 ft (0.3 m) wide by 6 ft (1.8 m) deep) of the EPGB basemat, plan view of which is shown in U.S. EPR FSAR Figure 3E.2-3. The beam strip is located at the centerline of the basemat and is perpendicular to the center reinforced concrete bearing wall. The selected two-span beam strip is 96 ft (29.3 m) long, with the aforementioned center wall and two parallel primary reinforced concrete bearing walls serving as pinned supports. Soil bearing pressures are applied to the beam strip and beam deflection is calculated. The calculation results confirm similar findings as the finite element analysis results, i.e., the maximum differential settlement of the EPGB basemat is substantially less than 1/1200.

To further evaluate the effects of the higher site-specific differential settlement, a finite element analysis of the entire EPGB is performed to evaluate the effect of a more conservative overall building tilt of L/550, where L is the least basemat dimension. For this analysis:

- Spring stiffnesses are adjusted until a tilt of L/550 is achieved.
- The elliptical distribution of soil springs is maintained.
- Soil spring stiffnesses along the centerline of the basemat (perpendicular to the direction of tilt) are retained.
- Adjustment is made to all other springs as a function of the distance from the basemat centerline.

The finite element analysis results show that increase in EPGB basemat design moment based on the more conservative differential settlement value of 1/550 (based on the overall tilt) is less than 3% of the U.S. EPR FSAR maximum design moment. Therefore, EPGB basemat is structurally adequate to resist the increased moments.}

3.8.5.5.3 Essential Service Water Buildings Foundation Basemats

{The following departure is taken from U.S. EPR FSAR Section 3.8.5.5.3.

U.S. EPR FSAR Section 2.5.4.10.2 states that:

> "The design of Seismic Category I foundations for the U.S. EPR is based on a maximum differential settlement of ½ inch per 50 ft in any direction across the basemat."

The U.S. EPR FSAR maximum allowable differential settlement of ½ inch per 50 ft may also be expressed as a fraction, i.e., 1/1200. According to Section 2.5.4.10.2, the maximum site-specific differential settlement is 1/845, which exceeds the allowable value specified in the U.S. EPR FSAR.

A finite element analysis of the entire ESWB structure, including CCNPP Unit 3 site-specific soil springs, indicates the maximum differential settlement within the confines of the ESWB basemat is 1/1417, or less than the allowable value of the U.S. EPR FSAR. The variation of the finite element analysis differential settlement (1/1417) with the estimated differential settlement value of 1/845 is attributed to the conventional geotechnical treatment of the

foundation as a flexible plate, a condition much more conservative than the actual 6 ft thick reinforced concrete basemat.

To verify the finite element analysis results, a manual calculation is performed for a selected beam strip (1 ft (0.3 m) wide by 6 ft (1.8 m) deep) of the ESWB basemat, plan view of which is shown in U.S. EPR FSAR Figure 3E.3-3. The beam strip is located at the centerline of the basemat and is perpendicular to the reinforced concrete bearing wall separating the two cooling towers. The selected two-span beam strip extends for the length of the two cooling towers, with the aforementioned divider wall and two parallel reinforced concrete bearing walls serving as pinned supports. Soil bearing pressures are applied to the beam strip and beam deflection is calculated. The calculation results confirm similar findings as the finite element analysis results, i.e., the maximum differential settlement of the ESWB basemat is less than 1/1200.

To further evaluate the effects of the higher site-specific differential settlement, a finite element analysis of the entire ESWB is performed to evaluate the effect of a more conservative overall building tilt of L/600, where L is the least basemat dimension. For this analysis:

- Spring stiffnesses are adjusted until a tilt of L/600 is achieved.
- The elliptical distribution of soil springs is maintained.
- Soil spring stiffnesses along the centerline of the basemat (perpendicular to the direction of tilt) are retained.
- Adjustment is made to all other springs as a function of the distance from the basemat centerline.

The finite element analysis results show that increase in the ESWB basemat design moments based on the more conservative differential settlement value of 1/600 (based on the overall tilt) is less than 5% of the U.S. EPR FSAR maximum design moments. So, the ESWB basemat is structurally adequate to resist the increased moments.}

3.8.5.5.4 {Forebay~~,~~ and UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ Basemats

This section is added as a supplement to U.S. EPR FSAR Section 3.8.5.5.

Acceptance criteria for reinforced concrete design of basemat critical sections are described in Section 3.8.4.5.

Stability and bearing pressure of the CBIS ~~and the UHS Electrical Building~~ are evaluated following the procedures presented in Section 3.8.5.4.6. As reported in Table 3.8-2, factors of safety from various stability load combinations show that the minimum required values are achieved. Therefore, the CBIS and the UHS Electrical Building are stable under various design conditions.

~~For the UHS Electrical Building, approximately 30% of full passive resistance is utilized for the most critical loading condition (SSE) to achieve a minimum sliding factor of safety FOS = 1.1, resulting in an estimated movement of approximately ¼ inch. During detailed design, the utility connections to the UHS Electrical Building will be designed to accommodate this movement.~~

Maximum soil bearing pressures under the CBIS ~~and the UHS Electrical Building~~ foundations are provided in Table 3.8-3. The calculated maximum bearing pressures are smaller than the bearing capacities presented in Table 2.5-65 under both static and dynamic conditions.

Differential settlement across the CBIS ~~and UHS Electrical Building~~ is within the U.S. EPR FSAR differential settlement criterion of 1/1200.}

3.8.5.6 Materials, Quality Control, and Special Construction Techniques

No departures or supplements.

3.8.5.6.1 Materials

The U.S. EPR FSAR includes the following COL Item in Section 3.8.5.6.1:

> A COL applicant that references the U.S. EPR design certification will evaluate and identify the need for the use of waterproofing membranes and epoxy coated rebar based on site-specific ground water conditions.

This COL Item is addressed as follows:

{The waterproofing membrane is used to eliminate the prolonged exposure of below grade concrete from the low pH groundwater of Surficial aquifer, as described in Section 3.8.4.6.1. Discussion of concrete mix design for improved resistance to sulfate attack and chloride ion penetration is also presented in Section 3.8.4.6.1. Epoxy coated rebar is not used.}

3.8.5.6.2 Quality Control

No departures or supplements.

3.8.5.6.3 Special Construction Techniques

{Special construction techniques are not expected to be used for the Emergency Power Generating Buildings, Essential Service Water Buildings, Forebay~~,~~ and UHS Makeup Water Intake Structure ~~and UHS Electrical Building.~~}

3.8.5.7 Testing and Inservice Inspection Requirements

The U.S. EPR FSAR includes the following COL Items in Section 3.8.5.7:

> A COL applicant that references the U.S. EPR design certification will identify if any site-specific settlement monitoring requirements for Seismic Category I foundations are required based on site-specific soil conditions.
>
> A COL applicant that references the U.S. EPR design certification will describe the program to examine inaccessible portions of below-grade concrete structures for degradation and monitoring of groundwater chemistry.

These COL Items are addressed as follows:

{Although settlement and differential settlement of foundations are not likely to affect the structures, systems, and components that make up the U.S. EPR standard plant due to the robust design of all Seismic Category I structures, a site-specific settlement monitoring program is required as a prudent measure of confirmation between expected or predicted settlement and actual field measured settlement values.

The settlement monitoring program employs conventional monitoring methods using standard surveying equipment and concrete embedded survey markers. Survey markers are embedded in the concrete structures during construction and located in conspicuous locations above grade for measurement purposes throughout the service life of the plant as necessary. Actual field settlement is determined by measuring the elevation of the marker relative to a reference elevation datum. The reference datum selected is located away from areas susceptible to vertical ground movement and loads. If field measured settlements are found to be trending greater than expected values, an evaluation will be conducted to ensure compliance with design basis requirements.

The settlement monitoring program shall satisfy the requirements for monitoring the effectiveness of maintenance specified in 10 CFR 50.65 (CFR, 2008) and Regulatory Guide 1.160 (NRC, 1997), as applicable to structures.

The CCNPP Unit 3 below-grade concrete degradation monitoring program is described in Section 3.8.4.7. This program calls for:

- Examination of exposed portions of below-grade concrete, including buried utilities, for signs of degradation when excavated for any reason; and
- Periodic monitoring of risers and drain sumps for the NI common basemat structures to ensure that the groundwater leaking through the geomembrane envelope, if any, is being effectively removed and is not ponding against the concrete structure.

As stated in Section 3.8.4.7, groundwater levels throughout the powerblock area will be monitored. The CCNPP Unit 3 groundwater monitoring program is established on the following bases:

- Recorded baseline concentrations and pH values of groundwater chemical properties prior to start of excavation.
- Recorded concentrations and pH values of groundwater chemical properties after backfill is completed and at six month intervals thereafter.
- One-year after backfill is completed:
  - If no negative trend is identified, inspection intervals can be increased to once per year.
  - If a negative trend is identified, need for dewatering provisions will be evaluated for other below-grade concrete structures and utilities.}

3.8.6 REFERENCES

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NRC, 2001. Safety-Related Concrete Structures for Nuclear Power Plants (Other than Reactor Vessels and Containments), Regulatory Guide 1.142, Revision 2, U.S. Nuclear Regulatory Commission, November 2001.

NRC, 2007. NUREG-0800, Standard Review Plan , Section 3.8.4, "Other Seismic Category I Structures," Revision 2, U.S. Nuclear Regulatory Commission, March 2007.

USACE, 2006. Coastal Engineering Manual. Engineering Manual EM 1110-2-1100, U.S. Army Corps of Engineers, 2006.}

Table 3.8-1—{Static Frictional Parameters}

Interface	Friction Coefficient	Adhesion (ksf)
NI Common Basemat Structures		
Basemat — Mudmat	0.60	-
Mud mat — Sand	0.58	-
Sand — Waterproofing	0.52	-
Sand — Structural Fill	0.58	-
Structural Fill—Stratum IIb	0.47	1.0
EPGBs and ESWBs		
Basemat — Mudmat	0.60	-
Mudmat — Structural Fill	0.52	-
Structural Fill—Stratum IIb	0.47	1.0
CBIS		
Basemat — Mudmat	0.60	-
Mudmat — Stratum IIc	0.21	1.2
Side wall — Structural fill	0.58	-
~~UHS Electrical Building~~		
~~Basemat — Mudmat~~	~~0.60~~	-
~~Mudmat — Sand~~	~~0.58~~	-
~~Sand — Waterproofing~~	~~0.52~~	-
~~Sand — Structural fill~~	~~0.58~~	-
~~Structural Fill — Stratum IIc~~	~~0.21~~	~~1.2~~

Table 3.8-2—{Stability Evaluation Results for the CBIS ~~and UHS Electrical Building~~}

~~Building~~	Load Combination (LC)	Factors of Safety (FOS)		
		Sliding	Overturning	Flotation
~~CBIS~~	D + H + W	~~103.0~~188	~~75.2~~1.84	-
	D + H + Wt	~~50.3~~23.4	~~19.5~~1.83	-
	D + H + E′ [(1)(2)]	~~1.18~~1.41	~~2.04~~2.83	-
	~~D + F′~~D + H + E′ ([1)(3)]	-1.29	-1.26	~~1.69~~
	~~D + H + SPH~~D + F′ [(4)]	~~6.17~~-	~~19.4~~	-1.83
	D + H + PMH	~~3.18~~7.97	~~10.6~~1.69	-
~~UHS EB~~	~~D + H + W~~	~~91.0~~	~~72.2~~	-
	~~D + H + Wt~~	~~32.1~~	~~22.7~~	-
	~~D + H + E′~~	~~1.10~~	~~2.06~~	-
	~~D + F′~~	-	-	~~1.30~~
	~~D + H + SPH~~	~~2.05~~	~~3.65~~	-
	~~D + H + PMH~~	~~1.10~~	~~2.16~~	-

Notes:

(1) ~~For the CBIS, f~~Friction (traction) between side wall and backfill is utilized ~~for LC (D+H+E′)~~.
(2) Factors of Safety computed from SASSI SSI analysis.
(3) Factors of Safety computed from STAAD analysis. Due to the conservatism in the SSE accelerations applied, the SASSI analysis results will be more accurate and should be used. The STAAD values are given for comparison purposes only.
~~For the UHS EB, passive soil pressure is utilized for LC (D+H+E′) and (D+H+PMH).~~
(4) ~~For the CBIS,~~ The factor of safety against flotation (D+F′) is governed by the PMH draw-down condition.

Table 3.8-3—{Bearing Capacity Evaluation Results for the CBIS~~ and UHS Electrical Building~~}

~~Building~~	Load Combination	Bearing pressure (ksf)	
		Average	Maximum[1]
~~CBIS~~	D + L + F	~~3.84~~2.10	~~4.73~~5.04
	D + L + F + W	~~3.83~~2.10	~~4.74~~5.03
	~~D + L + F + SPH~~	~~4.83~~	~~6.30~~
	D + L + F + Wt	~~3.84~~2.15	~~4.79~~3.77
	D + L + F + E′	~~4.47~~1.72	~~5.89~~5.67
	D + L + F + PMH	~~5.78~~2.78	~~8.90~~4.94
~~UHS EB~~	~~D + L + F~~	~~2.11~~	~~2.23~~
	~~D + L + F + W~~	~~2.11~~	~~2.25~~
	~~D + L + F + SPH~~	~~2.46~~	~~2.79~~
	~~D + L + F + Wt~~	~~2.11~~	~~2.29~~
	~~D + L + F + E′~~	~~2.53~~	~~2.82~~
	~~D + L + F + PMH~~	~~3.21~~	~~3.84~~

Notes:

(1) Maximum bearing pressures occur below the UHS MWIS. The maximum bearing pressure is determined as the average pressure below the UHS MWIS.

Static and dynamic bearing capacities are 12 ksf and 18 ksf, respectively~~, for the CBIS and 11 ksf and 16.5 ksf, respectively, for the UHS EB~~ (See Table 2.5-65).

Table 3.8-4—{Factors of Safety for NI Common Basemat Structure, EPGB, and ESWB under SSE Loading}

Building	Sliding	Overturning
NI Common Basemat Structure	1.88	4.50
EPGB	1.77	3.17
ESWB	3.19	4.0

Table 3.8-5—{Observed Chemical Properties of Groundwater}

Properties	Surficial aquifer	Upper Chesapeake unit
pH (average)	5.2	7.4
Sulfate (ppm, maximum)	68.6	365
Chloride (ppm, maximum)	47.4	370

Notes:

Sulfate and chloride concentrations indicate the maximum observed values at the powerblock and intake areas.

ppm = parts per million.

Figure Replaced

Figure 3.8-1—{Schematic Site Plan of Seismic Category I Buried Utilities (Electrical Duct Banks)}

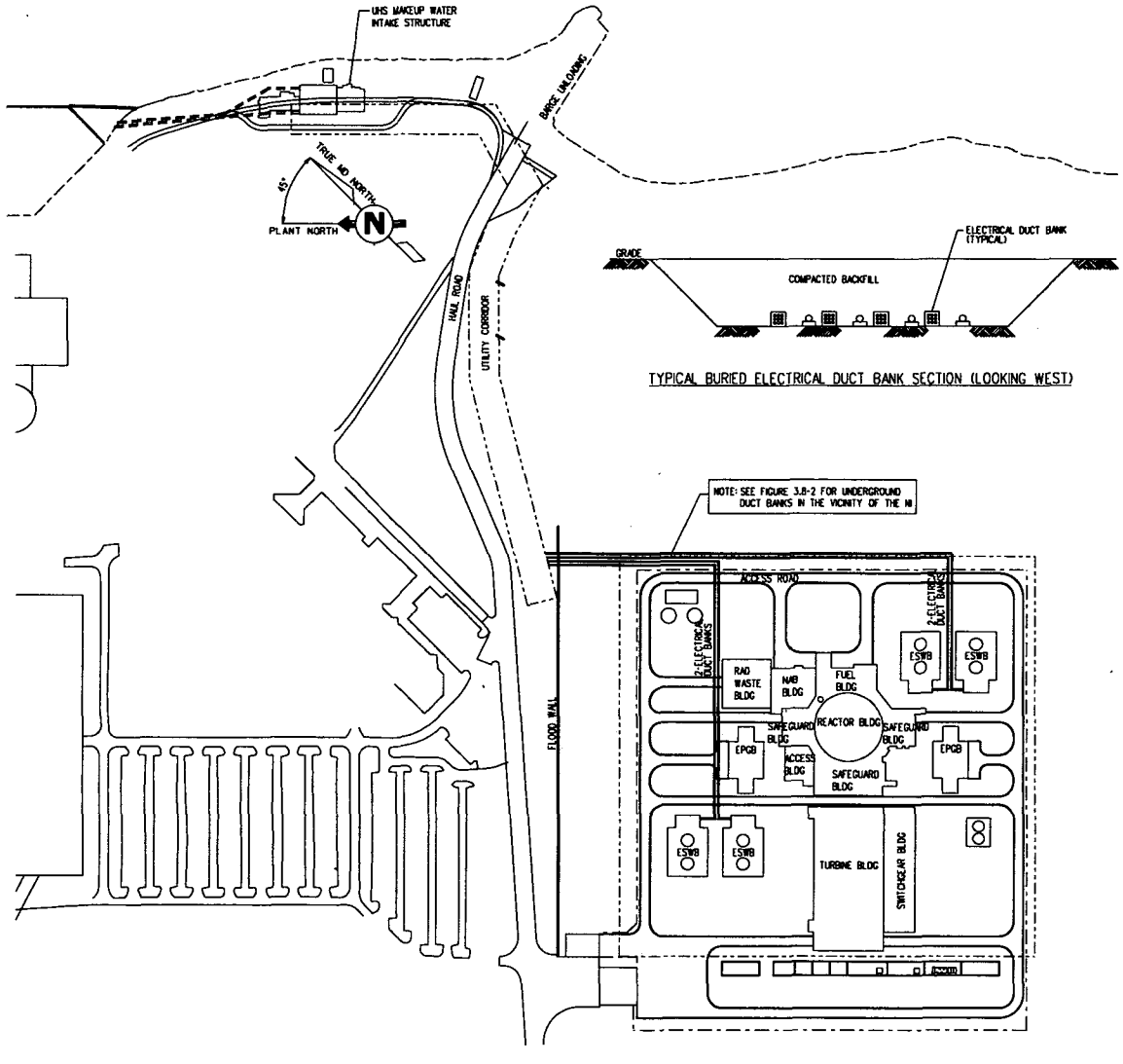


Figure 3.8-2—{Schematic Site Plan of Seismic Category I Buried Utilities at the NI (Electrical Duct Banks)}

Withheld under 10 CFR 2.390.
See Part 9 of the COL Application

Note:

This figure is unaffected by the change to the UHS Intake Structure

Figure Replaced

Figure 3.8-3—{Schematic Site Plan of Seismic Category I Buried Utilities (Underground Piping)}

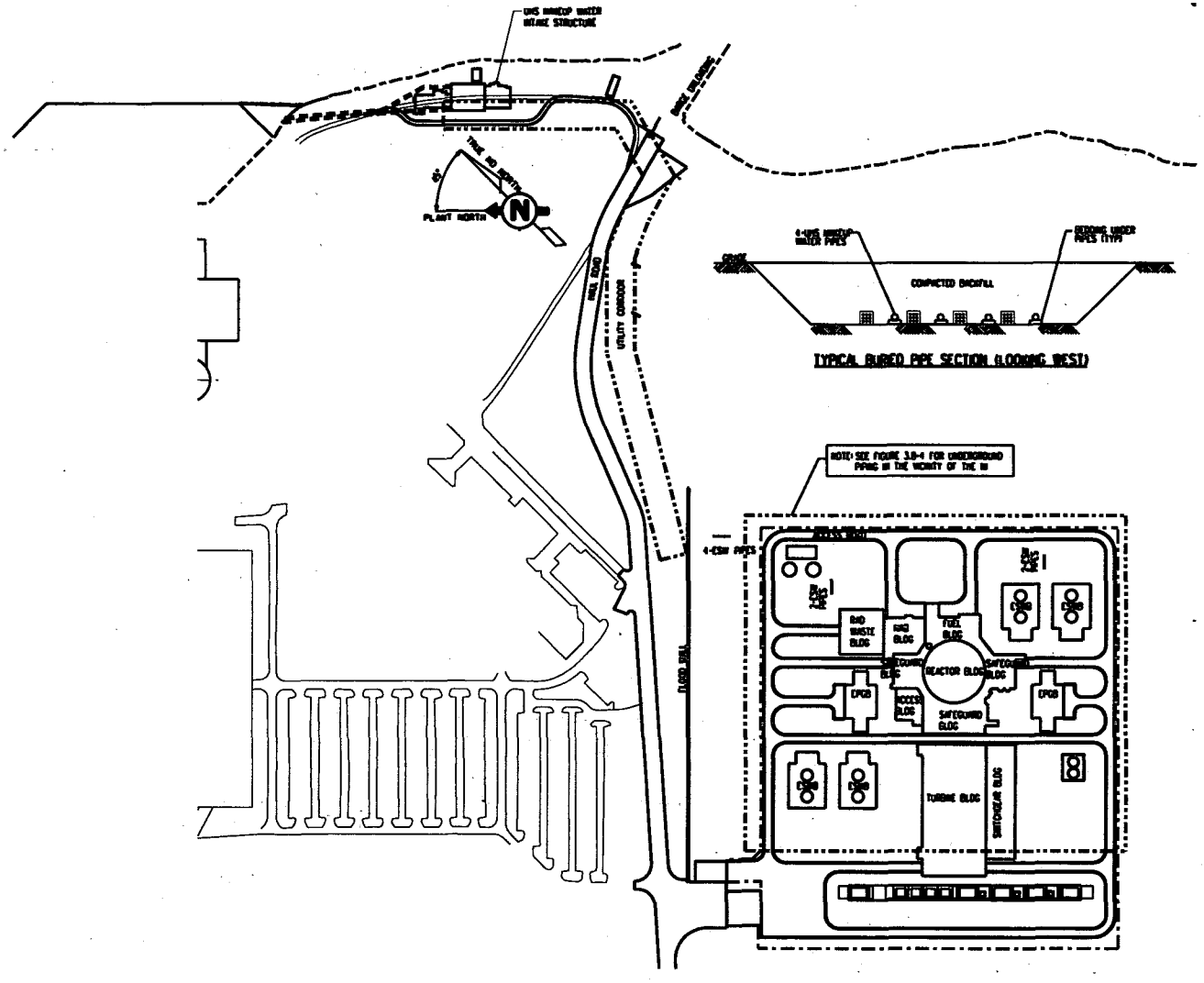


Figure 3.8-4—{Schematic Site Plan of Seismic Category I Buried Utilities (Underground Piping)}

Withheld under 10 CFR 2.390.
See Part 9 of the COL Application

Note:

This figure is unaffected by the change to the UHS Intake Structure

Figure Replaced

Figure 3.8-5—{Isometric View of the Basemat Finite Element Mesh (~~half model~~(STAAD Pro Static Analysis Model) for the CWS Makeup Water Intake Structure, Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~}

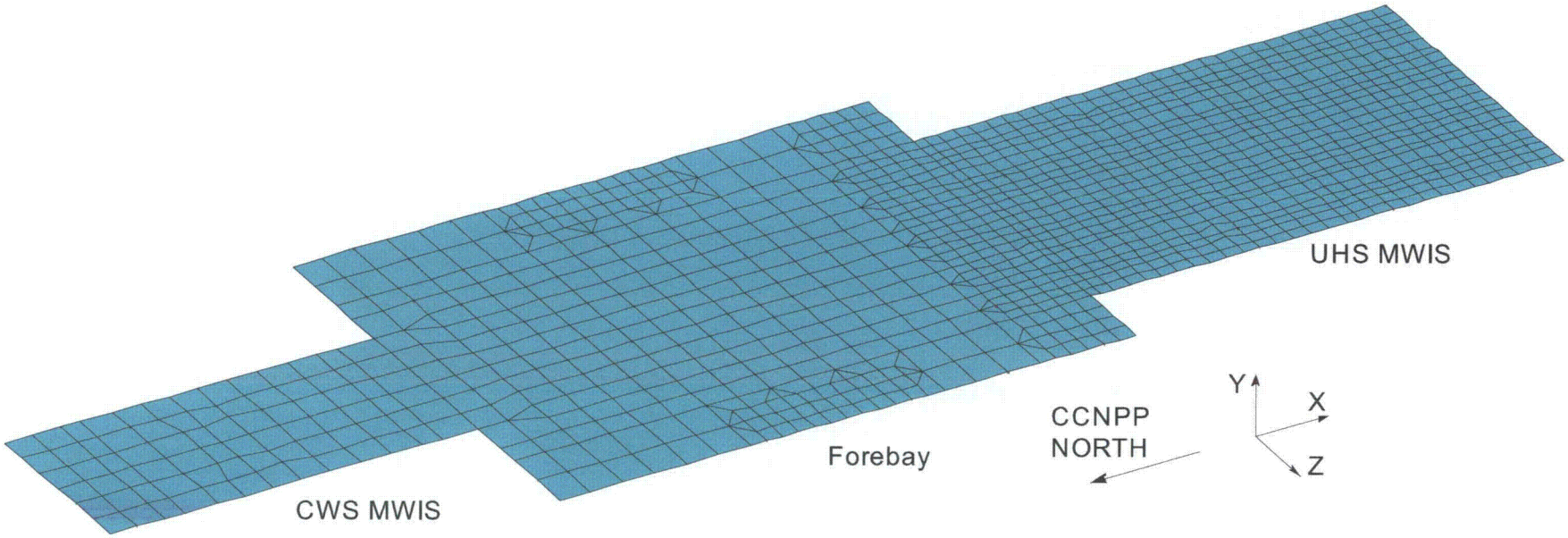
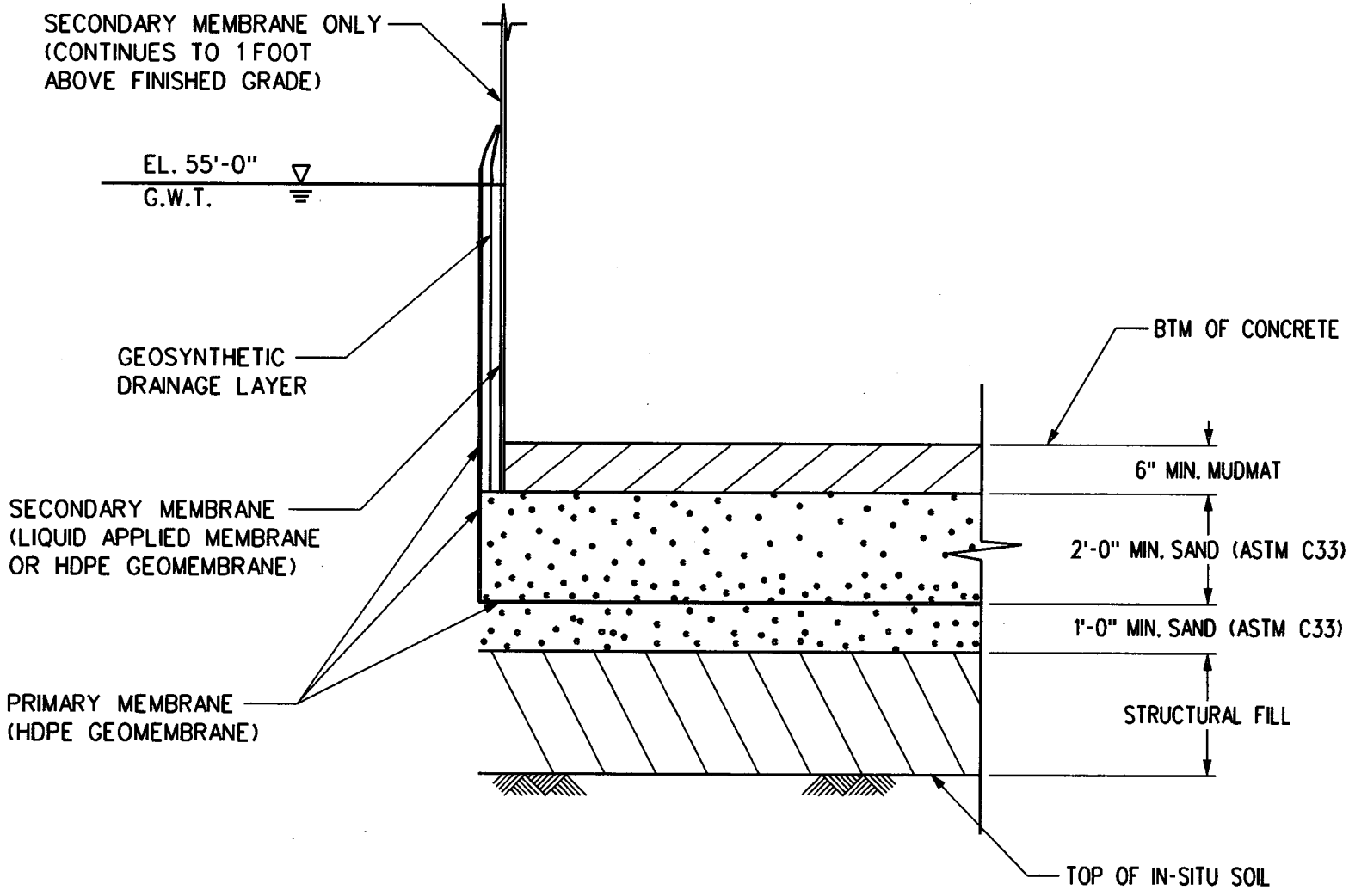


Figure 3.8-6—{Conceptual Configuration of Waterproofing Membrane}



3E CRITICAL SECTIONS FOR SAFETY-RELATED CATEGORY I STRUCTURES

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

The U.S. EPR FSAR contains the following COL item in Appendix 3E:

> A COL applicant that references the U.S. EPR design certification will address critical sections relevant to site-specific Seismic Category I structures.

This COL item is addressed as follows:

{Section 3E.4 of Appendix 3E provides the discussion regarding the critical sections of the site-specific Seismic Category I Structures:

- Forebay
- Ultimate Heat Sink (UHS) Makeup Water Intake Structure (MWIS)
- ~~UHS Electrical Building (EB)~~}

3E.1 NUCLEAR ISLAND STRUCTURES

No departures or supplements.

3E.2 EMERGENCY POWER GENERATING BUILDINGS

No departures or supplements.

3E.3 ESSENTIAL SERVICE WATER BUILDINGS

No departures or supplements.

3E.4 {FOREBAY~~,~~ AND UHS MAKEUP WATER INTAKE STRUCTURE ~~AND UHS ELECTRICAL BUILDING~~

This section is a supplement to U.S. EPR FSAR Appendix 3E.

3E.4.1 Structural Description and Geometry

The General Arrangement plans and elevations of the Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ are provided as Figures 9.2-4, 9.2-5 and 9.2-6. A general description of the structures is provided in Section 3.8.4.1.11. Section 3.8.5.1.4 provides additional details regarding the basemats.

A Foundation Plan for the Forebay and UHS Makeup Water Intake Structure at Elevation -22 ft 6 in (-6.9 m) is provided as Figure 3E.4-1. ~~For the UHS Electrical Building, the Foundation Plan at Elevation -5 ft 6 in (-1.7 m) is provided as Figure 3E.4-2.~~ As described in Section 3E.4.4, the following critical structural elements are selected for design based on their location, dimension, support conditions, and applied loads:

- Basemat of the Forebay (Figure 3E.4-1).
- Basemat of the UHS Makeup Water Intake Structure (Figure 3E.4-1).

- ~~Basemat of the UHS Electrical Building (Figures 3E.4-2).~~
- Long wall of the Forebay (Figures 3E.4-1 and 3E.4-5).
- Side wall of the UHS Makeup Water Intake Structure water basin (Figures 3E.4-1 and 3E.4-4).
- Side wall of the UHS Makeup Water Intake Structure pump house (Figure 3E.4-4).
- ~~North wall of the UHS Electrical Building (Figures 3E.4-2 and 3E.4-7).~~

Forebay and UHS Makeup Water Intake Structure share a common basemat, as described in Section 3.8.5.1.4. Additional descriptions of the critical structural elements are provided in Section 3E.4.4.

3E.4.2 Material Properties

Concrete and reinforcing steel materials for the site-specific Seismic Category I structures conform to the requirements of U.S. EPR FSAR Sections 3.8.4.6 and 3.8.5.6. The following material properties are used in critical section design:

- Concrete
  - Compressive strength (fc'): 5000 psi (34.5 MPa) minimum at 28 days
  - Modulus of elasticity (E): ~~4287 ksi (2.96 x 104 MPa)~~4031 ksi (2.779E+04 MPa)
  - Shear modulus (G): ~~1832 ksi (1.26 x 104 Mpa)~~1722 ksi (1.188E+04 MPa)
  - Poisson's ratio: 0.17
- Reinforcement
  - Yield stress (fy): 60 ksi (413.7 MPa)

General description of foundation soil is provided in Section 2.5.4. Soil properties and ground water table for calculating lateral earth pressure are described in Section 3.8.4.3.1.

3E.4.3 Structural Loads and Load Combinations

Structural loads and load combinations for the design of site-specific Seismic Category I structures are specified in Sections 3.8.4.3.1 and 3.8.4.3.2, respectively. For convenience, the basic load combinations used for concrete design are repeated below:

- Normal: $1.4(D + F) + 1.7(L + H)$
- Wind: $1.4(D + F) + 1.7(L + H + W)$
- SPH: $1.4(D + F) + 1.7(L + H + SPH)$
- SSE: $D + L + H + F + E'$

- Tornado: D + L + H + F + Wt
- PMH: D + L + H + F + PMH

Where,

D = Dead load

L = Live load

F = Hydrostatic load from water inside structures

H = Lateral earth pressure including load due to water outside structures and compaction pressures.

W = Normal wind load

Wt = Tornado wind load

SPH = Standard Project Hurricane load

PMH = Probable Maximum Hurricane load

E' = Safe Shutdown Earthquake (SSE) load

Additional load combinations for stability and bearing pressure evaluation are specified in Section 3.8.5.3.

3E.4.4 Structural Analysis and Design

The analysis and design procedures for Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ are presented in Sections 3.8.4.4.7 and 3.8.5.4.6, including the procedures for stability and bearing pressure evaluation. Structural acceptance criteria are presented in Sections 3.8.4.5 and 3.8.5.5. Selection and design of critical elements is further discussed in this section.

Selection of Critical Elements

The following critical sections are selected for design. Clear dimensions are used in the descriptions.

- *Foundation Basemats (Figures 3E.4-1~~ and 3E.4-2~~):* Foundation basemats transfer all applicable vertical and horizontal structural loads to the supporting soil. Therefore, basemats of the Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ are selected as critical structural elements. Basemats of Forebay and UHS Makeup Water Intake Structure are part of the common basemat of the CBIS and are integrally connected, while the UHS Electrical Building sits on a separate basemat at a higher elevation. Further descriptions of the basemats are provided in Section 3.8.5.1.4.

- *Forebay Long Wall (Figures 3E.4-1 and 3E.4-5):* Long walls in the plant north-south direction are subject to large lateral earth pressure. Each wall is 100 ft (30.5 m) long, 34 ft (10.4 m) high, and 4.5 ft (1.4 m) thick. Due to its length and support conditions, the center portion of each wall behaves like a cantilever making it a critical element.

- *UHS Makeup Water Intake Structure Side Walls (Figures 3E.4-1 and 3E.4-4):* Below-grade side walls of the UHS Makeup Water Intake Structure in the plant north-south direction are subject to large lateral earth pressures. Each wall is ~~50.5 ft (15.4 m)~~80.5 ft (24.5 m) long, 31 ft (9.4 m) high, and 4 ft (1.2 m) thick. The loading condition is more critical when the adjacent pump bay is emptied for maintenance. Side walls of the Pump House, which sit above the operating deck (Elevation 11'-6" (3.51 m)), are ~~53.5 ft (16.3 m)~~69.5 ft (21.2 m) long, 13 ft (4.0 m) tall, and 2 ft (0.61 m) thick and subject to large hurricane wave pressures.

- ~~*UHS Electrical Building North Wall (Figures 3E.4-2 and 3E.4-7):* The exterior wall on the north side of the building is not supported by any interior wall and is considered critical under lateral earth pressure. The wall is about 70 ft (21.3 m) long, 14 ft (4.3 m) high, and 2 ft (0.6 m) thick.~~

Design of Critical Elements

Structural analysis and design of the aforementioned critical sections are performed using the procedures outlined in Section 3.8.4.4.7. Each critical concrete section is designed for combined axial force and bending moment, shear friction, in-plane and outof- plane shear according to the applicable provisions of ACI 349-01 (ACI, 2001).

As stated in Section 3.8.4.4.7, ~~design forces and moments~~accelerations are calculated using the finite element results from SASSI for seismic loads and ~~GT STRUDL~~applied to the STAAD Pro model to be combined with other ~~for~~ non-seismic loads. Design for combined axial force (P) and bending moment (M) is based on P-M interaction of element level results. Design for shear friction, in-plane, and out-of-plane shear is based on section cuts at critical locations of a wall or basemat.

The following provisions from ACI 349-01 (ACI, 2001) are used for design:

- *Axial force and bending moment:* Sections 7.12, 9.3, 10.2, 10.3, 14.3, and 21.6.

- *Shear friction:* Section 11.7. A friction coefficient of 1.0 is used for concrete placed against hardened concrete with surface intentionally roughened. The beneficial effect of compression is ignored.

- *In-plane shear:* Section 11.10 (non-seismic loads) and Section 21.6 (seismic loads). As discussed in U.S. EPR FSAR Section 3.8.4.4.1, a shear strength reduction factor of 0.85 is used.

- *Out-of-plane shear:* Sections 11.1, 11.3, 11.5, and 11.12.

For all section cuts, the design reinforcement is based on the sum of reinforcement required for in-plane shear and combined axial force and bending moment. For a section cut subject to shear friction requirement, the reinforcement provided for combined axial force and bending moment is checked for shear friction and increased, if necessary. Minimum reinforcement required by the code is satisfied. Maximum concrete section strengths limited by the code are also satisfied.

Results of critical section design in terms of the demand to capacity ratios and estimated reinforcements are presented in Section 3E.4.5.

3E.4.5 Summary of Results

Arrangement of main reinforcement for the Forebay~~,~~ and UHS Makeup Water Intake Structure, ~~and UHS Electrical Building~~ is shown in Figures 3E.4-3 through 3E.4-~~7~~5. Note that supplementary shrinkage and temperature reinforcement is not shown for clarity, but it will be provided where required. The maximum demand to capacity ratios are presented in Tables 3E.4-1 through 3E.4-4 for various design load combinations.

Stability evaluation results of the Forebay, UHS Makeup Water Intake Structure, and UHS Electrical Building are presented in Table 3.8-2. Bearing pressure calculation results are presented in Table 3.8-3. These results are discussed in Section 3.8.5.5.4.

3E.4.6 Conclusions

The critical sections of the Forebay~~,~~ and UHS Makeup Water Intake Structure~~, and UHS Electrical Building~~ have adequate strength to resist the structural loads from various design basis events. The structures satisfy the minimum required factors of safety against sliding, overturning and ~~floatation~~flotation loading conditions. The foundation soil has adequate capacity to resist bearing pressure.

3E.4.7 References

ACI, 2001. Code Requirements for Nuclear Safety-Related Concrete Structures and Commentary on Code Requirements for Nuclear Safety-Related Concrete Structures, ACI 349-01/349R-01, American Concrete Institute, 2001.

Table 3E.4-1 – {Demand and Capacity for In-Plane Shear}

Section	Load [a] Combination	Vu [b] (kip)	φVc [c] (kip)	D/C [d]
Forebay Long Wall	Normal	~~1567~~2987	~~1233~~11725	~~0.13~~0.25
	Wind	~~1602~~3038	~~1233~~11731	~~0.13~~0.26
	~~SPH~~	~~2269~~	~~12272~~	~~0.18~~
	SSE	~~3434~~1941	~~1168~~11062	~~0.29~~0.18
	Tornado	~~1035~~1567	~~1196~~11231	~~0.09~~0.14
	PMH	~~2092~~2087	~~1199~~11161	~~0.17~~0.19
UHS MWIS Water Basin Side Wall	Normal	~~1725~~4129	~~5597~~8170	~~0.31~~0.51
	Wind	~~1728~~4138	~~5596~~8161	~~0.31~~0.51
	~~SPH~~	~~1870~~	~~5590~~	~~0.33~~
	SSE	~~1892~~2912	~~5141~~7852	~~0.37~~0.37
	Tornado	~~1014~~2281	~~5592~~7900	~~0.18~~0.29
	PMH	~~1379~~3365	~~5654~~8127	~~0.24~~0.28
UHS MWIS Pump House Side Wall	Normal	~~43~~241	~~1729~~819	~~0.03~~0.29
	Wind	~~56~~253	~~1725~~820	~~0.03~~0.31
	~~SPH~~	~~277~~	~~1793~~	~~0.15~~
	SSE	~~447~~447	~~1584~~822	~~0.28~~0.54
	Tornado	~~27~~165	~~1704~~801	~~0.02~~0.21
	PMH	~~324~~279	~~1884~~790	~~0.17~~0.35
~~UHS EB North Wall~~	~~Normal~~	~~70~~	~~1114~~	~~0.06~~
	~~Wind~~	~~73~~	~~1113~~	~~0.07~~
	~~SPH~~	~~151~~	~~1098~~	~~0.14~~
	~~SSE~~	~~191~~	~~1039~~	~~0.18~~
	~~Tornado~~	~~52~~	~~1107~~	~~0.05~~
	~~PMH~~	~~164~~	~~1109~~	~~0.15~~

Notes:
(a) Load combinations are defined in Section 3E.4.3
(b) Vu = Maximum in-plane shear demand
(c) φVc = Nominal in-plane shear strength due to concrete as defined in Section 3E.4.4
(d) D/C = Demand/Capacity, i.e. Vu/φVn

Table 3E.4-2 – {Demand and Capacity for Out-of-Plane Shear}

Section	Load [a] Combination	Vu [b] (kip)	φVc [c] (kip)	D/C [d]
Common Basemat	Normal	~~6454~~6208	~~8741~~8154	~~0.74~~0.76
	Wind	~~6465~~6218	~~8741~~8152	~~0.74~~0.76
	~~SPH~~	~~6182~~	~~8741~~	~~0.71~~
	SSE	~~5004~~3209	~~8741~~4198	~~0.57~~0.76
	Tornado	~~4238~~2411	~~8741~~4242	~~0.48~~0.57
	PMH	~~4147~~2295	~~7137~~4241	~~0.58~~0.54
~~UHS EB Basemat~~	~~Normal~~	~~654~~	~~5934~~	~~0.11~~
	~~Wind~~	~~661~~	~~5934~~	~~0.11~~
	~~SPH~~	~~821~~	~~5934~~	~~0.14~~
	~~SSE~~	~~725~~	~~5934~~	~~0.12~~
	~~Tornado~~	~~412~~	~~5934~~	~~0.07~~
	~~PMH~~	~~714~~	~~5934~~	~~0.12~~
Forebay Long Wall	Normal	~~6439~~6992	~~7797~~7288	~~0.83~~0.96
	Wind	~~6446~~7005	~~7797~~7285	~~0.83~~0.96
	~~SPH~~	~~5878~~	~~7797~~	~~0.75~~
	SSE	~~5271~~5194	~~7797~~7122	~~0.68~~0.73
	Tornado	~~4679~~5527	~~7797~~7320	~~0.60~~0.76
	PMH	~~3229~~6263	~~7797~~7304	~~0.41~~0.86
UHS MWIS Water Basin Side Wall	Normal	~~2461~~1900	~~3710~~5336	~~0.66~~0.36
	Wind	~~2464~~1909	~~3710~~5333	~~0.66~~0.36
	~~SPH~~	~~1705~~	~~3710~~	~~0.46~~
	SSE	~~1622~~2092	~~3710~~5235	~~0.44~~0.40
	Tornado	~~1336~~913	~~3710~~5251	~~0.36~~0.17
	PMH	~~1152~~1330	~~3710~~5322	~~0.31~~0.25
UHS MWIS Pump House Side Wall	Normal	~~107~~81	~~1031~~470	~~0.10~~0.17
	Wind	~~128~~85	~~1031~~469	~~0.12~~0.18
	~~SPH~~	~~648~~	~~1031~~	~~0.63~~
	SSE	~~83~~67	~~1031~~405	~~0.08~~0.16
	Tornado	~~79~~60	~~1031~~468	~~0.08~~0.13
	PMH	~~842~~190	~~1031~~468	~~0.82~~0.41
~~UHS EB North Wall~~	~~Normal~~	~~1490~~	~~2091~~	~~0.71~~
	~~Wind~~	~~1499~~	~~2091~~	~~0.72~~
	~~SPH~~	~~1932~~	~~2091~~	~~0.92~~
	~~SSE~~	~~1815~~	~~2091~~	~~0.87~~
	~~Tornado~~	~~847~~	~~2091~~	~~0.41~~
	~~PMH~~	~~1392~~	~~2091~~	~~0.67~~

Notes:
(a) Load combinations are defined in Section 3E.4.3
(b) Vu = Maximum out-of-plane shear demand
(c) φVc = Nominal out-of-plane shear strength due to concrete as defined in Section 3E.4.4
(d) D/C = Demand/Capacity, i.e. Vu/φVc

Table 3E.4-3 – {Demand and Capacity for Combined Moment and Axial Force}
(Page 1 of 5)

Section Direction	Load [a] Combination	Mu [b] (kip-ft)	Pu [c] (kip)	φMn [d] (kip-ft)	φPn [e] (kip)	D/C [f]
(a) CBIS Common Basemat (5 ft thick) (for areas where 1 layer of #11 @ ~~67~~" each face is required)						
~~N-S~~	~~Normal~~	~~444~~	~~0~~	~~544~~	~~1881~~	~~0.82~~
	~~Wind~~	~~446~~	~~0~~	~~544~~	~~1881~~	~~0.82~~
	~~SPH~~	~~473~~	~~0~~	~~544~~	~~1881~~	~~0.87~~
	~~SSE~~	~~263~~	~~15~~	~~573~~	~~1881~~	~~0.46~~
	~~Tornado~~	~~238~~	~~0~~	~~544~~	~~1881~~	~~0.44~~
	~~PMH~~	~~190~~	~~0~~	~~544~~	~~1881~~	~~0.35~~
~~E-W~~	~~Normal~~	~~259~~	~~0~~	~~544~~	~~1881~~	~~0.48~~
	~~Wind~~	~~262~~	~~0~~	~~544~~	~~1881~~	~~0.48~~
	~~SPH~~	~~389~~	~~0~~	~~544~~	~~1881~~	~~0.71~~
	~~SSE~~	~~83~~	~~-65~~	~~421~~	~~-245~~	~~0.27~~
	~~Tornado~~	~~157~~	~~0~~	~~544~~	~~1881~~	~~0.29~~
	~~PMH~~	~~195~~	~~0~~	~~544~~	~~1881~~	~~0.36~~
N S	Normal	663	200	1079	1908	0.61
	Wind	671	195	1071	1908	0.63
	SSE	358	-8	730	-183	0.49
	Tornado	397	25	693	164	0.57
	PMH	450	236	1131	1908	0.40
E W	Normal	457	62	877	1908	0.52
	Wind	456	61	876	1908	0.52
	SSE	145	44	824	1908	0.18
	Tornado	267	66	884	1908	0.30
	PMH	269	73	897	1908	0.30
(b) CBIS Common Basemat (5 ft thick) (for areas where 2 layers of #11 @ ~~7~~6" each face is required)						
~~N-S~~	~~Normal~~	~~1043~~	~~0~~	~~1083~~	~~2000~~	~~0.96~~
	~~Wind~~	~~1045~~	~~0~~	~~1083~~	~~1999~~	~~0.97~~
	~~SPH~~	~~845~~	~~0~~	~~1083~~	~~2048~~	~~0.78~~
	~~SSE~~	~~689~~	~~18~~	~~1117~~	~~2048~~	~~0.62~~
	~~Tornado~~	~~629~~	~~0~~	~~1083~~	~~2048~~	~~0.58~~
	~~PMH~~	~~458~~	~~0~~	~~1083~~	~~2048~~	~~0.42~~
~~E-W~~	~~Normal~~	~~404~~	~~0~~	~~1083~~	~~2048~~	~~0.37~~
	~~Wind~~	~~404~~	~~0~~	~~1083~~	~~2048~~	~~0.37~~
	~~SPH~~	~~656~~	~~0~~	~~1083~~	~~2048~~	~~0.61~~
	~~SSE~~	~~261~~	~~20~~	~~1121~~	~~2048~~	~~0.23~~
	~~Tornado~~	~~256~~	~~0~~	~~1083~~	~~2048~~	~~0.24~~
	~~PMH~~	~~480~~	~~0~~	~~1083~~	~~2048~~	~~0.44~~
N S	Normal	663	200	1695	2103	0.39
	Wind	671	195	1690	2103	0.40
	SSE	358	-8	1432	-519	0.25
	Tornado	397	25	1396	501	0.28
	PMH	450	236	1731	2103	0.26

Table 3E.4-3 – {Demand and Capacity for Combined Moment and Axial Force}
(Page 2 of 5)

Section Direction	Load [a] Combination	Mu [b] (kip-ft)	Pu [c] (kip)	φMn [d] (kip-ft)	φPn [e] (kip)	D/C [f]
E W	Normal	1069	51	1516	2101	0.71
	Wind	1070	51	1516	2101	0.71
	SSE	499	44	1507	2103	0.33
	Tornado	671	59	1526	2103	0.44
	PMH	741	68	1538	2103	0.48
~~{c) UHS EB Common Basemat (5 ft thick) (1 layer #9 @ 12" each face)~~						
~~N-S~~	~~Normal~~	~~52~~	~~0~~	~~199~~	~~1776~~	~~0.26~~
	~~Wind~~	~~52~~	~~0~~	~~199~~	~~1776~~	~~0.26~~
	~~SPH~~	~~69~~	~~0~~	~~199~~	~~1776~~	~~0.35~~
	~~SSE~~	~~63~~	~~3~~	~~204~~	~~1776~~	~~0.31~~
	~~Tornado~~	~~28~~	~~0~~	~~199~~	~~1776~~	~~0.14~~
	~~PMH~~	~~45~~	~~0~~	~~199~~	~~1776~~	~~0.23~~
~~E-W~~	~~Normal~~	~~74~~	~~0~~	~~199~~	~~1776~~	~~0.37~~
	~~Wind~~	~~75~~	~~0~~	~~199~~	~~1776~~	~~0.37~~
	~~SPH~~	~~104~~	~~0~~	~~199~~	~~1776~~	~~0.52~~
	~~SSE~~	~~96~~	~~10~~	~~217~~	~~1776~~	~~0.44~~
	~~Tornado~~	~~41~~	~~0~~	~~199~~	~~1776~~	~~0.21~~
	~~PMH~~	~~78~~	~~0~~	~~199~~	~~1776~~	~~0.39~~

Table 3E.4-3 – {Demand and Capacity for Combined Moment and Axial Force}
(Page 3 of 5)

Section Direction	Load [a] Combination	Mu [b] (kip-ft)	Pu [c] (kip)	φMn [d] (kip-ft)	φPn [e] (kip)	D/C [f]
(~~d~~c) Forebay Long Wall (4.5 ft thick) (for areas where 1 layer of #11 @ ~~7~~6" each face is required)						
~~**Vertical**~~	~~Normal~~	~~487~~	~~64~~	~~597~~	~~1709~~	~~0.81~~
	~~Wind~~	~~488~~	~~64~~	~~598~~	~~1709~~	~~0.82~~
	~~SPH~~	~~361~~	~~46~~	~~566~~	~~1709~~	~~0.64~~
	~~SSE~~	~~311~~	~~37~~	~~551~~	~~1709~~	~~0.56~~
	~~Tornado~~	~~296~~	~~42~~	~~559~~	~~1709~~	~~0.53~~
	~~PMH~~	~~278~~	~~37~~	~~551~~	~~1709~~	~~0.50~~
~~**Horizontal**~~	~~Normal~~	~~290~~	~~7~~	~~501~~	~~1709~~	~~0.58~~
	~~Wind~~	~~290~~	~~7~~	~~501~~	~~1709~~	~~0.58~~
	~~SPH~~	~~245~~	~~29~~	~~539~~	~~1709~~	~~0.45~~
	~~SSE~~	~~206~~	~~7~~	~~500~~	~~1709~~	~~0.41~~
	~~Tornado~~	~~176~~	~~8~~	~~503~~	~~1709~~	~~0.35~~
	~~PMH~~	~~147~~	~~40~~	~~557~~	~~1709~~	~~0.26~~
Vertical	Normal	540	49	735	1737	0.74
	Wind	541	485	734	1737	0.74
	SSE	205	15	685	1737	0.30
	Tornado	349	47	732	1737	0.48
	PMH	362	43	727	1737	0.50
Horizontal	Normal	333	37	607	176	0.55
	Wind	336	38	606	175	0.55
	SSE	194	42	703	1737	0.28
	Tornado	180	21	639	254	0.28
	PMH	209	21	640	239	0.33
(~~e~~d) Forebay Long Wall (4.5 ft thick) (for areas where 2 layers of #11 @ ~~7~~6" each face are required)						
~~**Vertical**~~	~~Normal~~	~~960~~	~~125~~	~~1174~~	~~1764~~	~~0.82~~
	~~Wind~~	~~961~~	~~125~~	~~1173~~	~~1763~~	~~0.82~~
	~~SPH~~	~~805~~	~~161~~	~~1234~~	~~1858~~	~~0.65~~
	~~SSE~~	~~627~~	~~103~~	~~1138~~	~~1876~~	~~0.55~~
	~~Tornado~~	~~599~~	~~93~~	~~1121~~	~~1876~~	~~0.53~~
	~~PMH~~	~~551~~	~~113~~	~~1155~~	~~1876~~	~~0.48~~
~~**Horizontal**~~	~~Normal~~	~~915~~	~~66~~	~~1075~~	~~1792~~	~~0.85~~
	~~Wind~~	~~915~~	~~66~~	~~1075~~	~~1791~~	~~0.85~~
	~~SPH~~	~~798~~	~~89~~	~~1114~~	~~1862~~	~~0.72~~
	~~SSE~~	~~629~~	~~61~~	~~1067~~	~~1876~~	~~0.59~~
	~~Tornado~~	~~574~~	~~55~~	~~1058~~	~~1876~~	~~0.54~~
	~~PMH~~	~~448~~	~~61~~	~~1068~~	~~1876~~	~~0.42~~
Vertical	Normal	1106	57	1341	1803	0.82
	Wind	1106	56	1341	1803	0.82
	SSE	473	18	1299	1932	0.36
	Tornado	696	55	1339	1932	0.52
	PMH	754	50	1334	1932	0.56
Horizontal	Normal	775	252	814	274	0.95
	Wind	782	254	811	270	0.96
	SSE	285	-91	1113	-538	0.26
	Tornado	441	211	891	454	0.50
	PMH	544	245	828	398	0.66

Table 3E.4-3 – {Demand and Capacity for Combined Moment and Axial Force}
(Page 4 of 5)

Section Direction	Load [a] Combination	Mu [b] (kip-ft)	Pu [c] (kip)	φMn [d] (kip-ft)	φPn [e] (kip)	D/C [f]
(f~~e~~) UHS MWIS Water Basin Side Wall (4 ft thick) (1 layer of #11 @ ~~10~~9" each face)						
~~**Vertical**~~	~~Normal~~	~~425~~	~~140~~	~~510~~	~~1488~~	~~0.83~~
	~~Wind~~	~~430~~	~~142~~	~~513~~	~~1488~~	~~0.84~~
	~~SPH~~	~~520~~	~~170~~	~~555~~	~~1488~~	~~0.94~~
	~~SSE~~	~~324~~	~~62~~	~~394~~	~~1488~~	~~0.82~~
	~~Tornado~~	~~285~~	~~94~~	~~442~~	~~1488~~	~~0.65~~
	~~PMH~~	~~558~~	~~182~~	~~573~~	~~1475~~	~~0.97~~
~~**Horizontal**~~	~~Normal~~	~~190~~	~~34~~	~~353~~	~~1488~~	~~0.54~~
	~~Wind~~	~~191~~	~~34~~	~~353~~	~~1488~~	~~0.54~~
	~~SPH~~	~~34~~	~~-101~~	~~151~~	~~-179~~	~~0.56~~
	~~SSE~~	~~144~~	~~12~~	~~319~~	~~1488~~	~~0.45~~
	~~Tornado~~	~~116~~	~~17~~	~~326~~	~~1488~~	~~0.36~~
	~~PMH~~	~~177~~	~~35~~	~~353~~	~~1488~~	~~0.50~~
Vertical	Normal	170	37	337	136	0.50
	Wind	170	38	336	136	0.50
	SSE	172	-81	264	-135	0.65
	Tornado	132	23	360	157	0.37
	PMH	103	32	345	172	0.30
Horizontal	Normal	48	80	266	200	0.40
	Wind	49	81	264	200	0.41
	SSE	114	-34	342	-166	0.33
	Tornado	63	48	318	193	0.25
	PMH	40	54	309	205	0.26

Table 3E.4-3 – {Demand and Capacity for Combined Moment and Axial Force}
(Page 5 of 5)

Section Direction	Load [a] Combination	Mu [b] (kip-ft)	Pu [c] (kip)	φMn [d] (kip-ft)	φPn [e] (kip)	D/C [f]
~~g~~(f) UHS MWIS Pump House Side Wall (2 ft thick) (1 layer #9 @ ~~10~~9" each face)						
~~**Vertical**~~	~~Normal~~	~~2~~	~~-13~~	~~85~~	~~-127~~	~~0.10~~
	~~Wind~~	~~2~~	~~-15~~	~~84~~	~~-127~~	~~0.12~~
	~~SPH~~	~~3~~	~~-27~~	~~75~~	~~-125~~	~~0.21~~
	~~SSE~~	~~1~~	~~-7~~	~~89~~	~~-128~~	~~0.06~~
	~~Tornado~~	~~4~~	~~14~~	~~105~~	~~760~~	~~0.04~~
	~~PMH~~	~~15~~	~~14~~	~~105~~	~~760~~	~~0.14~~
~~**Horizontal**~~	~~Normal~~	~~1~~	~~-55~~	~~55~~	~~-128~~	~~0.43~~
	~~Wind~~	~~2~~	~~-58~~	~~53~~	~~-127~~	~~0.45~~
	~~SPH~~	~~20~~	~~-81~~	~~36~~	~~-102~~	~~0.79~~
	~~SSE~~	~~2~~	~~-38~~	~~67~~	~~-127~~	~~0.30~~
	~~Tornado~~	~~13~~	~~3~~	~~97~~	~~760~~	~~0.13~~
	~~PMH~~	~~32~~	~~-27~~	~~75~~	~~-85~~	~~0.43~~
Vertical	Normal	13	-18	109	-131	0.17
	Wind	13	-20	107	-130	0.18
	SSE	15	-56	81	-129	0.18
	Tornado	36	-15	111	-107	0.32
	PMH	29	-34	98	-114	0.30
Horizontal	Normal	6	-74	66	-138	0.53
	Wind	6	-75	64	-138	0.55
	SSE	10	-68	71	-134	0.51
	Tornado	24	-46	89	-119	0.38
	PMH	16	-57	80	-128	0.45
~~**(h) UHS EB North Wall (2 ft thick) (1 layer #9 @ 12" each face)**~~						
~~**Vertical**~~	~~Normal~~	~~29~~	~~15~~	~~89~~	~~748~~	~~0.33~~
	~~Wind~~	~~30~~	~~15~~	~~89~~	~~748~~	~~0.34~~
	~~SPH~~	~~55~~	~~27~~	~~98~~	~~748~~	~~0.56~~
	~~SSE~~	~~32~~	~~14~~	~~89~~	~~748~~	~~0.37~~
	~~Tornado~~	~~17~~	~~11~~	~~86~~	~~748~~	~~0.20~~
	~~PMH~~	~~50~~	~~30~~	~~100~~	~~748~~	~~0.50~~
~~**Horizontal**~~	~~Normal~~	~~58~~	~~12~~	~~87~~	~~748~~	~~0.67~~
	~~Wind~~	~~59~~	~~12~~	~~87~~	~~748~~	~~0.68~~
	~~SPH~~	~~87~~	~~14~~	~~88~~	~~748~~	~~0.99~~
	~~SSE~~	~~70~~	~~9~~	~~85~~	~~748~~	~~0.82~~
	~~Tornado~~	~~33~~	~~8~~	~~84~~	~~748~~	~~0.39~~
	~~PMH~~	~~69~~	~~13~~	~~88~~	~~748~~	~~0.78~~

Notes:

(a) Load combinations are defined in Section 3E.4.3
(b) Mu = Bending moment demand
(c) Pu = Axial force demand (positive for compression)
(d) φMn = Bending moment capacity
(e) φPn = Axial force capacity
(f) D/C = Demand/capacity, larger of Mu/φMn and Pu/φPn

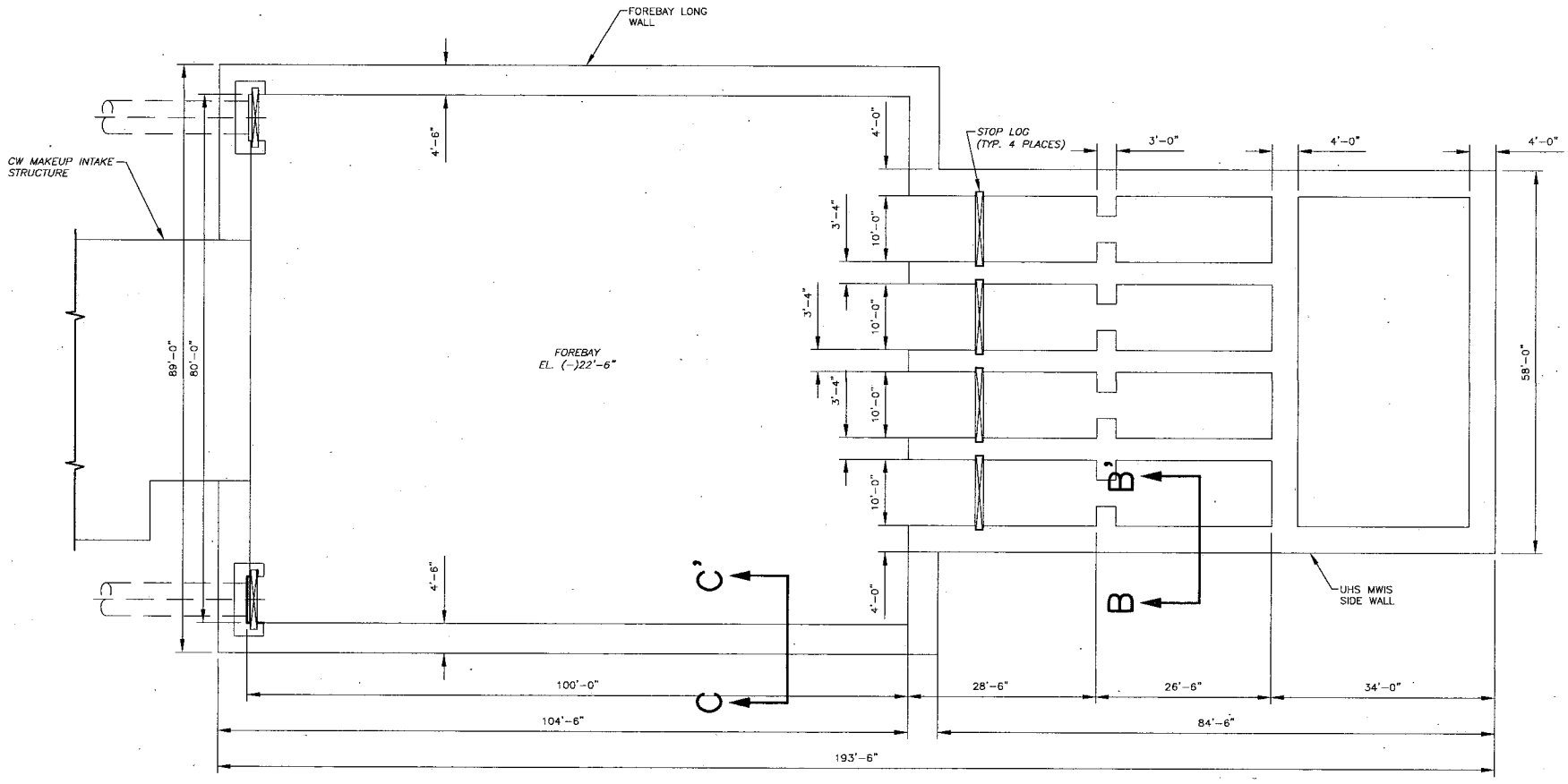
Table 3E.4-4 – {Demand and Capacity for Shear Friction}

Section	Load [a] Combination	Nu [b] (kip)	Vu [c] (kip)	φVn [d] (kip)	D/C [e]
Forebay Long Wall (2 layers of #11@~~7~~6")	Normal	~~-6620~~3929	~~7852~~2987	~~2973~~44204	~~0.26~~0.07
	Wind	~~-6605~~3878	~~7859~~3650	~~2973~~44204	~~0.26~~0.08
	~~SPH~~	~~-6365~~	~~6247~~	~~29733~~	~~0.21~~
	SSE	~~-3911~~856.4	~~5354~~1974	~~2973~~44204	~~0.18~~0.04
	Tornado	~~-4432~~4521	~~4782~~1567	~~2973~~44204	~~0.16~~0.04
	PMH	~~-4778~~4218	~~3794~~2087	~~2973~~44204	~~0.13~~0.05
UHS MWIS Water Basin Side Wall (2 layers of #11@~~10~~9")	Normal	~~-1936~~3158	~~2982~~4129	~~1126~~32710	~~0.26~~0.13
	Wind	~~-1934~~3107	~~2982~~4138	~~1126~~32710	~~0.26~~0.13
	~~SPH~~	~~-1662~~	~~2525~~	~~11266~~	~~0.22~~
	SSE	~~-1701~~1239	~~2063~~2979	~~1126~~32710	~~0.18~~0.09
	Tornado	~~-1175~~1572	~~1671~~2281	~~1126~~32710	~~0.15~~0.07
	PMH	~~-1538~~2910	~~1771~~2265	~~1126~~32710	~~0.16~~0.07
UHS MWIS Pump House Side Wall (~~2~~1 layers of #9@~~10~~9")	Normal	~~-306~~202	~~111~~241	~~4468~~2250	~~0.02~~0.11
	Wind	~~-280~~184	~~131~~253	~~4468~~2250	~~0.03~~0.11
	~~SPH~~	~~-638~~	~~651~~	~~4468~~	~~0.15~~
	SSE	91-288	~~423~~447	~~4390~~2250	~~0.10~~0.20
	Tornado	~~-176~~154	~~79~~165	~~4468~~2250	~~0.02~~0.07
	PMH	~~-1124~~151	~~842~~279	~~4468~~2250	~~0.19~~0.12
~~**UHS EB North Wall (2 layers of #9@12")**~~	~~Normal~~	~~-790~~	~~1501~~	~~7548~~	~~0.20~~
	~~Wind~~	~~-777~~	~~1511~~	~~7548~~	~~0.20~~
	~~SPH~~	~~-748~~	~~1972~~	~~7548~~	~~0.26~~
	~~SSE~~	~~-978~~	~~1821~~	~~7548~~	~~0.24~~
	~~Tornado~~	~~-583~~	~~848~~	~~7548~~	~~0.11~~
	~~PMH~~	~~-792~~	~~1399~~	~~7548~~	~~0.19~~

Notes:
(a) Load combinations are defined in Section 3E.4.3
(b) Nu = Normal force on friction interface (positive for tension)
(c) Vu = Shear demand, vector sum of in-plane and out-of-plane shear
(d) φVn = Nominal shear friction strength
(e) D/C = Demand/Capacity, i.e. Vu/φVn

Figure Replaced

Figure 3E.4-1—{Foundation Plan for the Forebay and UHS Makeup Water Intake Structure @ Elevation -22.5 ft (-6.86 m)}

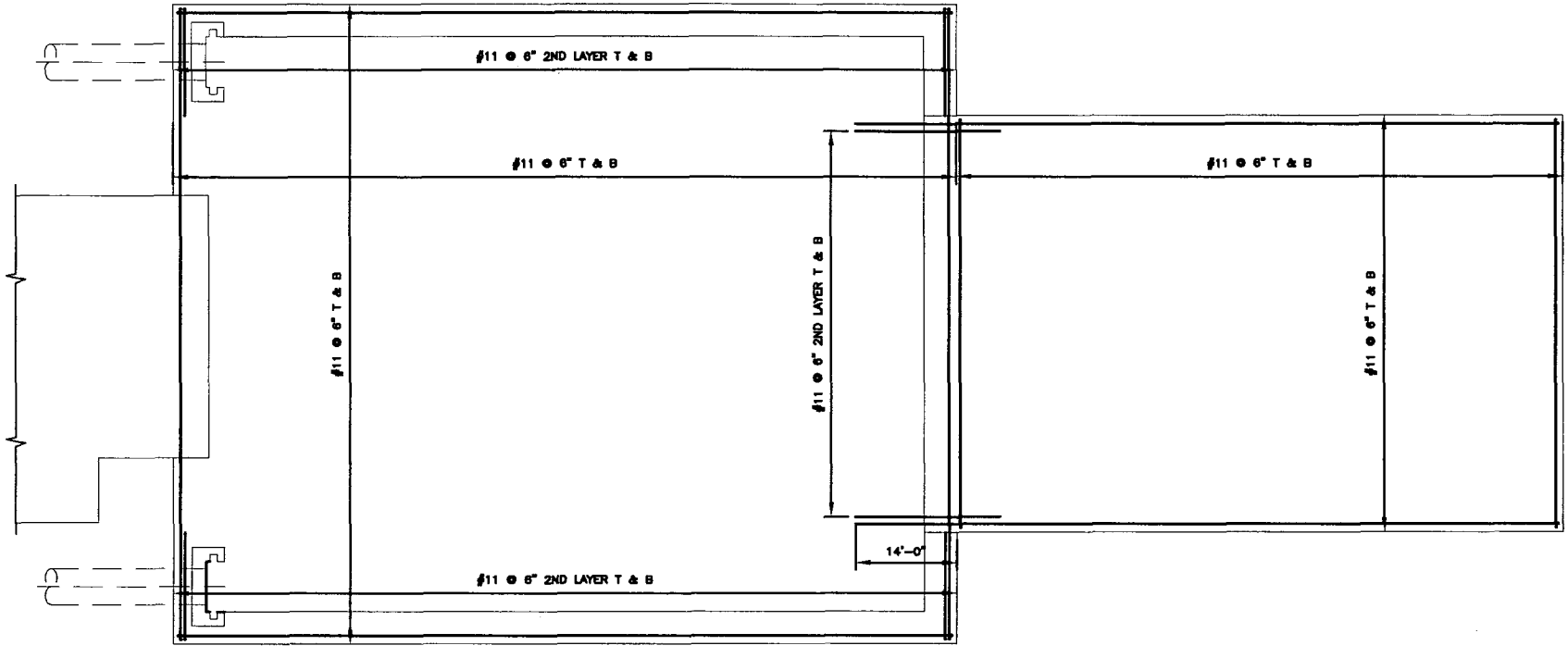


SCALE: 1/16"=1'–0"

Figure 3E.4-2—~~{Foundation Plan for UHS Electrical Building @ Elevation -5.5 ft (-1.68m)~~Not Used~~}~~

Figure Replaced

Figure 3E.4-3—{Reinforcement for Forebay and UHS Makeup Water Intake Structure Basemat}

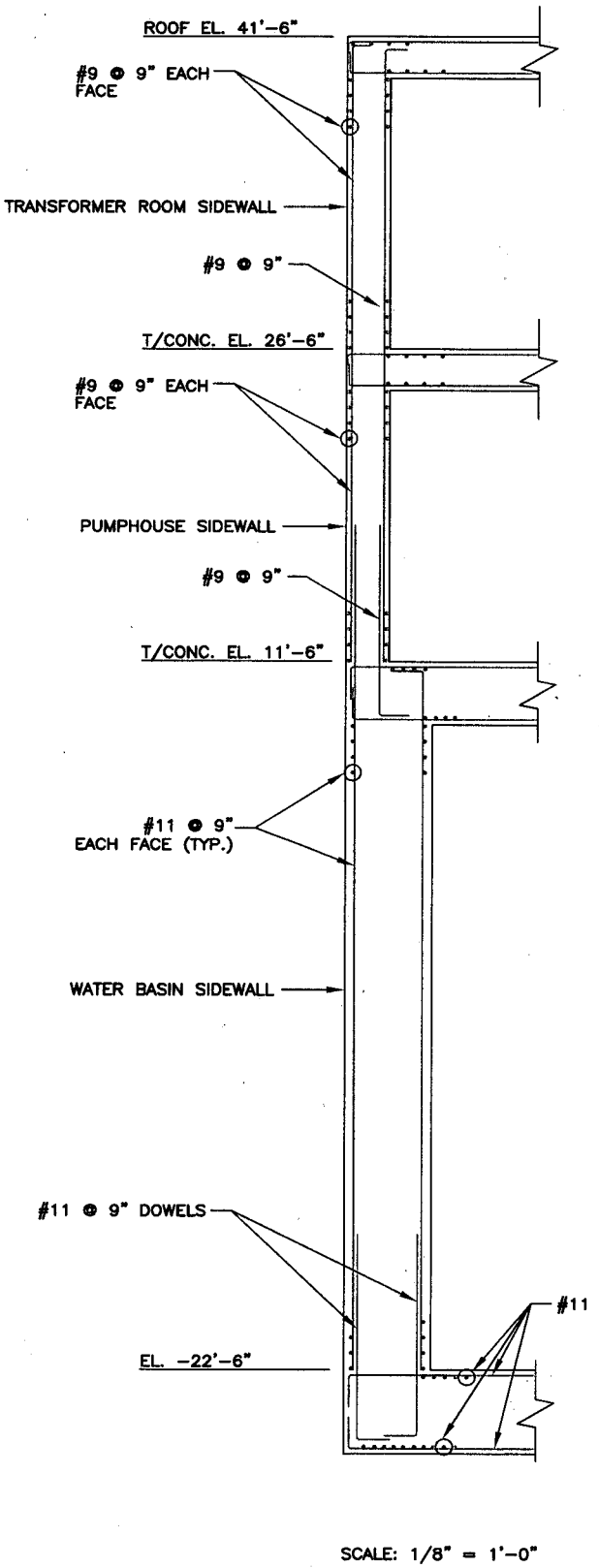


SCALE: 1/16"=1'-0"

~~Note: Required rebar spacing is 7" (Table 3E.4-3 (a), (b)).~~

Figure Replaced

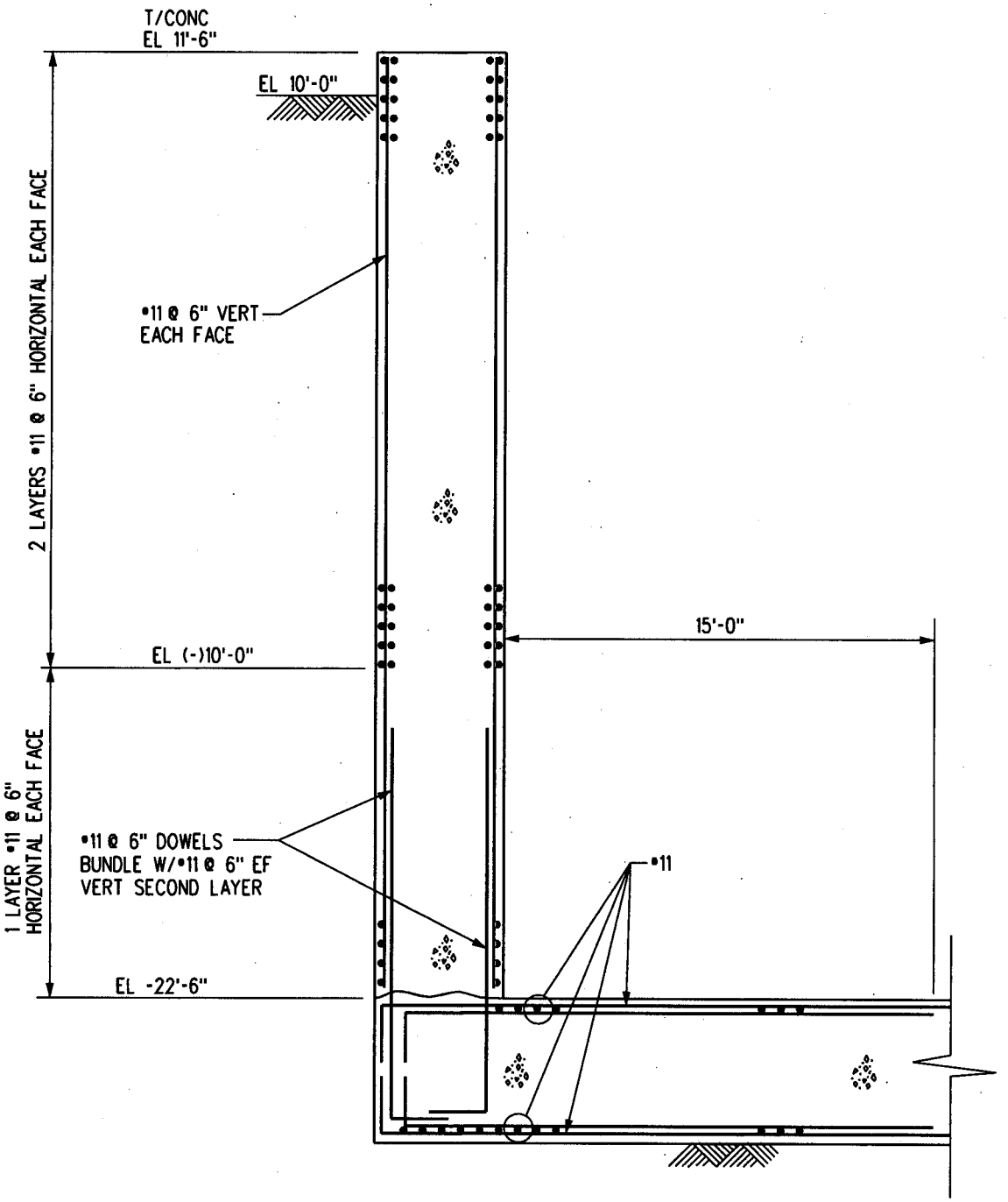
Figure 3E.4-4—{Reinforcement for Forebay and UHS Makeup Water Intake Structure Walls - UHS Makeup Water Intake Structure Side Wall (Section B)}



~~Note: Required rebar spacing for #11 is 10" (Table 3E.4-3 (f), (g)).~~

Figure Replaced

Figure 3E.4-5—{Reinforcement for Forebay and UHS Makeup Water Intake Structure Walls - Forebay Long Wall (Section C)}



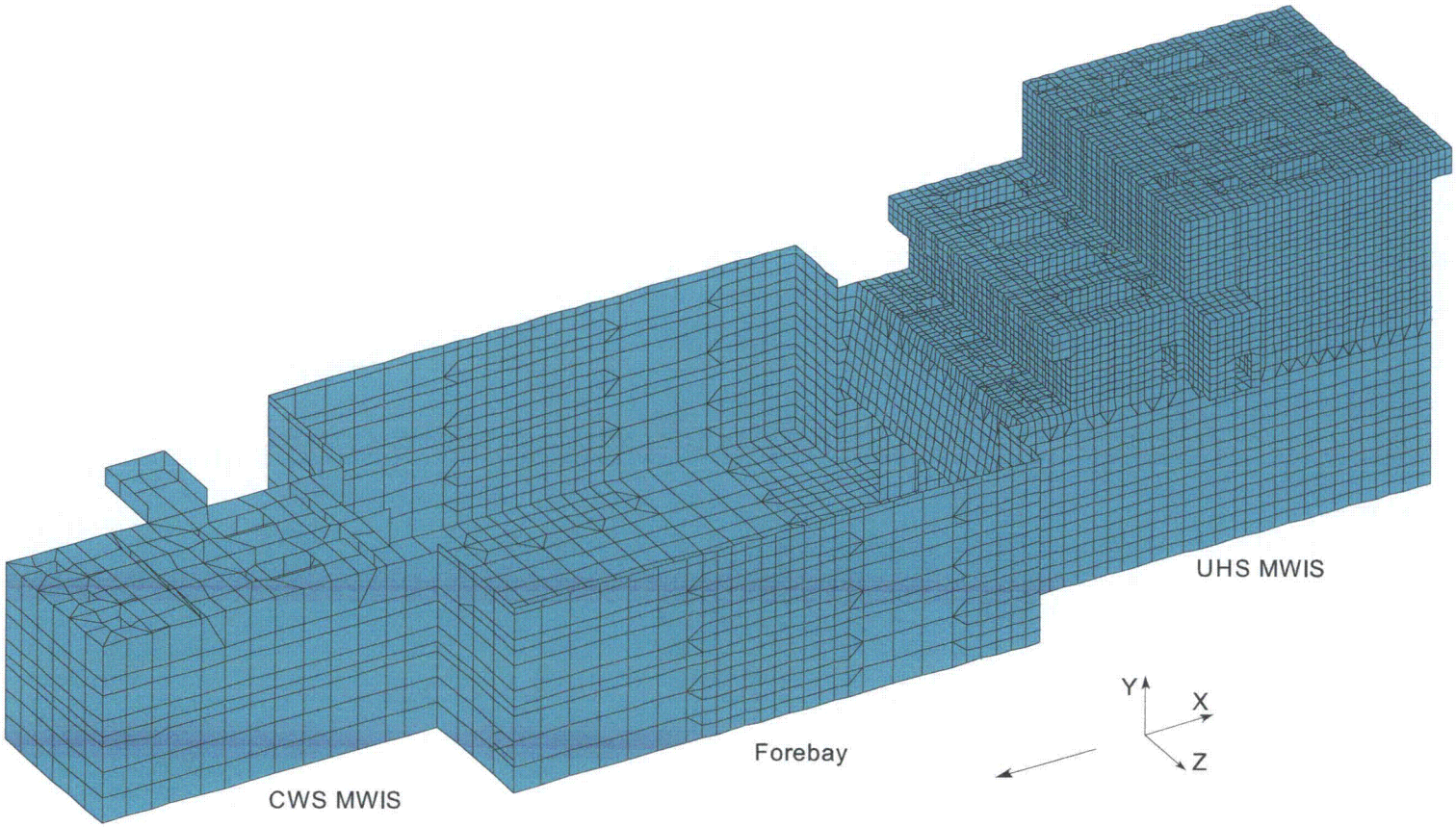
~~Note: Required rebar spacing is 7" (Table 3E.4-3 (d), (e)).~~

Figure 3E.4-6—~~{Reinforcement for UHS Electrical Building Basemat~~Not Used~~}~~

Figure 3E.4-7—~~{Reinforcement for UHS Electrical Building North Wall~~Not Used~~}~~

New Figure

Figure 3E.4-8—{Isometric View of the Common Basemat Intake Structures STAAD Pro Model for Static Analyses}



3F {SITE RESPONSE ANALYSIS AND SSI ANALYSIS INPUT FOR EPGB, ESWB, AND CBIS~~, AND UHS ELECTRICAL BUILDING~~

This Appendix added as a Supplement to the U.S. EPR FSAR.

This appendix discusses in detail the development of the seismic ground motions and the strain-compatible soil profile properties, which are used in the Soil-Structure Interaction (SSI) analysis of Seismic Category I structures. Structures analyzed in the intake area include the Common Basemat Intake Structures (CBIS)~~, and the UHS Electrical Building~~. The CBIS includes two Seismic Category I structures: the Ultimate Heat Sink (UHS) Makeup Water Intake Structure and the Forebay, as well as the Seismic Category II Circulating Water Makeup Intake Structure, which all share the same basemat. Structures analyzed in the vicinity of the Nuclear Island (NI) include the Emergency Power Generating Buildings (EPGB) and the Essential Service Water Buildings (ESWB). Seismic ground motions and the strain-compatible soil profile properties for the structures associated with the NI common basemat are not discussed in this appendix.

Section 3F.1 describes the development of the Foundation Input Response Spectra (FIRS). The FIRS are developed in accordance with Regulatory Guide 1.208 (NRC, 2007), through seismic site response analysis using the rock motion spectra, presented in Section 2.5.2.5.1.4, and the soil profile properties, presented in Section 2.5.4.2. The FIRS are modified according to the requirements for checking the adequacy of the SSI input motion (NRC, 2009 and NEI, 2009). FIRS for EPGB and ESWB are amplified to account for the structure-soil-structure Interaction (SSSI) effects due to NI Common Basemat Structures.

The Site Safe Shutdown Earthquake (Site SSE), presented in Section 3.7.1.1.1.1, is shown to envelop the Adjusted FIRS, and therefore its adequacy for use in SSI analysis is confirmed. The Site SSE strain-compatible soil properties are discussed in Section 3F.2. The acceleration time histories that are to be applied at the foundation of the structures in the SSI analysis are presented in Section 3F.3. Section 3F.4 describes the computer codes used in the analyses, while Section 3F.5 includes a list of the references.

3F.1 FOUNDATION INPUT REPONSE SPECTRA (FIRS)

The EPGB and ESWB are situated at the CCNPP Unit 3 site in the NI area. The bottom of the ESWB basemat is situated approximately 22 ft (6.7 m) below grade, while the bottom of the EPGB basemat is situated approximately 5 ft (1.5 m) below grade. The confirmatory SSI analysis, the EPGB is treated as a surface structure, the FIRS for the EPGB are calculated at the ground surface.

The site-specific Seismic Category I CBIS ~~and UHS Electrical Building~~ are situated at the CCNPP Unit 3 intake area, along the west bank of the Chesapeake Bay. The bottom of the CBIS common basemat is situated approximately 37.5 ft (11.4 m) below grade~~, while the bottom of the UHS Electrical Building mat foundation is situated approximately 20.5 ft (6.2 m) below grade~~. Table 3F-1 summarizes the bottom of foundation depths and elevations.

The generation of low-strain site-specific simulated soil property profiles is described in Section 3F1.1, the site response analysis is discussed in Section 3F.1.2, and the calculation of FIRS is presented in Section 3F.1.3. The adjustment of FIRS is described in Section 3F.1.4 and 3F.1.5, where the Adjusted FIRS are compared to Site SSE. The Site SSE is found to envelop the Adjusted FIRS, and is therefore adequate for use in the SSI analysis.

3F.1.1 DYNAMIC SOIL PROFILE AND STOCHASTIC SIMULATION

The computer program SPS, described in Section 3F.4, is used to generate site-specific simulated (randomized) soil profiles to represent the dynamic properties of the site while considering the uncertainty associated with each of these properties. The generation of the low-strain simulated soil profiles requires the input Best Estimate (BE) properties and their associated uncertainty. The uncertainty is expressed in terms of statistical distribution, standard deviation (SD), and correlation among engineering parameters.

The static and dynamic soil properties, required to generate the simulated profiles for the NI and Intake areas, are provided in Section 2.5.4.2. These properties include shear wave velocity, thicknesses, unit weight, and the strain-dependent property curves (shear modulus reduction and damping ratio) for the different soil layers (including the structural backfill). Figures 3F-1 and 3F-2 present the BE low-strain shear wave velocity profile for the NI area and Intake area, respectively (also see Figures 2.5-167 and 2.5-169). The total BE soil column thickness is about 2,500 ft (762 m) in both areas. At that depth, bedrock is defined with a shear-wave velocity of 9,200 ft/sec (2,804 m/sec). Figures 3F-3 and 3F-4 present the associated log-standard deviation for the shear wave velocity profile at the NI area and Intake area, respectively. While the two areas share similar properties for the deep soil strata, they are different with respect to finished grade elevation, ground water level elevation, thickness of backfill, and the upper soil strata.

Two sets of 60 simulated profiles, representing the NI and Intake area site conditions, are generated. Figure 3F-5 presents the set of 60 simulated low-strain shear wave velocity profiles for the NI area, which includes the thickness variation of the soil layers. The figure also presents the BE profile used as input for simulation and the simulated median profile, calculated as the log-mean of the 60 simulated profiles, and shows a close match between these two profiles. Figure 3F-6 presents the corresponding low-strain shear wave velocity profiles for the Intake area, also having a close match between the BE and simulated median.

As an example, the simulated shear strength reduction and damping ratio curves for the uppermost fill layer (referred to as Fill 1) at the NI area are presented in Figures 3F-7a and 3F-7b, respectively. In these figures, the BE and simulated median are compared as well as the input log-standard deviation (Input SD) and simulated log-standard deviation (Simulated SD). Maximum and minimum bounds of twice the SD around the BE are imposed on the strain-dependent property curves. Note that damping curves, in Figure 3F-7b, are truncated at a maximum of 15% as described by NUREG/CR-1161, which explains the discrepancy between input and simulated properties once that upper limit is reached. The damping truncation at 15% is a conservative measure with respect to their subsequent use in site response analysis.

3F.1.2 SITE RESPONSE ANALYSIS

The low-frequency (LF) and high frequency (HF) input rock spectra at the 1E-4 and 1E-5 hazard levels (or annual probability of exceedance) are presented in Section 2.5.2.5.1.4, Figures 2.5-70 and 2.5-71. The rock spectra are applied at bedrock having a shear wave velocity of 9,200 ft/sec (2,804 m/sec), and are propagated from bedrock to the ground surface, through the two sets of 60 simulated profiles, for the NI and Intake areas, using the computer program P-SHAKE (described in Section 3F.4).

As an input for site response analysis, the duration of the input motion is specified as a parameter in P-SHAKE. The strong motion durations are determined using the magnitudes (M) of the four input rock motions (see Table 3F-2), and Table 2.3-1 in ASCE 4-98 (ASCE, 2000). The magnitudes and corresponding durations are reported in Table 3F-2. An additional parameter required for P-SHAKE is the effective strain ratio, which is calculated as a function of earthquake

magnitude, as shown in Equation 3F-1 (Idriss and Sun, 1992). Kramer (1996) recommends the range for the effective strain ratio to be between 0.5 and 0.7. This range is imposed on the ratios calculated using Equation 3F-1. The resulting effective strain ratios used in site response analysis are reported in Table 3F-2.

Effective Strain Ratio = (M-1)/10 Equation (3F-1)

The free field 5% damping Acceleration Response Spectra (ARS) at the ground surface and at the bottom of foundation elevations are computed as outcrop motions through analysis of the full soil column up to the ground surface. All spectra are calculated at 301 points equally spaced in log-scale in the frequency range from 0.1 to 100 Hz (a period range of 0.01 to 10 seconds). The cut-off frequency of the P-SHAKE runs is 100 Hz. Log-mean (median) ARS are calculated from the ARS results for all 60 simulated profiles, for each set of P-SHAKE analyses. ARS amplification functions are calculated at each horizon, by dividing the ARS of the given horizon by the ARS of the input rock motion. Figure 3F-8 presents the ARS amplification functions calculated at 22 ft (6.7m) depth for the NI area~~, while Figure 3F-9 presents the ARS amplification functions calculated at 20.5 ft (6.2 m) depth for the Intake area~~. The ARS amplification functions are also calculated at ground surface in the NI area, and at ground surface and at 37.5 ft (11.4 m) below grade in the Intake area, but are not presented in figures.

The P-SHAKE runs provide the strain compatible shear wave velocities and damping ratio profiles (presented in Section 3F.2) as well as the maximum strains within each soil layer. Figure 3F-10 and Figure 3F-11 present the log-mean strain profiles for the NI area and Intake area, respectively.

FIRS Calculation

The horizontal Foundation Input Response Spectra (FIRS) are calculated using the procedure described in Section 5.1 of Regulatory Guide 1.208 (NRC, 2007). At 1E-4 hazard level, the log-mean ARS are obtained by enveloping the log-mean ARS for LF and HF for the horizon of interest. The same procedure is repeated for 1E-5 hazard level. Equations 3F-2 and 3F-3 are used to determine AR and DF factors for the horizon of interest.

$$A_R(f) = \frac{ARS_{1E-5}}{ARS_{1E-4}}$$ Equation (3F-2)

$$DF(f) = \max\left\{1.0,\ 0.6(A_R)^{0.8},\ 0.45\,A_R\right\}$$ Equation (3F-3)

The A_R and DF factors at the considered horizon are calculated as a function of frequency (*f*). The notation indicating the dependency on frequency is implied in Equation 3F-4. Given DF from Equation 3F-3, horizontal FIRS at the considered horizon are calculated using Equation 3F-4:

$$FIRS = DF \times ARS_{1E-4}$$ Equation (3F-4)

The FIRS are calculated using the 5% damping "outcrop" ARS. At ground surface, the FIRS are also designated as the performance-based surface response spectra (PBSRS).

The horizontal FIRS are scaled by an appropriate V/H scaling function to obtain the corresponding vertical FIRS. For this calculation, the V/H function is that presented in FSAR

Section 2.5.2.6 (Table 2.5-22) and presented below as Equation 3F-5, and is applicable for both rock and soil spectra at Calvert Cliffs:

V/H = 0.75	Freq £ 5 Hz	
= log-linearly interpolated	5 Hz < Freq < 25 Hz	Equation (3F-5)
= 1.00	Freq ³ 25 Hz	

Figure 3F-12 presents the horizontal and vertical FIRS calculated for the NI area, and Figure 3F-13 presents the horizontal and vertical FIRS calculated for the Intake area.

Best Estimate (BE), lower bound (LB) and upper bound (UB) soil properties are calculated consistent with the FIRS motions. The BE profile consists of the log-mean profile properties, and the LB and UB profiles are calculated maintaining a minimum variation of 0.5 on the shear modulus. Figure 3F-14 presents the shear wave velocity profiles strain-compatible with FIRS for the NI area. FIRS strain-compatible damping and P-wave velocity profiles, for the NI area, are presented in Figure 3F-15 and 3F-16, respectively. The corresponding profiles for the Intake area are presented in Figures 3F-17, and 3F-19. Note that the lower shear wave and primary wave velocity are used in conjunction with the higher damping values to form the LB profile, and vice versa for the UB profile.

3F.1.3 FIRS ADJUSTMENT

The adequacy of the horizontal and vertical FIRS, calculated at depth, as input ground motions for SSI analysis is evaluated by ensuring that the FIRS convolved from the foundation level up to the surface using the LB, BE, and UB FIRS strain-compatible soil properties envelop the PBSRS (i.e., the FIRS at ground surface). This verification is referred to as the NEI check in reference to the Nuclear Energy Institute (NEI) white paper (NEI, 2009) and Interim Staff Guidance (NRC, 2009). The check is conducted for each of the embedded FIRS, namely at the foundation elevation of the ESWB in the NI area, as well as the ~~UHS Electrical Building and~~ CBIS in the Intake area (refer to Table 3F-1 for foundation elevations).

For the NEI check, the horizontal and vertical FIRS are applied at the foundation level using the LB, BE, and UB FIRS strain-compatible soil properties, using P-SHAKE. The horizontal FIRS are convolved to the surface using vertically propagating shear-waves (VS) and the vertical FIRS are convolved to the surface through vertically propagating P-waves (VP). Shear-wave damping is used for both vertical and horizontal analyses. The analyses are carried out linearly with no further degradation of the strain-compatible shear modulus and damping profiles. The horizontal and vertical free field 5% damping ARS at surface corresponding to each FIRS are determined and the envelope ARS resulting from the LB, BE and UB soil columns is compared to the PBSRS. In the event the envelope of the LB, BE and UB ARS (at surface) does not envelop the corresponding PBSRS, the FIRS must be modified. The frequency dependent adjustment factor is either unity or the ratio of PBSRS to the envelope of LB, BE, and UB ARS, whichever is greater. This adjustment factor is applied to the computed FIRS at the foundation level to yield the horizontal and vertical Adjusted FIRS.

Figure 3F-20 presents the horizontal 5% damping ARS calculated at the ground surface using the FIRS at 37.5 ft (11.4 m) depth for the Intake area as input to P-SHAKE, and using the LB, BE and UB FIRS strain-compatible damping and shear-wave velocity profiles. The PBSRS is divided by the envelope of the response of the 3 soil cases to calculate the FIRS adjustment factor (also shown in Figure 3F-20), which is applied to the FIRS only if greater than 1. Figure 3F-21 presents the corresponding plot for the vertical 5% damping ARS. This check was also performed for the

Intake area FIRS at 20.5 ft (6.2 m) depth and the NI area FIRS at 22 ft (6.7 m) depth, but these checks are not presented in figures. Note that only in the case of the FIRS at 37.5 ft (11.4 m) depth, does the FIRS adjustment factor exceed 1 with a maximum of less than 1.04 in the horizontal direction and a maximum of about 1.10 in the vertical direction. Hereafter FIRS that have been subjected to the NEI check are referred to as Adjusted FIRS (whether or not a FIRS adjustment was necessary).

The Adjusted FIRS for the NI area (EPGB at ground surface (GS) and ESWB at 22 ft (6.7 m) depth) are enveloped. The envelope of the Adjusted FIRS is smoothed using a simple moving average. The resulting smoothed horizontal and vertical Adjusted FIRS for the NI area (EPGB and ESWB) are presented in Figure 3F-22 and Figure 3F-23, respectively.

Similarly, the Adjusted FIRS for the Intake area (GS~~and at 20.5 ft (6.2 m) depth~~) are enveloped. The envelope of the Adjusted FIRS and the Adjusted FIRS at 37.5 ft (11.4 m) depth are smoothed. The resulting smoothed horizontal and vertical Adjusted FIRS for the Intake area are presented in Figure 3F-24 and Figure 3F-25, respectively.

3F.1.4 SSSI EFFECTS AND COMPARISON TO SSE

An amplification function is developed to account for the structure-soil-structure interaction (SSSI) that affects the seismic response of the buildings in the NI area. An analysis is conducted where the Site SSE (defined in Section 3.7.1.1.1.1) is applied as seismic input to evaluate the seismic response of the Nuclear Island (NI) and 6 nearby ancillary structures, two EPGB and four ESWB. The spectral response results at foundation level are calculated for the 6 ancillary structures with the Site SSE input at the NI foundation level. The 5% damping ARS at the 6 locations are enveloped and the amplification functions are calculated as the ratio of the envelope to the Site SSE spectrum as a function of frequency. The amplification functions for the horizontal directions (X and Y) and the vertical direction (Z) are calculated, where a minimum limit of 1 is imposed on the function. Figure 3F-26 presents the amplification functions in the vertical and horizontal directions. The developed functions are used to amplify the FIRS for the EPGB and ESWB in the NI area, thus accounting for the NI SSSI effects.

The resulting Adjusted FIRS (amplified to include NI SSSI Effects) for the EPGB and ESWB are compared to the Site SSE in Figure 3F-27, while the Adjusted FIRS for the Intake area are compared to the Site SSE in Figure 3F-28. Note that while the Intake area Adjusted FIRS are smooth, the EPGB and ESWB Adjusted FIRS are not due to the amplification accounting for the NI SSSI effects. The comparison confirms that the Site SSE envelops all the smoothed Adjusted FIRS, horizontal and vertical, at all foundation elevations, and thus the Site SSE is conservative and can be used as SSI input. The Regulatory Guide 1.60 (NRC, 1973) horizontal spectrum, scaled to 0.1 g is also plotted in these figures, and is shown to be enveloped by the Site SSE, thus confirming the Site SSE satisfies the requirements of Appendix S of 10 CFR part 50 (CFR, 2008).

3F.2 SITE SSE STRAIN-COMPATIBLE SOIL PROPERTY PROFILES

A set of LB, BE and UB profiles, strain-compatible with Site SSE, is developed for both the NI area and Intake area. The approach used here is iterative and consists of running the site response analysis, using P-SHAKE, with modified rock motions (input at bedrock) convolved through each set of 60 simulated profiles (NI area and Intake area) and computing the response at the foundation elevation horizons of interest. The analysis is repeated, modifying the input rock motion each time, until the 5% damping log-mean ARS at the FIRS horizons roughly matches the Site SSE. The set of iterated properties resulting from the set of runs yielding an

approximate match of the log-mean response to Site SSE are considered to be the BE Site SSE strain-compatible properties.

The lower bound (LB) and upper bound (UB) values are calculated as -/+ one log-standard deviation from the log average values (i.e., BE values) using the following equations where S is the soil property considered, mln, is the log-mean and sln is the log-standard deviation of that property:

$$S_{LB} = \exp\left(\ln\left(\mu_{\ln}\right) - \sigma_{\ln}\right) \qquad \text{Equation (3F-6)}$$

$$S_{UB} = \exp\left(\ln\left(\mu_{\ln}\right) + \sigma_{\ln}\right) \qquad \text{Equation (3F-7)}$$

Lower bound and upper bound damping ratios corresponding to BE Site SSE are calculated using Equation 3F-6 and Equation 3F-7, respectively. Lower bound shear wave velocity profiles are calculated as the minimum resulting from Equation 3F-6 and $BE(V_s)/\sqrt{1.5}$, and upper bound shear wave velocity profiles are calculated as the maximum resulting from Equation 3F-7 and $BE(V_s)/\sqrt{1.5}$. LB, BE, and UB primary wave velocities are calculated using Equation 3F-8 where n is the Poisson's ratio, and V_S is LB, BE, and UB shear wave velocities. In addition, below the ground water level, a minimum P-wave velocity of 4800 ft/sec (1,463 m/sec) is imposed, on the condition that n does not exceed 0.48.

$$V_P = V_S\sqrt{\frac{2-2\nu}{1-2\nu}} \qquad \text{Equation (3F-8)}$$

The resulting Site SSE strain-compatible soil profiles are plotted in Figure 3F-29 through Figure 3F-31 for the upper 600 ft (183m) for NI area site conditions, and reported in Table 3F-3 through Table 3F-5 for the upper 300 ft. Note that the lower shear wave and primary wave velocity are used in conjunction with the higher damping values to form the LB profile, and vice versa for the UB profile. The presented profiles are used in the SSI analysis for the ESWB and EPGB in the NI area. The resulting Site SSE strain-compatible soil profiles for the Intake area site conditions are presented in Figure 3F-32 through Figure 3F-34 for the upper 600 ft (183m) and reported in Table 3F-6 through Table 3F-8 for the upper 380 ft. The Intake area profiles are used in the SSI analysis for the ~~UHS Electrical Building and~~ CBIS.

3F.3 SITE SSE "WITHIN" ACCELERATION TIME HISTORIES

The input time history needed for SSI analysis of the three embedded structures (ESWB in the NI area and CBIS ~~and UHS Electrical Building~~ in the Intake area) are "within" motions at the foundation elevation corresponding to each of the LB, BE, and UB soil profiles. As such, each of the outcrop Site SSE acceleration time-histories (2 horizontal and 1 vertical) presented in Section 3.7.1.1.2, is used as input at the foundation level to a SHAKE2000 soil column model of the LB, BE, and UB profile, and their corresponding 5% damping within time histories are obtained. The horizontal acceleration time histories are applied using strain compatible shear-wave velocities (VS) and the vertical acceleration time-history is applied using corresponding P-wave velocities (VP). The strain compatible shear-wave damping is used for both vertical and horizontal analyses. The analyses are carried out linearly with no further degradation of the strain-compatible shear modulus and damping profiles. This analysis results in a set of 3 "within" motions: two horizontal and one vertical. ~~Nine (9)~~Six sets are developed corresponding to the LB, BE and UB profiles for the ~~three~~two embedded structures (ESWB~~,~~ and CBIS ~~and UHS Electrical Building~~), as presented in Figure 3F-35 through Figure 3F-43. The time histories are applied at the FIRS horizon as "within" motion and are used in combination with

their corresponding Site SSE strain-compatible soil profiles, described in Section 3F.2. The EPGB structure, which is surface founded in the SSI analysis, (see Table 3F-1 foundation depth of 5 ft (1.5 m)) uses the acceleration time histories spectrally matched to Site SSE directly. The 5% damping ARS for the calculated within ground motions are presented in Figure 3F-44 through Figure 3F-52.

3F.4 COMPUTER CODES

The computer codes SPS, SHAKE2000 and P-SHAKE are used in the analyses discussed herein, and are described in this section.

3F.4.1 SOIL PROFILE SIMULATION (SPS) PROGRAM

Description

SPS (Version 1.0 / 2009) is a Bechtel proprietary program. SPS generates a set of site-specific stochastically simulated soil profiles to represent the dynamic properties of the site while considering the uncertainty associated with each of the properties. The output is intended for use in site response analysis using the Bechtel computer programs SHAKE2000 (Section 3F.4.2) or P-SHAKE (Section 3F.4.3).

Validation

SPS was developed by Bechtel. The program validation documents are located in Bechtel's Computation Service Library.

Extent of Application

SPS is used to generate sets of stochastically simulated profiles to represent the site conditions for the NI and Intake areas.

3F.4.2 SHAKE2000

Description

The original SHAKE computer program for earthquake response analysis of horizontally layered sites was developed at the University of California, Berkeley, by B. Schnabel, John Lysmer and H. B. Seed in 1972. SHAKE2000 (Version 1.1 / 2006) is a Bechtel proprietary modified version of SHAKE, and is a separate program. SHAKE2000 generates the design earthquake-induced strain-compatible soil properties and site response motions.

Validation

SHAKE2000 was developed by Bechtel. The program validation documents are located in Bechtel's Computation Service Library.

Extent of Application

SHAKE2000 is used to convert outcrop acceleration time histories at the foundation elevation for different structures to within (in-column) acceleration time histories.

3F.4.3 P-SHAKE

Description

P-SHAKE (Version 2.0 / 2009) is a Bechtel proprietary modified version of SHAKE2000, and is a separate program. P-SHAKE generates the same design earthquake-induced strain-compatible

soil properties and site response motions as SHAKE2000 does, and the input files of the two programs for the most parts are compatible. However, P-SHAKE is built on different program logic that allows the site response analysis to be performed with an acceleration response spectrum as input, instead of an acceleration time history as used by SHAKE2000.

Validation

P-SHAKE was developed by Bechtel. The program validation documents are located in Bechtel's Computation Service Library.

Extent of Application

P-SHAKE is used to provide site-specific earthquake-induced design ground motions and the associated strain-compatible soil properties.

3F.5 REFERENCES

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Table 3F-1—{Bottom of Foundation Depths and Elevations

Building	Location (Area)	Bottom of Foundation depth	Bottom of Foundation Elevation
		[ft]	[ft]
Emergency Power Generator Building (EPGB) *	NI	0.0	85.0
Emergency Service Water Building (ESWB)	NI	22.0	63.0
~~Ultimate Heat Sink Electrical Building (UHS Electrical Building)~~	~~Intake~~	~~20.5~~	~~-10.5~~
Common Basemat Intake Structures (CBIS)	Intake	37.5	-27.5

* The bottom of foundation depth of the EPGB is at 6.0 ft (1.5 m) below finished grade. However in the SSI analysis the EPGB is surface founded and its FIRS are calculated at the ground surface.

Table 3F-2—{Input Rock Motions and Associated Parameters}

Rock Motion	Magnitude (M)	Duration [sec]	Effective Strain Ratio
LF 1E-4	5.5	5.5	0.50
HF 1E-4	6.8	10	0.58
LF 1E-5	5.5	5.5	0.50
HF 1E-5	6.9	10	0.59

Table 3F-3—{Best Estimate Site SSE Strain-Compatible Profiles for the NI Area}

Layer No.	Thickness [ft]	Top Depth [ft]	Unit Weight [kcf]	S-Wave Vel. [ft/sec]	P-Wave Vel. [ft/sec]	Damping [%]
1	3.0	0.0	0.145	730.9	1521.6	1.88
2	3.0	3.0	0.145	705.7	1469.1	2.72
3	3.5	6.0	0.145	681.2	1418.0	3.55
4	4.0	9.5	0.145	670.0	1394.7	4.32
5	4.0	13.5	0.145	665.8	1386.0	4.94
6	4.5	17.5	0.145	677.0	1409.3	5.36
7	4.0	22.0	0.145	647.2	1347.3	6.17
8	4.0	26.0	0.145	677.0	1409.3	6.24
9	4.0	30.0	0.145	672.4	3428.6	6.46
10	4.0	34.0	0.145	657.7	3353.6	6.82
11	3.5	38.0	0.145	656.9	3349.6	7.00
12	2.0	41.5	0.145	646.8	3297.8	7.14
13	3.5	43.5	0.120	1380.3	4800.0	1.99
14	4.0	47.0	0.120	1378.3	4800.0	2.01
15	4.0	51.0	0.120	1376.2	4800.0	2.03
16	5.0	55.0	0.120	1590.6	5275.3	1.88
17	5.0	60.0	0.120	1587.9	5266.4	1.91
18	5.0	65.0	0.120	1585.3	5257.9	1.94
19	5.0	70.0	0.120	1044.9	5327.7	2.66
20	5.0	75.0	0.120	1040.9	5307.5	2.69
21	5.0	80.0	0.120	1074.5	5479.1	2.64
22	5.0	85.0	0.120	1482.1	4915.7	2.10
23	5.0	90.0	0.120	1537.2	5098.3	2.05
24	5.0	95.0	0.119	1525.0	5057.8	2.02
25	5.0	100.0	0.107	1253.3	5267.9	1.38
26	5.0	105.0	0.105	1229.5	5167.9	1.30
27	7.0	110.0	0.105	1228.9	5165.3	1.31
28	8.0	117.0	0.105	1228.2	5162.5	1.31
29	10.0	125.0	0.105	1227.5	5159.4	1.32
30	10.0	135.0	0.105	1230.0	5170.0	1.34
31	10.0	145.0	0.105	1230.5	5171.9	1.33
32	10.0	155.0	0.105	1225.1	5149.2	1.34
33	10.0	165.0	0.105	1224.7	5147.7	1.34
34	10.0	175.0	0.105	1224.0	5144.9	1.35
35	10.0	185.0	0.105	1218.3	5120.9	1.34
36	10.0	195.0	0.105	1203.4	5058.3	1.36
37	10.0	205.0	0.105	1199.1	5040.1	1.36
38	10.0	215.0	0.105	1197.8	5034.4	1.38
39	10.0	225.0	0.105	1197.1	5031.6	1.38
40	10.0	235.0	0.105	1193.1	5014.9	1.39
41	8.0	245.0	0.105	1189.1	4998.0	1.42
42	7.0	253.0	0.105	1198.4	5037.3	1.41
43	5.0	260.0	0.105	1201.3	5049.1	1.41
44	5.0	265.0	0.105	1211.4	5091.7	1.42
45	5.0	270.0	0.106	1222.9	5140.1	1.43
46	5.0	275.0	0.108	1259.4	5293.6	1.52
47	5.0	280.0	0.112	1317.4	5537.1	1.67
48	5.0	285.0	0.116	1397.8	4800.0	1.89
49	5.0	290.0	0.119	1477.8	4901.4	2.01
50	5.0	295.0	0.123	1626.3	5393.9	2.10

Table 3F-4—{Lower Bound Site SSE Strain-Compatible Profiles for the NI Area}

Layer No.	Thickness [ft]	Top Depth [ft]	Unit Weight [kcf]	S-Wave Vel. [ft/sec]	P-Wave Vel. [ft/sec]	Damping [%]
1	3.0	0.0	0.145	582.4	1212.4	2.82
2	3.0	3.0	0.145	535.3	1114.3	4.59
3	3.5	6.0	0.145	501.8	1044.6	6.15
4	4.0	9.5	0.145	474.5	987.8	7.63
5	4.0	13.5	0.145	448.8	934.2	8.93
6	4.5	17.5	0.145	438.9	913.7	9.70
7	4.0	22.0	0.145	408.2	849.7	11.40
8	4.0	26.0	0.145	432.8	900.9	11.37
9	4.0	30.0	0.145	409.6	2088.5	11.84
10	4.0	34.0	0.145	396.5	2022.0	12.24
11	3.5	38.0	0.145	393.8	2008.0	12.34
12	2.0	41.5	0.145	376.0	1917.4	12.61
13	3.5	43.5	0.120	988.2	4800.0	2.71
14	4.0	47.0	0.120	985.6	4800.0	2.76
15	4.0	51.0	0.120	982.9	4800.0	2.81
16	5.0	55.0	0.120	1104.5	4800.0	2.51
17	5.0	60.0	0.120	1101.3	4800.0	2.56
18	5.0	65.0	0.120	1098.2	4800.0	2.61
19	5.0	70.0	0.120	733.4	3739.7	3.93
20	5.0	75.0	0.120	730.1	3723.0	3.99
21	5.0	80.0	0.120	751.3	3830.7	3.94
22	5.0	85.0	0.120	1032.6	4800.0	2.89
23	5.0	90.0	0.120	1068.8	4800.0	2.80
24	5.0	95.0	0.119	1060.6	4800.0	2.85
25	5.0	100.0	0.107	1023.3	4800.0	1.75
26	5.0	105.0	0.105	1003.9	4800.0	1.50
27	7.0	110.0	0.105	1003.4	4800.0	1.52
28	8.0	117.0	0.105	1002.8	4800.0	1.52
29	10.0	125.0	0.105	1002.2	4800.0	1.53
30	10.0	135.0	0.105	1004.3	4800.0	1.56
31	10.0	145.0	0.105	1004.7	4800.0	1.57
32	10.0	155.0	0.105	1000.3	4800.0	1.60
33	10.0	165.0	0.105	1000.0	4800.0	1.59
34	10.0	175.0	0.105	999.4	4800.0	1.60
35	10.0	185.0	0.105	994.8	4800.0	1.59
36	10.0	195.0	0.105	982.6	4800.0	1.59
37	10.0	205.0	0.105	979.1	4800.0	1.61
38	10.0	215.0	0.105	978.0	4800.0	1.64
39	10.0	225.0	0.105	977.4	4800.0	1.64
40	10.0	235.0	0.105	974.2	4800.0	1.66
41	8.0	245.0	0.105	970.9	4800.0	1.74
42	7.0	253.0	0.105	978.5	4800.0	1.70
43	5.0	260.0	0.105	980.8	4800.0	1.70
44	5.0	265.0	0.105	989.1	4800.0	1.74
45	5.0	270.0	0.106	998.5	4800.0	1.78
46	5.0	275.0	0.108	1028.3	4800.0	2.00
47	5.0	280.0	0.112	1065.4	4800.0	2.24
48	5.0	285.0	0.116	1120.0	4800.0	2.52
49	5.0	290.0	0.119	1194.9	4800.0	2.64
50	5.0	295.0	0.123	1306.3	4800.0	2.65

Table 3F-5—{Upper Bound Site SSE Strain-Compatible Profiles for the NI Area}

Layer No.	Thickness [ft]	Top Depth [ft]	Unit Weight [kcf]	S-Wave Vel. [ft/sec]	P-Wave Vel. [ft/sec]	Damping [%]
1	3.0	0.0	0.145	917.3	1909.5	1.25
2	3.0	3.0	0.145	930.4	1936.8	1.61
3	3.5	6.0	0.145	924.7	1925.0	2.05
4	4.0	9.5	0.145	945.9	1969.1	2.45
5	4.0	13.5	0.145	987.8	2056.2	2.73
6	4.5	17.5	0.145	1044.2	2173.7	2.96
7	4.0	22.0	0.145	1026.2	2136.2	3.34
8	4.0	26.0	0.145	1059.1	2204.7	3.42
9	4.0	30.0	0.145	1103.8	4800.0	3.52
10	4.0	34.0	0.145	1090.8	4800.0	3.80
11	3.5	38.0	0.145	1095.8	4800.0	3.97
12	2.0	41.5	0.145	1112.4	4800.0	4.04
13	3.5	43.5	0.120	1927.9	6394.2	1.46
14	4.0	47.0	0.120	1927.5	6392.7	1.47
15	4.0	51.0	0.120	1926.9	6390.7	1.47
16	5.0	55.0	0.120	2290.5	7596.8	1.41
17	5.0	60.0	0.120	2289.5	7593.4	1.43
18	5.0	65.0	0.120	2288.4	7589.9	1.44
19	5.0	70.0	0.120	1488.5	7590.0	1.80
20	5.0	75.0	0.120	1483.9	7566.5	1.81
21	5.0	80.0	0.120	1536.9	7836.9	1.77
22	5.0	85.0	0.120	2127.2	7055.3	1.52
23	5.0	90.0	0.120	2210.9	7332.6	1.50
24	5.0	95.0	0.119	2192.7	7272.4	1.43
25	5.0	100.0	0.107	1535.0	6451.9	1.09
26	5.0	105.0	0.105	1505.9	6329.4	1.13
27	7.0	110.0	0.105	1505.1	6326.2	1.13
28	8.0	117.0	0.105	1504.3	6322.7	1.13
29	10.0	125.0	0.105	1503.4	6318.9	1.14
30	10.0	135.0	0.105	1506.5	6331.9	1.15
31	10.0	145.0	0.105	1507.0	6334.3	1.12
32	10.0	155.0	0.105	1500.4	6306.5	1.12
33	10.0	165.0	0.105	1500.0	6304.6	1.13
34	10.0	175.0	0.105	1499.1	6301.2	1.14
35	10.0	185.0	0.105	1492.2	6271.8	1.13
36	10.0	195.0	0.105	1473.9	6195.1	1.16
37	10.0	205.0	0.105	1468.6	6172.9	1.15
38	10.0	215.0	0.105	1466.9	6165.8	1.16
39	10.0	225.0	0.105	1466.1	6162.5	1.16
40	10.0	235.0	0.105	1461.3	6142.0	1.16
41	8.0	245.0	0.105	1456.4	6121.3	1.16
42	7.0	253.0	0.105	1467.8	6169.4	1.17
43	5.0	260.0	0.105	1471.2	6183.9	1.17
44	5.0	265.0	0.105	1483.6	6236.0	1.16
45	5.0	270.0	0.106	1497.7	6295.3	1.15
46	5.0	275.0	0.108	1542.5	6483.3	1.15
47	5.0	280.0	0.112	1629.0	6846.8	1.25
48	5.0	285.0	0.116	1744.5	5785.7	1.42
49	5.0	290.0	0.119	1827.7	6061.9	1.53
50	5.0	295.0	0.123	2024.7	6715.1	1.66

Table 3F-6—{Best Estimate Site SSE Strain-Compatible Profiles for the Intake Area}

Layer No.	Thickness [ft]	Top Depth [ft]	Unit Weight [kcf]	S-Wave Vel. [ft/sec]	P-Wave Vel. [ft/sec]	Damping [%]
1	3.5	0.0	0.145	666.6	1387.6	2.13
2	3.5	3.5	0.145	629.4	1310.1	3.46
3	3.0	7.0	0.145	596.9	3043.7	4.62
4	4.5	10.0	0.145	590.5	3010.8	5.49
5	3.5	14.5	0.145	587.0	2993.0	6.13
6	2.5	18.0	0.145	590.5	3011.2	6.51
7	4.0	20.5	0.145	606.9	3094.7	6.89
8	4.0	24.5	0.145	631.8	3221.5	7.03
9	4.0	28.5	0.145	634.8	3236.6	7.25
10	5.0	32.5	0.145	632.0	3222.4	7.53
11	3.5	37.5	0.115	1118.4	5125.2	2.10
12	4.0	41.0	0.115	1116.4	5116.0	2.13
13	4.0	45.0	0.115	1114.2	5106.0	2.16
14	4.0	49.0	0.115	1112.1	5096.4	2.19
15	5.0	53.0	0.105	1097.1	5027.4	2.01
16	5.0	58.0	0.105	1093.0	5008.8	2.08
17	5.0	63.0	0.105	1090.6	4997.9	2.13
18	7.0	68.0	0.105	1088.0	4985.9	2.19
19	10.0	75.0	0.105	1084.7	4970.7	2.26
20	10.0	85.0	0.105	1081.3	4955.0	2.33
21	10.0	95.0	0.105	1078.2	4941.1	2.39
22	10.0	105.0	0.106	1072.1	4913.1	2.29
23	10.0	115.0	0.113	1031.5	4800.0	1.53
24	8.0	125.0	0.115	1021.3	4800.0	1.39
25	8.0	133.0	0.113	1027.8	4800.0	1.39
26	9.0	141.0	0.107	1053.2	4826.4	1.39
27	10.0	150.0	0.105	1060.2	4858.4	1.38
28	10.0	160.0	0.105	1058.2	4849.4	1.39
29	10.0	170.0	0.105	1056.2	4840.3	1.40
30	10.0	180.0	0.105	1054.3	4831.2	1.41
31	10.0	190.0	0.105	1060.3	4858.8	1.43
32	10.0	200.0	0.108	1133.4	5194.0	1.55
33	10.0	210.0	0.119	1415.0	4800.0	1.90
34	10.0	220.0	0.125	1700.6	5640.3	2.09
35	10.0	230.0	0.125	2049.2	5517.6	1.88
36	10.0	240.0	0.125	2083.2	5944.6	1.90
37	10.0	250.0	0.125	2001.5	5711.4	1.95
38	10.0	260.0	0.125	1992.0	5684.3	1.98
39	10.0	270.0	0.125	1966.5	5611.5	2.04
40	10.0	280.0	0.125	1889.1	5771.4	2.11
41	10.0	290.0	0.125	1877.8	5736.7	2.09
42	10.0	300.0	0.125	1876.4	5732.4	2.10
43	10.0	310.0	0.125	1885.0	5758.8	2.09
44	7.0	320.0	0.123	1915.2	5851.0	2.07
45	6.0	327.0	0.118	2034.5	4983.4	2.00
46	7.0	333.0	0.116	2098.4	5140.0	1.99
47	10.0	340.0	0.115	2114.0	5178.2	2.01
48	10.0	350.0	0.115	2113.4	5176.7	2.02
49	10.0	360.0	0.115	2112.8	5175.2	2.03
50	10.0	370.0	0.115	2112.2	5173.8	2.03

Table 3F-7—{Lower Bound Site SSE Strain-Compatible Profiles for the Intake Area}

Layer No.	Thickness [ft]	Top Depth [ft]	Unit Weight [kcf]	S-Wave Vel. [ft/sec]	P-Wave Vel. [ft/sec]	Damping [%]
1	3.5	0.0	0.145	535.8	1115.4	3.19
2	3.5	3.5	0.145	462.2	962.1	5.78
3	3.0	7.0	0.145	418.3	2132.9	7.96
4	4.5	10.0	0.145	395.2	2014.9	9.44
5	3.5	14.5	0.145	374.3	1908.5	10.57
6	2.5	18.0	0.145	373.1	1902.6	11.12
7	4.0	20.5	0.145	384.5	1960.6	11.53
8	4.0	24.5	0.145	412.0	2100.5	11.52
9	4.0	28.5	0.145	403.9	2059.7	11.88
10	5.0	32.5	0.145	405.0	2065.1	12.19
11	3.5	37.5	0.115	913.2	4656.3	2.62
12	4.0	41.0	0.115	911.5	4648.0	2.67
13	4.0	45.0	0.115	909.7	4638.8	2.72
14	4.0	49.0	0.115	908.0	4630.1	2.77
15	5.0	53.0	0.105	895.8	4567.5	2.66
16	5.0	58.0	0.105	892.4	4550.6	2.79
17	5.0	63.0	0.105	890.5	4540.6	2.85
18	7.0	68.0	0.105	888.4	4529.7	2.92
19	10.0	75.0	0.105	885.6	4515.9	3.01
20	10.0	85.0	0.105	882.9	4501.7	3.11
21	10.0	95.0	0.105	880.4	4489.1	3.19
22	10.0	105.0	0.106	875.4	4463.6	3.16
23	10.0	115.0	0.113	842.2	4294.4	2.22
24	8.0	125.0	0.115	833.9	4251.9	1.76
25	8.0	133.0	0.113	839.2	4279.2	1.75
26	9.0	141.0	0.107	859.9	4384.8	1.79
27	10.0	150.0	0.105	865.6	4414.0	1.78
28	10.0	160.0	0.105	864.0	4405.7	1.79
29	10.0	170.0	0.105	862.4	4397.5	1.80
30	10.0	180.0	0.105	860.8	4389.2	1.82
31	10.0	190.0	0.105	865.7	4414.3	1.86
32	10.0	200.0	0.108	925.4	4718.9	2.14
33	10.0	210.0	0.119	1093.3	4800.0	2.51
34	10.0	220.0	0.125	1388.5	4800.0	2.51
35	10.0	230.0	0.125	1659.2	4800.0	2.28
36	10.0	240.0	0.125	1700.9	4853.7	2.22
37	10.0	250.0	0.125	1634.2	4800.0	2.30
38	10.0	260.0	0.125	1626.5	4800.0	2.37
39	10.0	270.0	0.125	1605.6	4800.0	2.44
40	10.0	280.0	0.125	1542.5	4800.0	2.49
41	10.0	290.0	0.125	1533.2	4800.0	2.46
42	10.0	300.0	0.125	1532.0	4800.0	2.48
43	10.0	310.0	0.125	1539.1	4800.0	2.46
44	7.0	320.0	0.123	1563.7	4800.0	2.43
45	6.0	327.0	0.118	1661.1	4800.0	2.35
46	7.0	333.0	0.116	1713.3	4800.0	2.33
47	10.0	340.0	0.115	1726.1	4800.0	2.32
48	10.0	350.0	0.115	1725.6	4800.0	2.33
49	10.0	360.0	0.115	1725.1	4800.0	2.35
50	10.0	370.0	0.115	1724.6	4800.0	2.35

Table 3F-8—{Upper Bound Site SSE Strain-Compatible Profiles for the Intake Area

Layer No.	Thickness [ft]	Top Depth [ft]	Unit Weight [kcf]	S-Wave Vel. [ft/sec]	P-Wave Vel. [ft/sec]	Damping [%]
1	3.5	0.0	0.145	829.2	1726.1	1.42
2	3.5	3.5	0.145	857.0	1784.0	2.07
3	3.0	7.0	0.145	851.8	4343.4	2.68
4	4.5	10.0	0.145	882.3	4498.9	3.19
5	3.5	14.5	0.145	920.5	4693.8	3.56
6	2.5	18.0	0.145	934.6	4765.8	3.81
7	4.0	20.5	0.145	958.0	4800.0	4.12
8	4.0	24.5	0.145	968.9	4800.0	4.29
9	4.0	28.5	0.145	997.5	4800.0	4.43
10	5.0	32.5	0.145	986.1	4800.0	4.65
11	3.5	37.5	0.115	1369.8	6277.0	1.68
12	4.0	41.0	0.115	1367.3	6265.8	1.70
13	4.0	45.0	0.115	1364.6	6253.5	1.72
14	4.0	49.0	0.115	1362.1	6241.8	1.73
15	5.0	53.0	0.105	1343.6	6157.3	1.52
16	5.0	58.0	0.105	1338.7	6134.5	1.55
17	5.0	63.0	0.105	1335.7	6121.1	1.59
18	7.0	68.0	0.105	1332.5	6106.4	1.64
19	10.0	75.0	0.105	1328.5	6087.8	1.70
20	10.0	85.0	0.105	1324.3	6068.6	1.75
21	10.0	95.0	0.105	1320.6	6051.6	1.79
22	10.0	105.0	0.106	1313.1	6017.3	1.66
23	10.0	115.0	0.113	1263.3	5789.2	1.05
24	8.0	125.0	0.115	1250.8	5731.8	1.10
25	8.0	133.0	0.113	1258.8	5768.7	1.11
26	9.0	141.0	0.107	1289.9	5911.1	1.08
27	10.0	150.0	0.105	1298.5	5950.3	1.07
28	10.0	160.0	0.105	1296.1	5939.3	1.08
29	10.0	170.0	0.105	1293.6	5928.2	1.09
30	10.0	180.0	0.105	1291.2	5917.0	1.09
31	10.0	190.0	0.105	1298.6	5950.8	1.10
32	10.0	200.0	0.108	1388.2	6361.4	1.12
33	10.0	210.0	0.119	1831.2	6073.3	1.44
34	10.0	220.0	0.125	2082.8	6907.9	1.74
35	10.0	230.0	0.125	2530.8	6814.4	1.55
36	10.0	240.0	0.125	2551.4	7280.6	1.63
37	10.0	250.0	0.125	2451.3	6995.0	1.65
38	10.0	260.0	0.125	2439.7	6961.8	1.66
39	10.0	270.0	0.125	2408.4	6872.7	1.71
40	10.0	280.0	0.125	2313.7	7068.5	1.79
41	10.0	290.0	0.125	2299.8	7026.0	1.77
42	10.0	300.0	0.125	2298.1	7020.7	1.78
43	10.0	310.0	0.125	2308.7	7053.1	1.78
44	7.0	320.0	0.123	2345.6	7165.9	1.76
45	6.0	327.0	0.118	2491.7	6103.4	1.70
46	7.0	333.0	0.116	2570.0	6295.2	1.70
47	10.0	340.0	0.115	2589.1	6342.0	1.74
48	10.0	350.0	0.115	2588.4	6340.1	1.75
49	10.0	360.0	0.115	2587.6	6338.3	1.75
50	10.0	370.0	0.115	2586.9	6336.5	1.75

Figure 3F-1—{Low-Strain Shear Wave Velocity Profile at the NI Area}

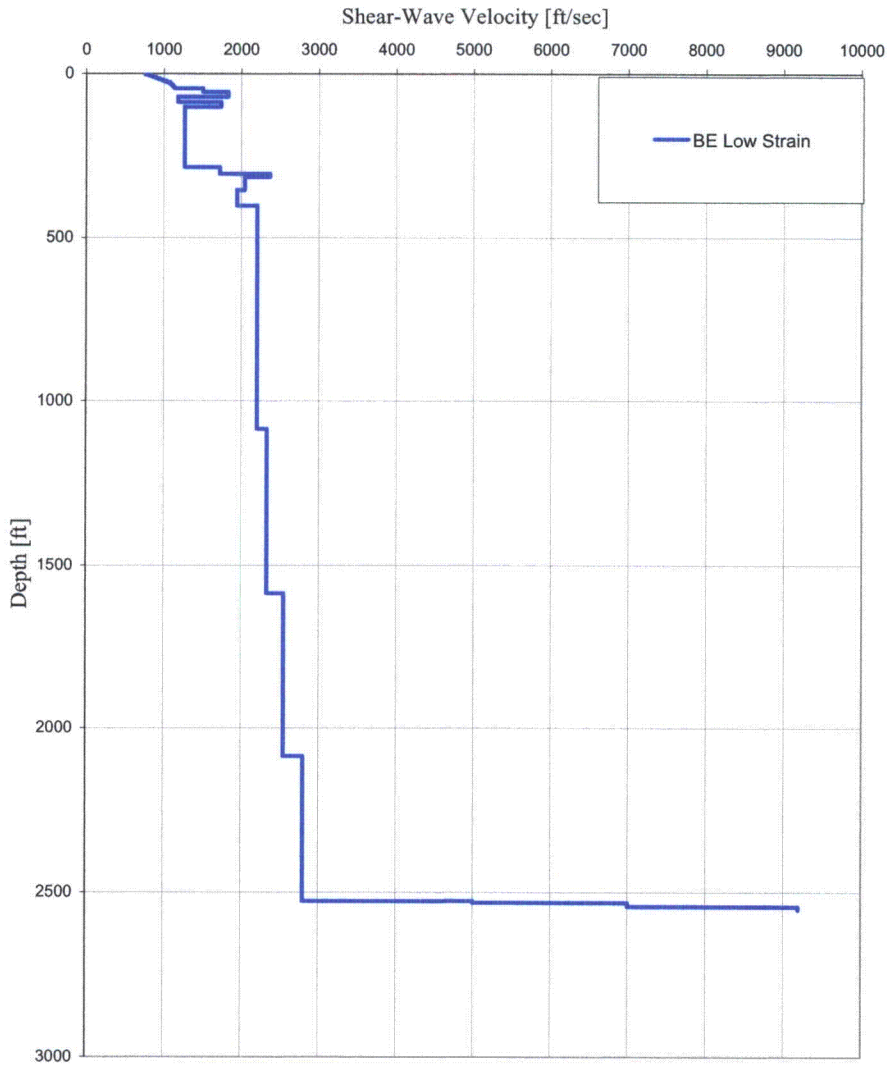


Figure 3F-2—{Low-Strain Shear Wave Velocity Profile at the Intake Area}

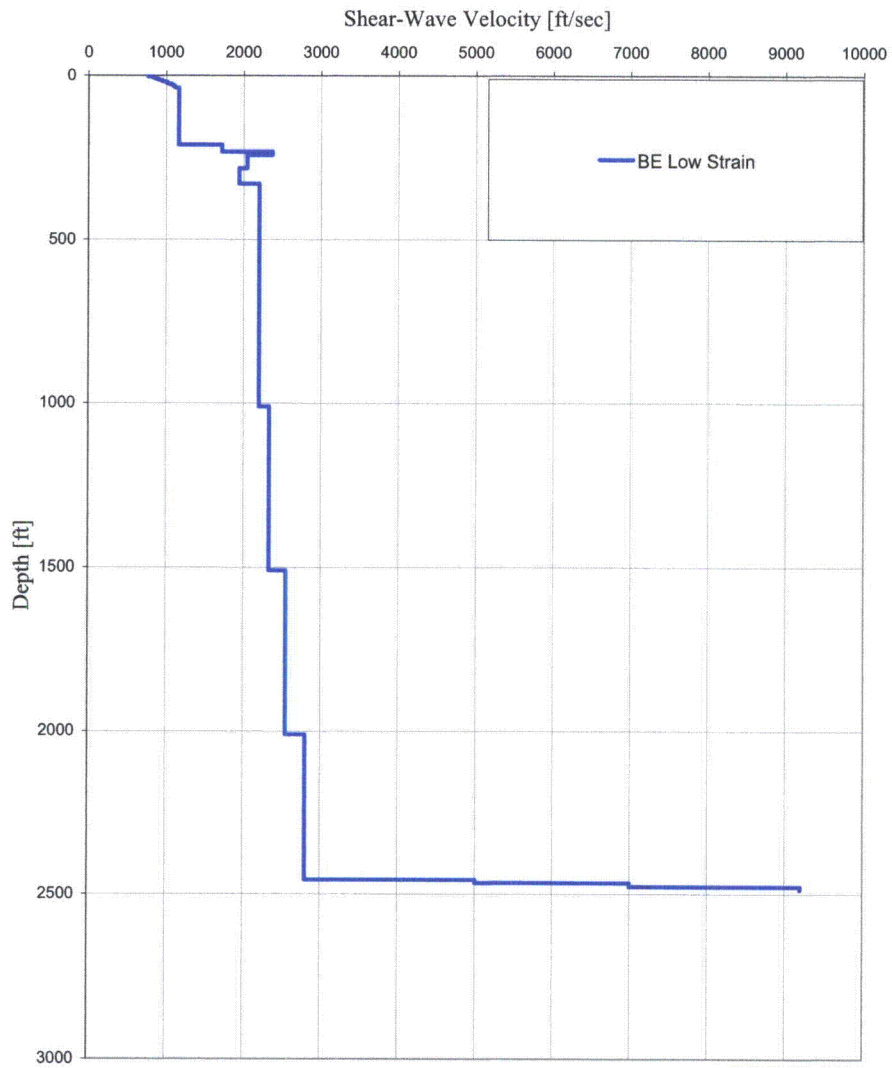


Figure 3F-3—{Log-Standard Deviation for Low-Strain Shear Wave Velocity Profile at the NI Area}

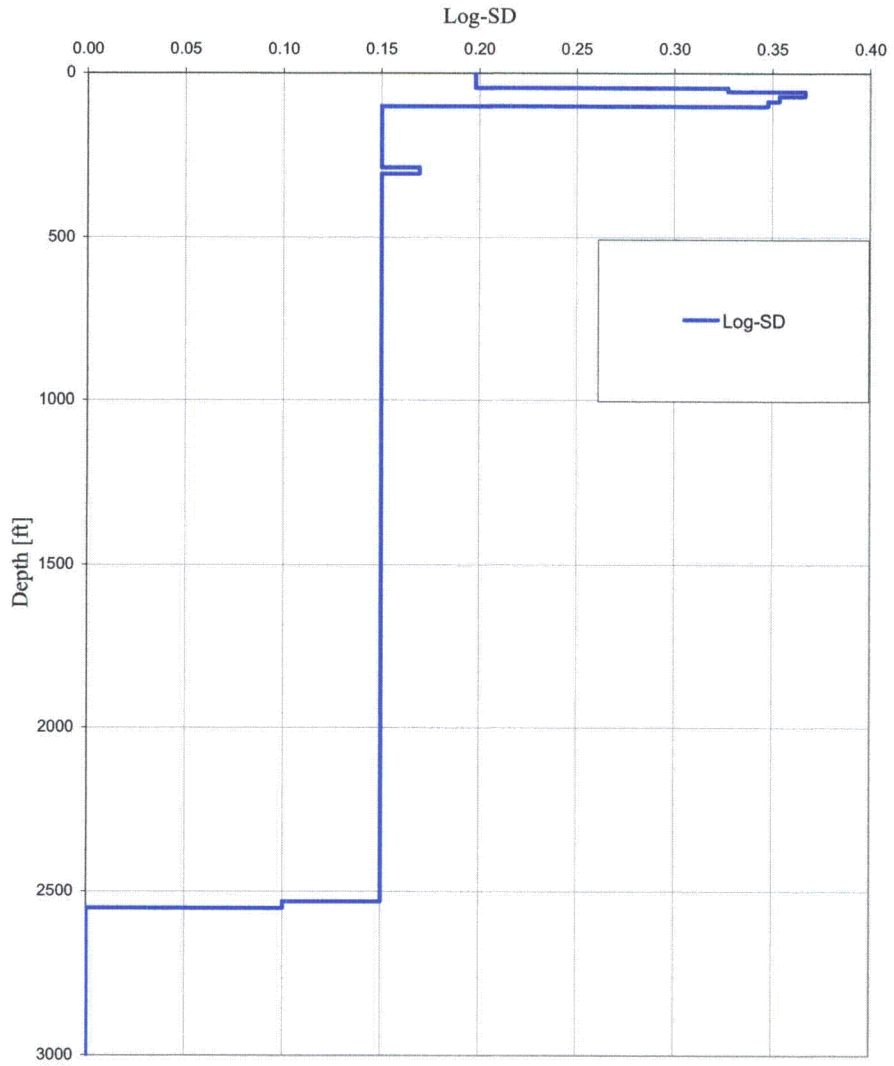


Figure 3F-4—{Log-Standard Deviation for Low-Strain Shear Wave Velocity Profile at the Intake Area}

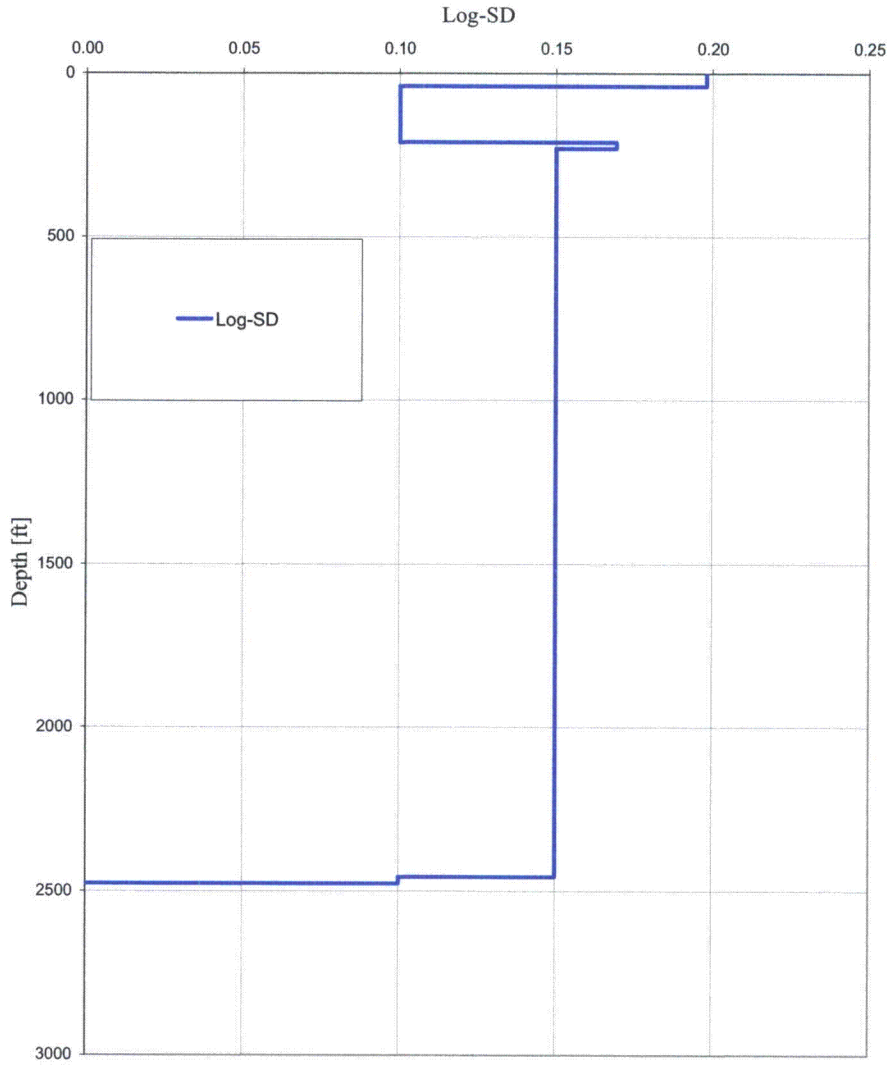


Figure 3F-5—{Shear Wave Velocity for 60 Simulated Profiles – NI Area (Halfspace at first occurrence of Vs =9200 ft/sec)}

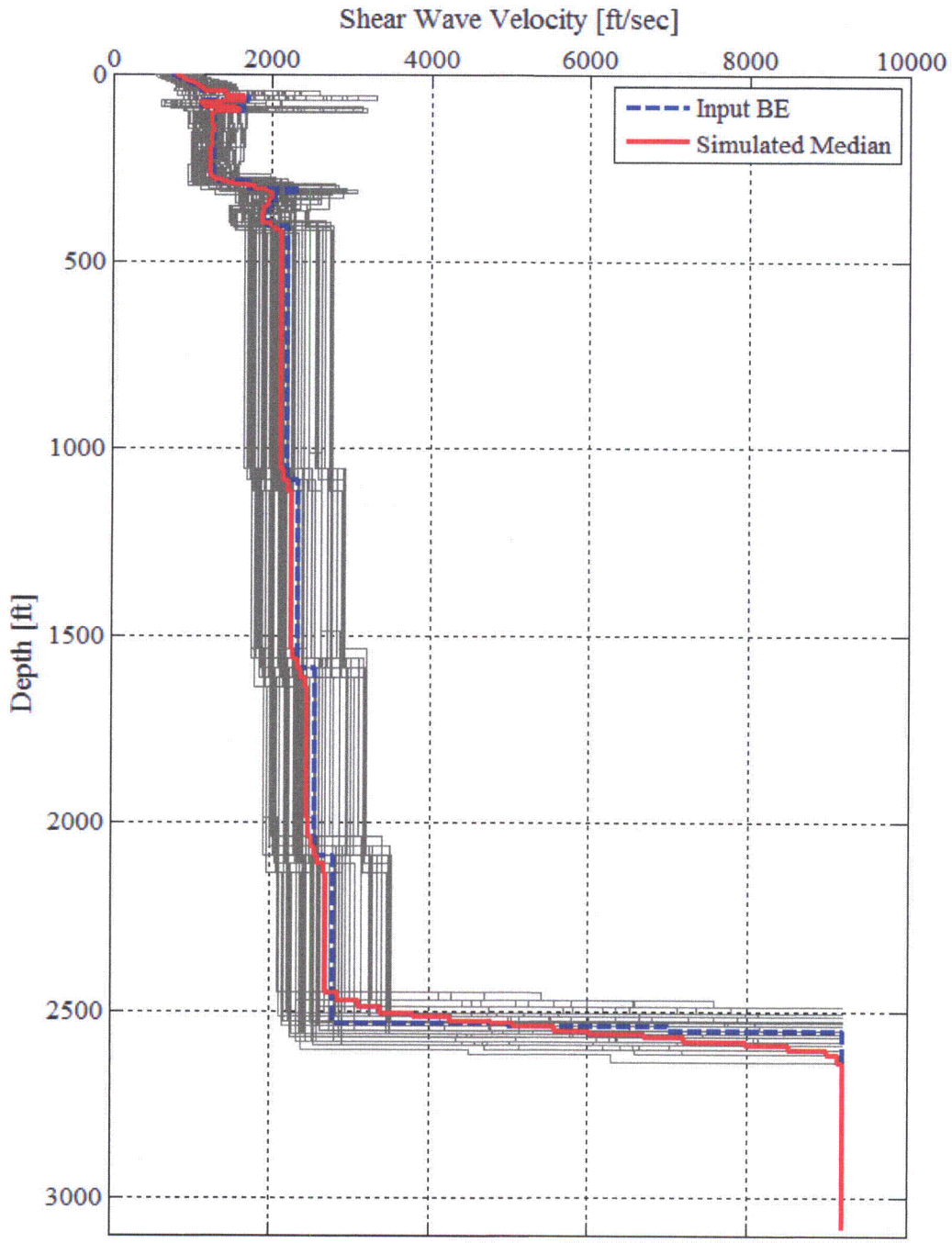


Figure 3F-6— {Shear Wave Velocity for 60 Simulated Profiles – Intake Area (Halfspace at first occurrence of Vs =9200 ft/sec)}

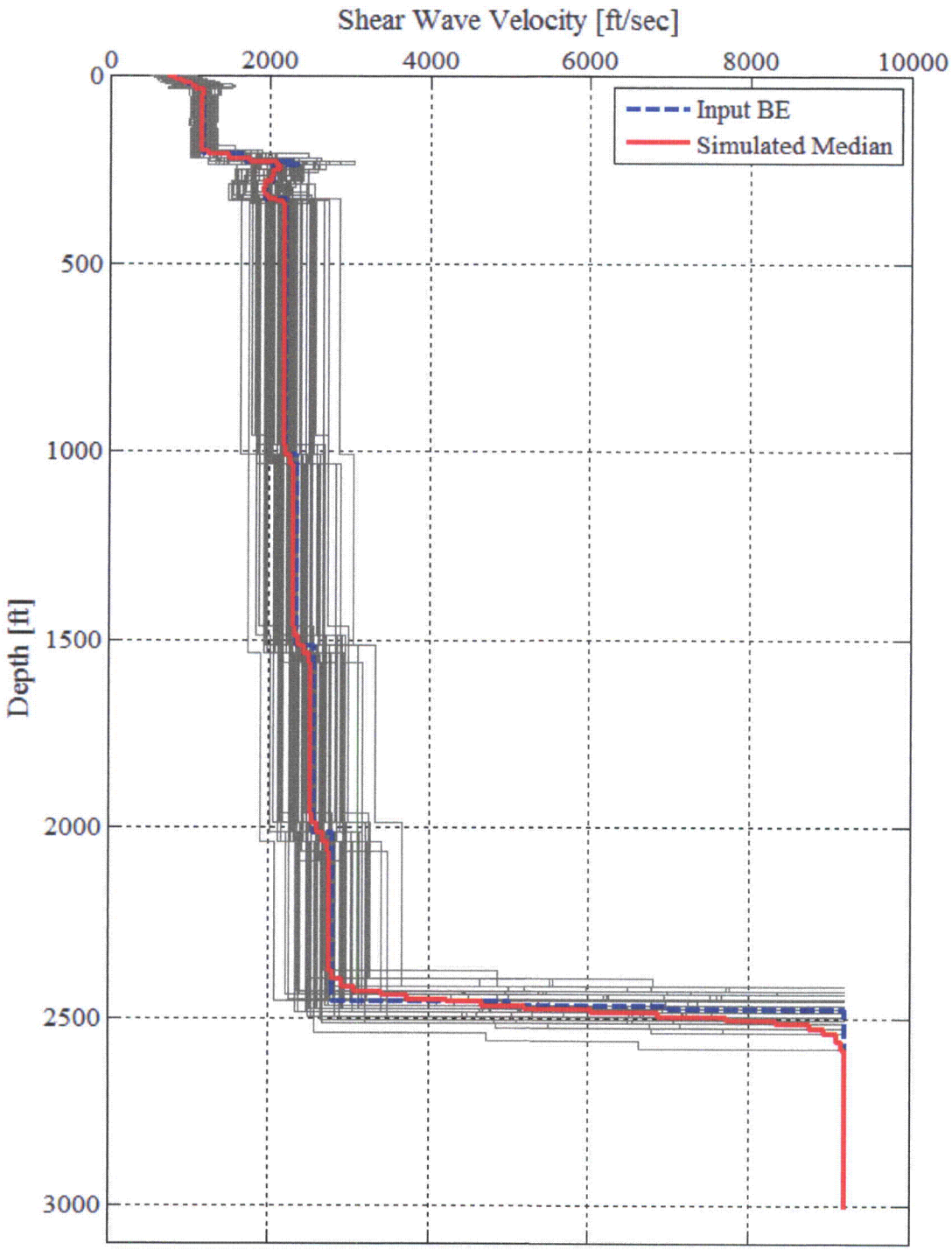


Figure 3F-7—{Fill 1 Shear Modulus Reduction Curves for 60 Simulated Profiles – NI Area}

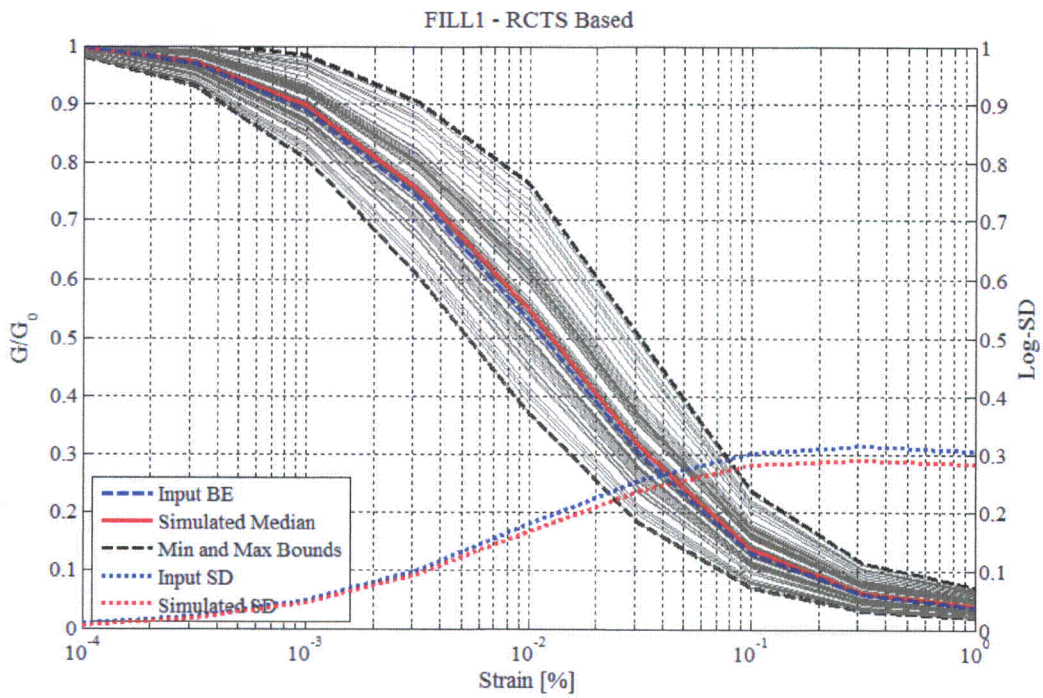


Figure 3F-7b— {Fill 1 Damping Ratio Curves for 60 Simulated Profiles – NI Area}

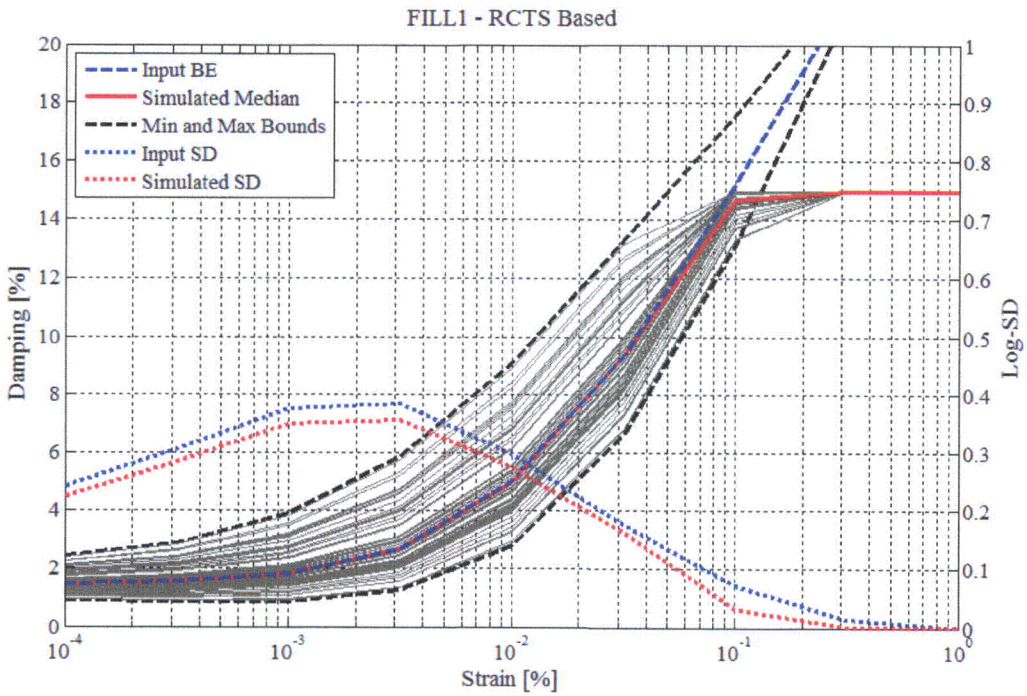


Figure 3F-8— {5% Damping ARS Amplification Functions at 22 ft Depth – NI Area}

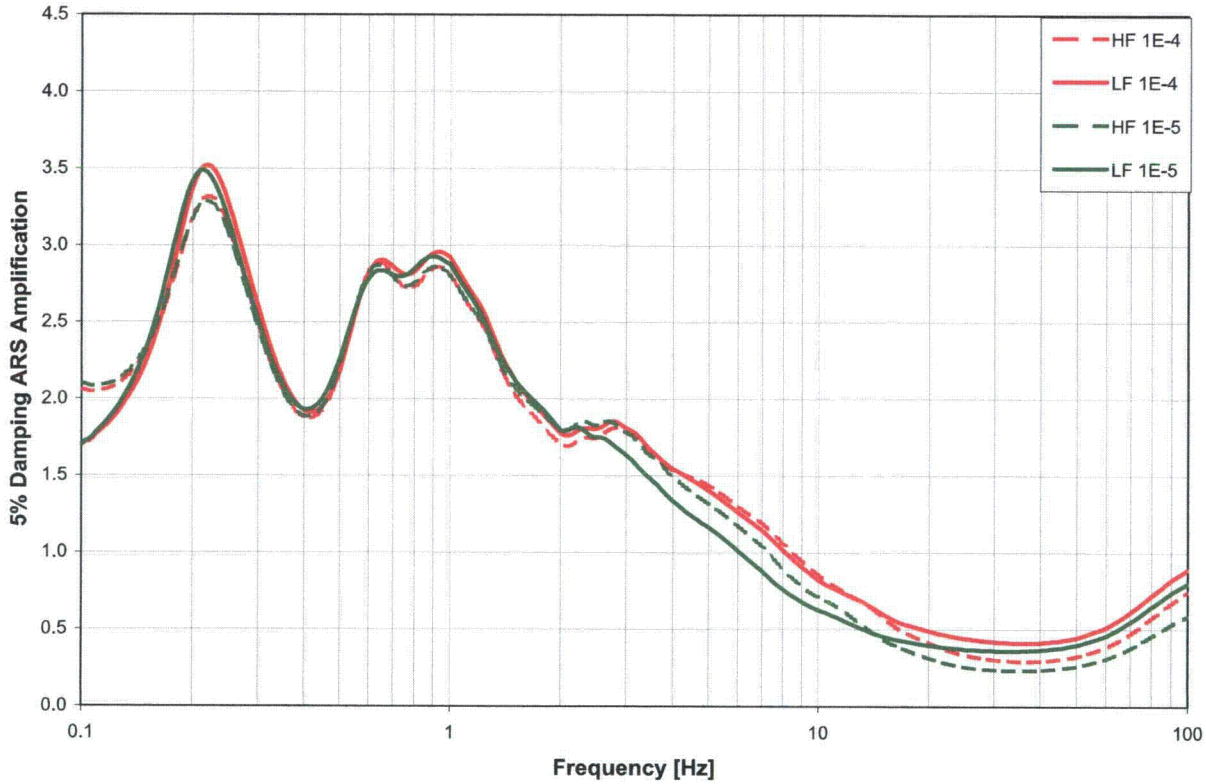


Figure 3F-9~~—{5% Damping ARS Amplification Function at 20.5 ft Depth – Intake Area~~Not Used}

Figure 3F-10—{Log-Mean Strain Profiles - NI Area}

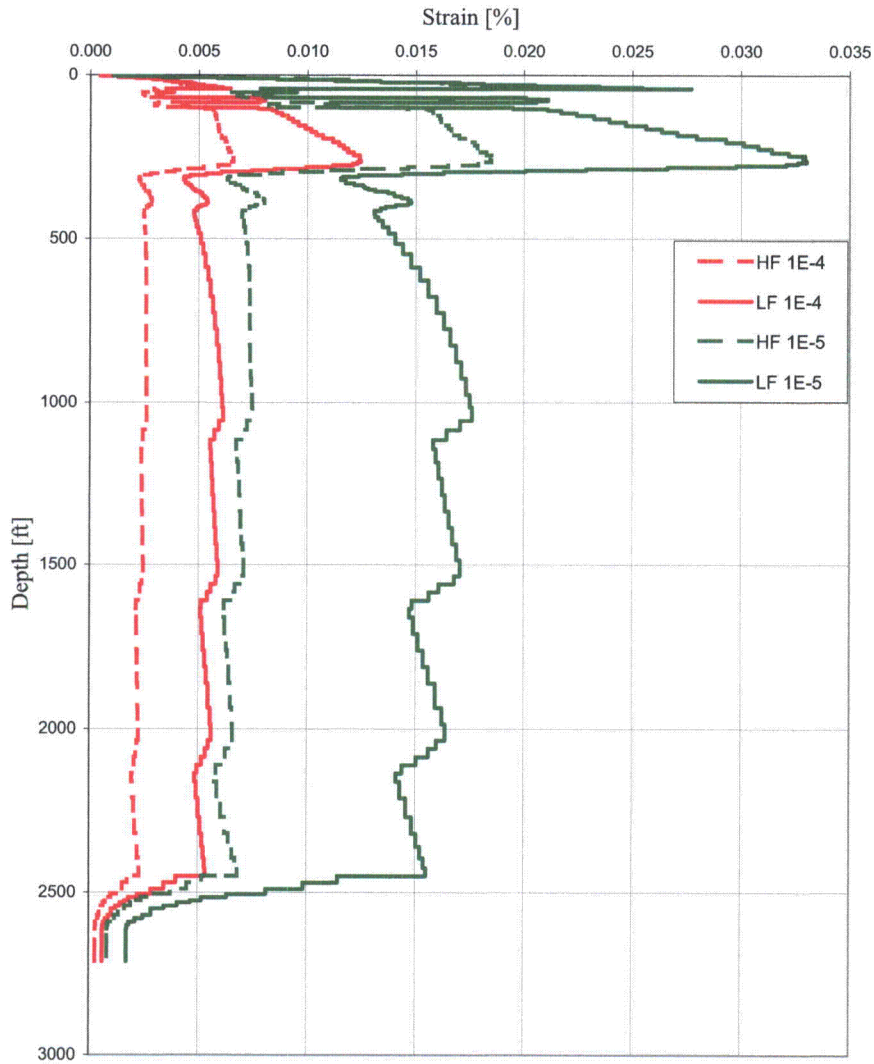


Figure 3F-11—{Log-Mean Strain Profiles - Intake Area}

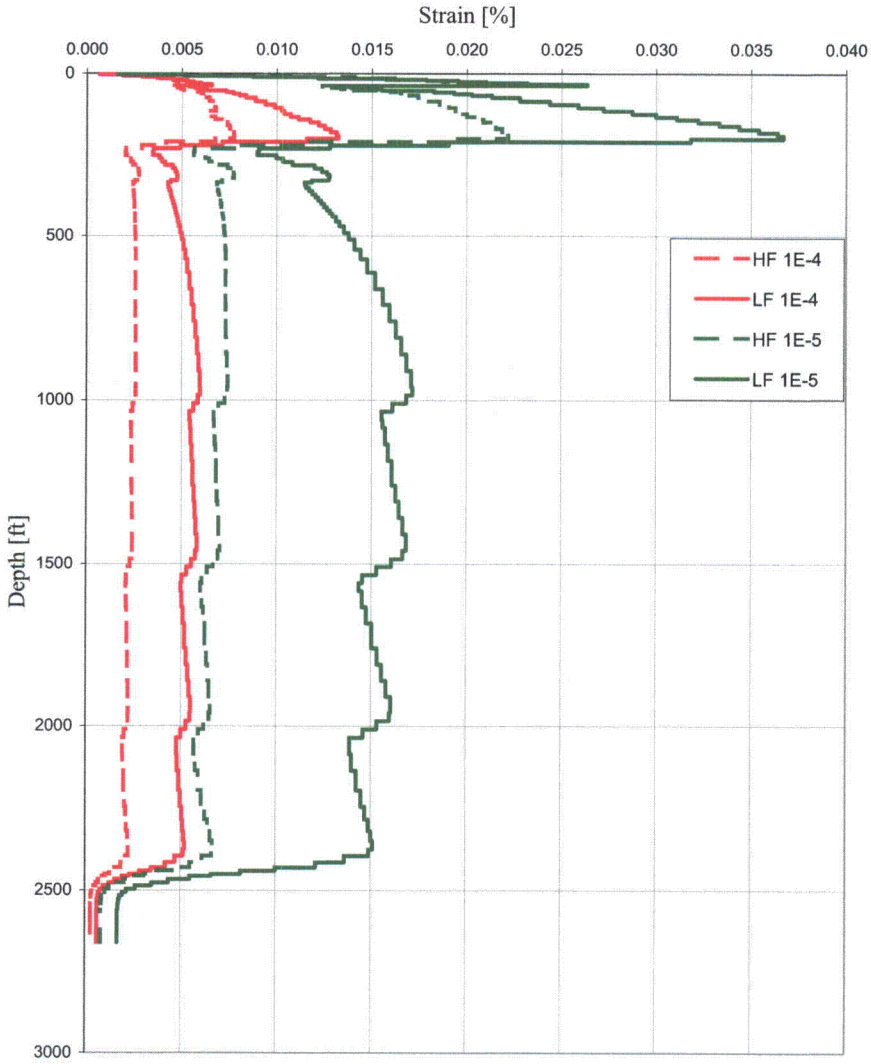


Figure 3F-12—{5% Damping Horizontal and Vertical FIRS – NI Area}

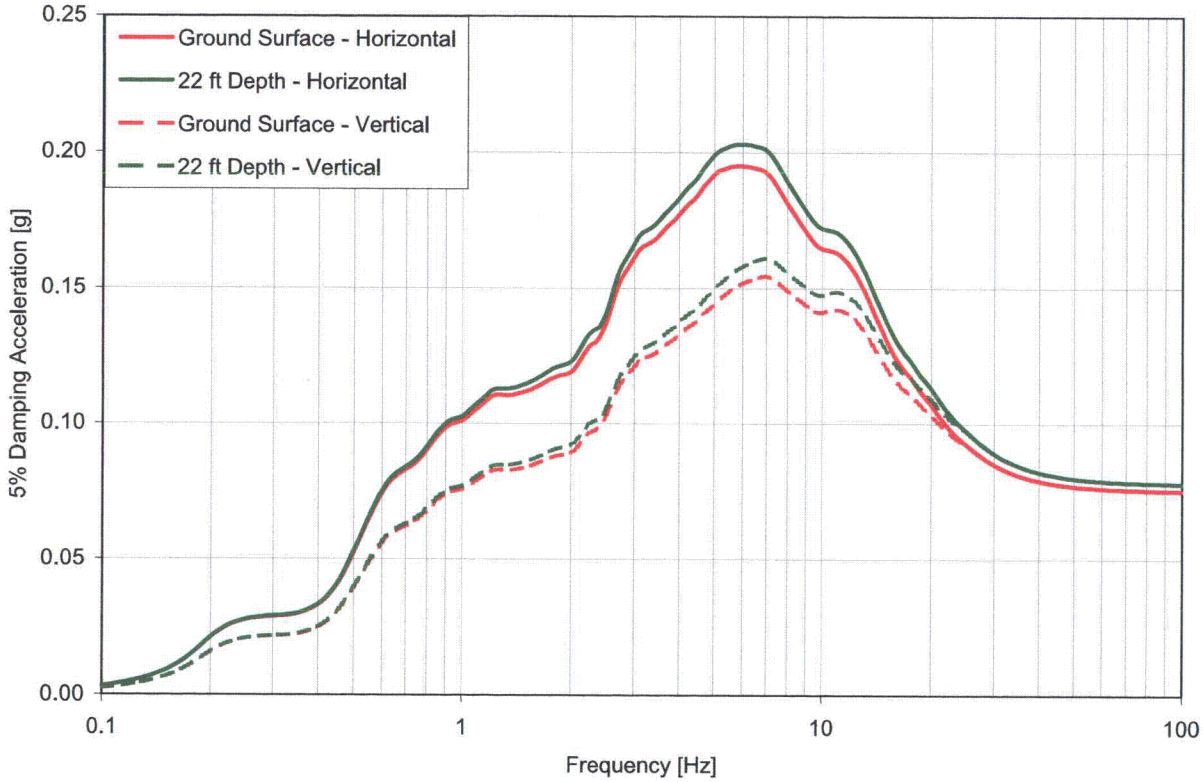


Figure 3F-13—{5% Damping Horizontal and Vertical FIRS – Intake Area}

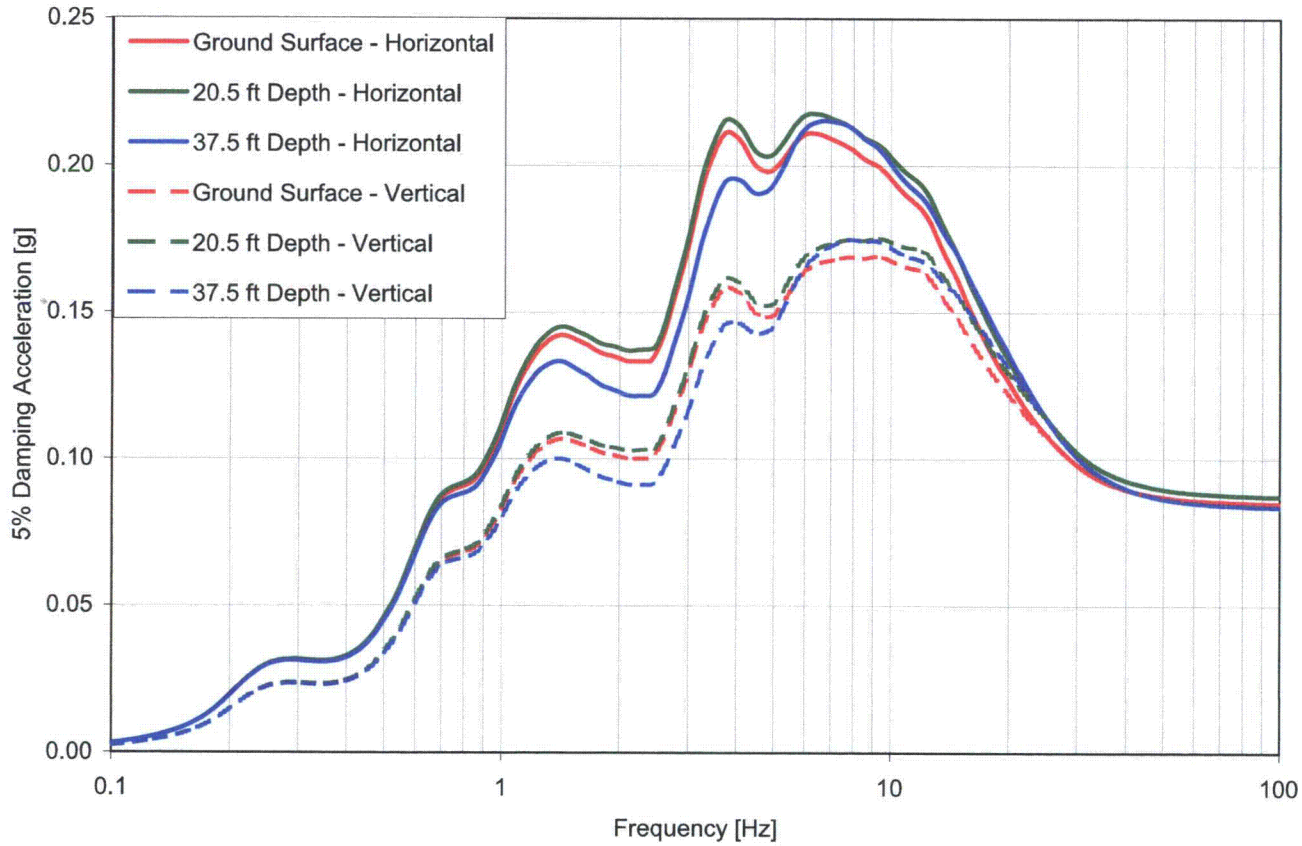


Figure 3F-14—{Shear-Wave Velocity Profiles Strain-Compatible with FIRS for the NI Area}

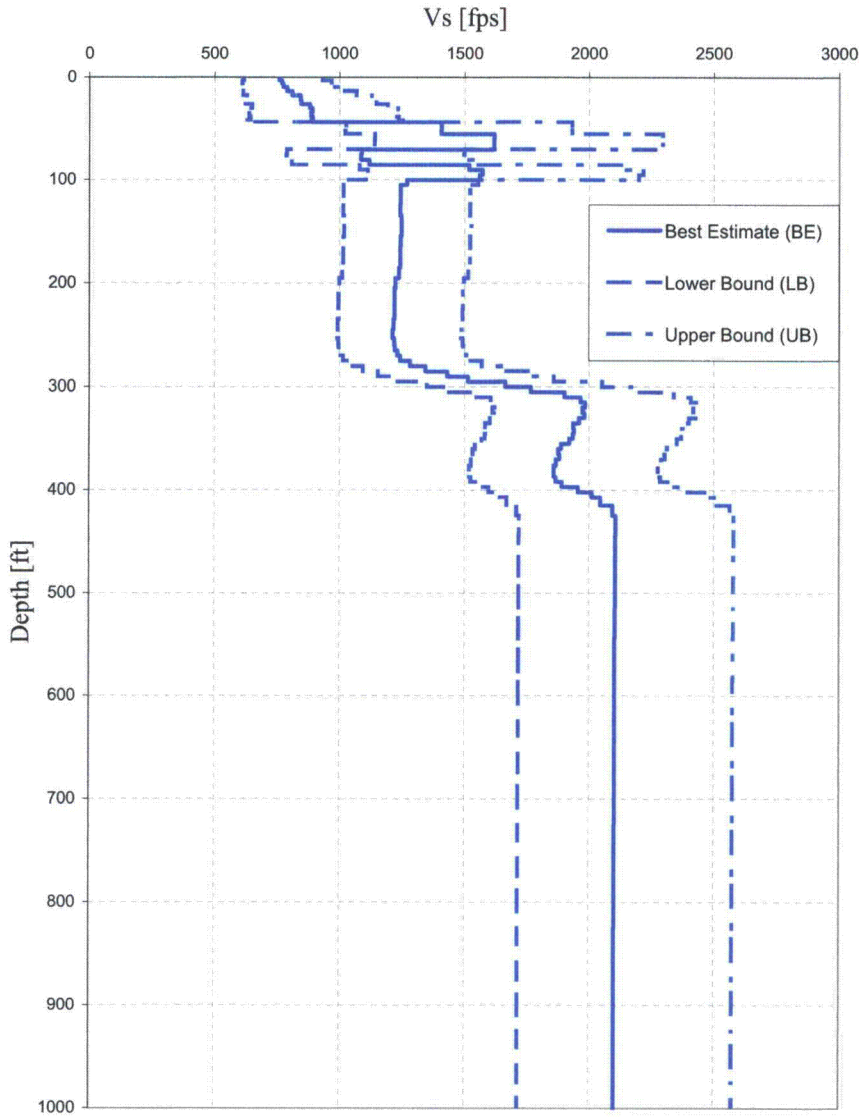


Figure 3F-15—{Damping Profiles Strain-Compatible with FIRS for the NI Area}

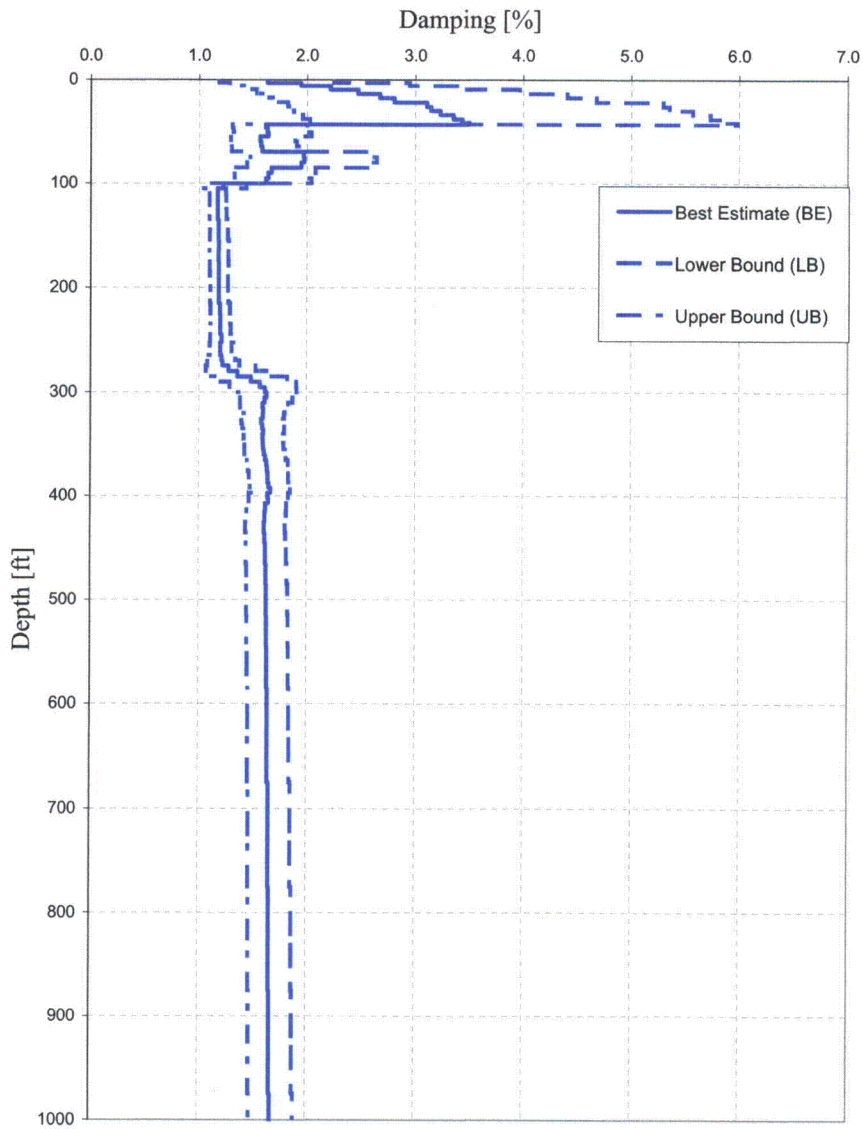


Figure 3F-16—{FIRS P-Wave Velocity Profiles for the NI Area}

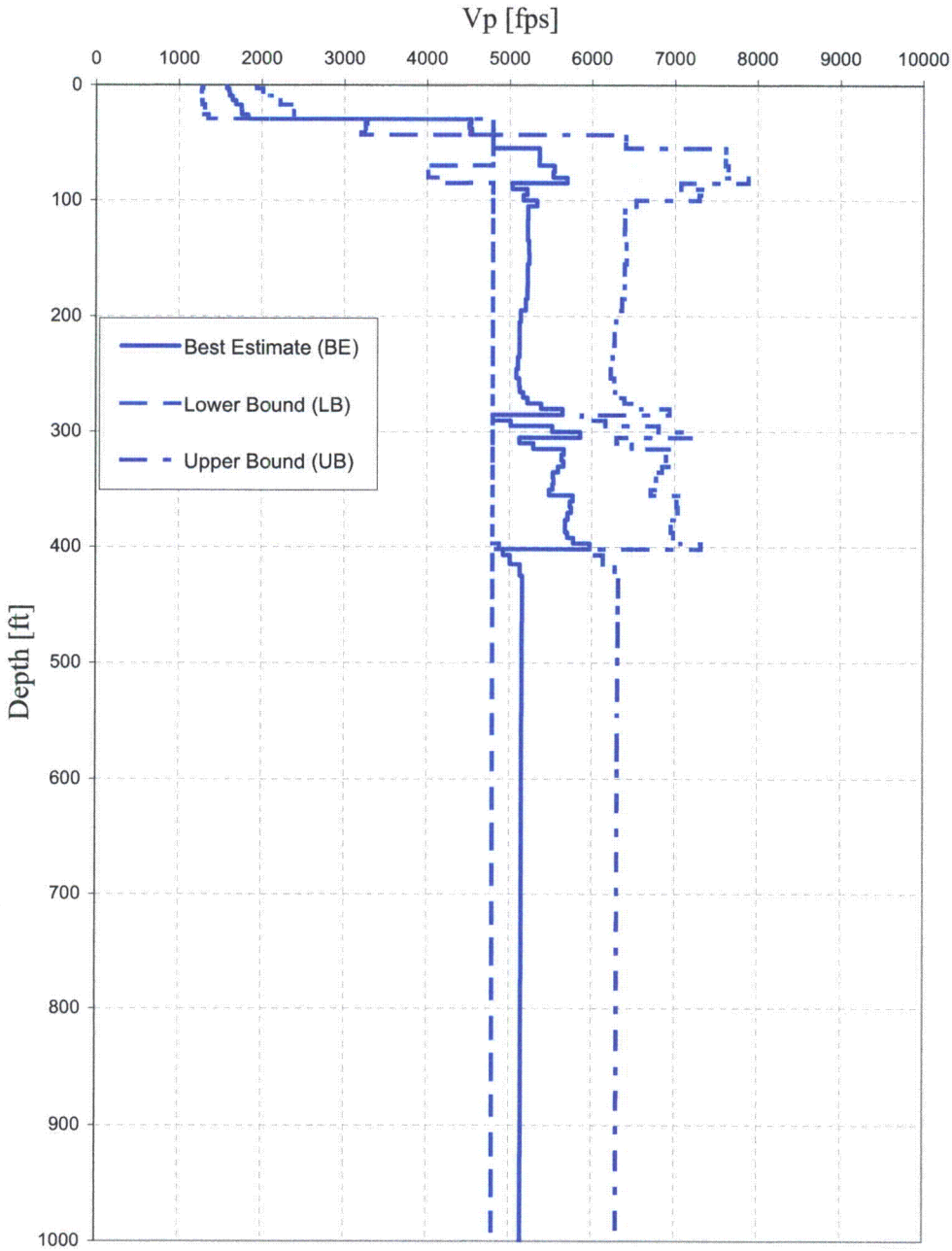


Figure 3F-17—{Shear-Wave Velocity Profiles Strain-Compatible with FIRS for the Intake Area}

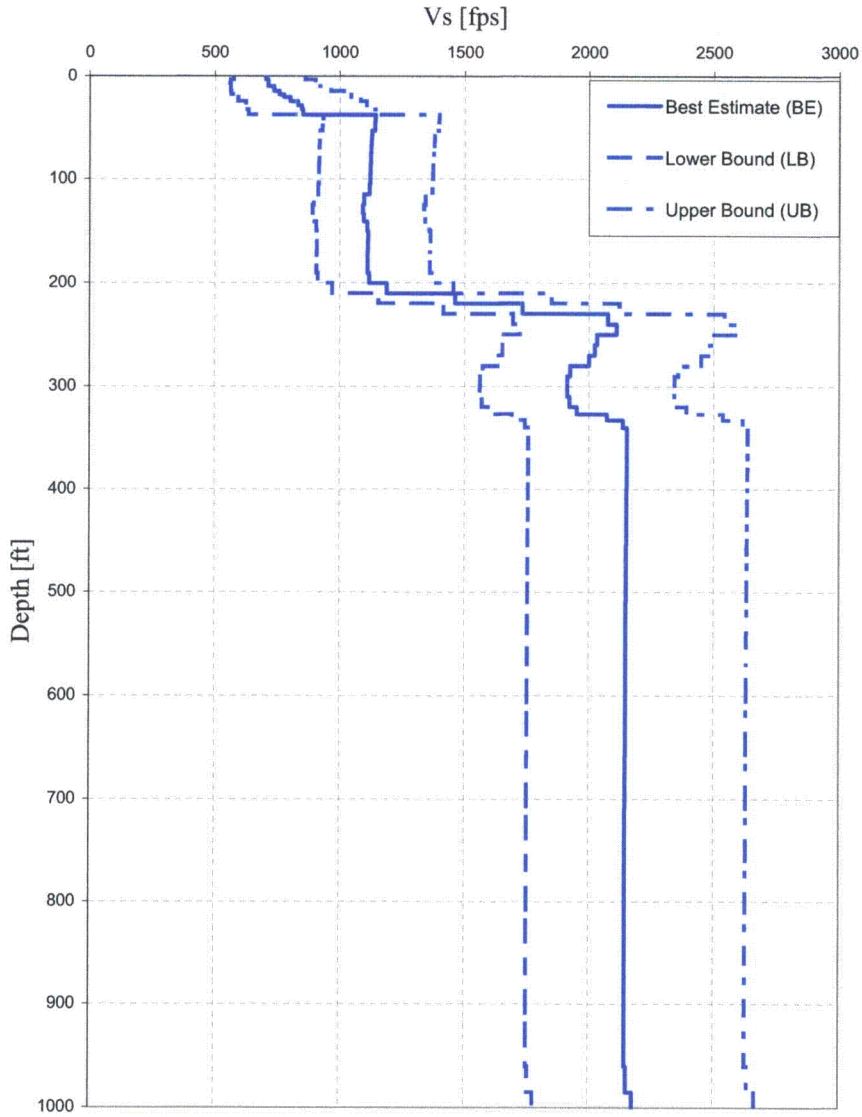


Figure 3F-18—{Damping Profiles Strain-Compatible with FIRS for the Intake Area}

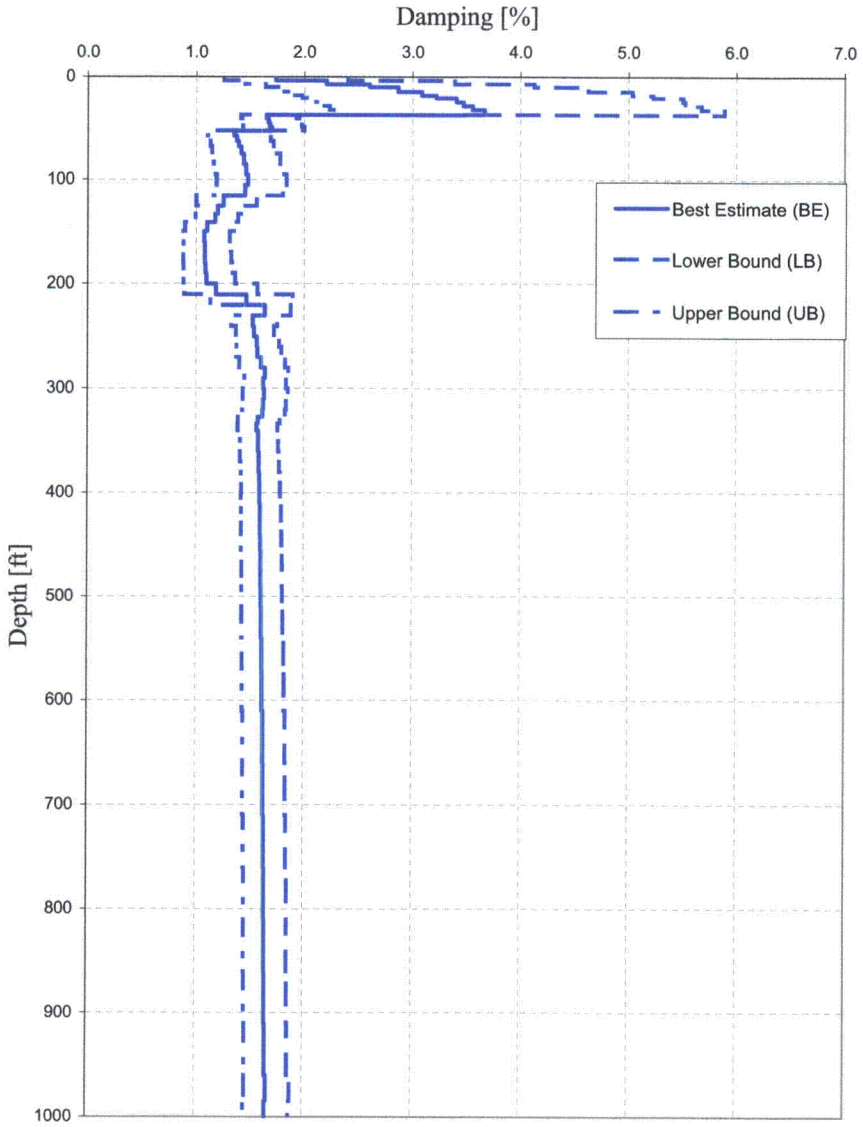


Figure 3F-19—{FIRS P-Wave Velocity Profiles for the Intake Area}

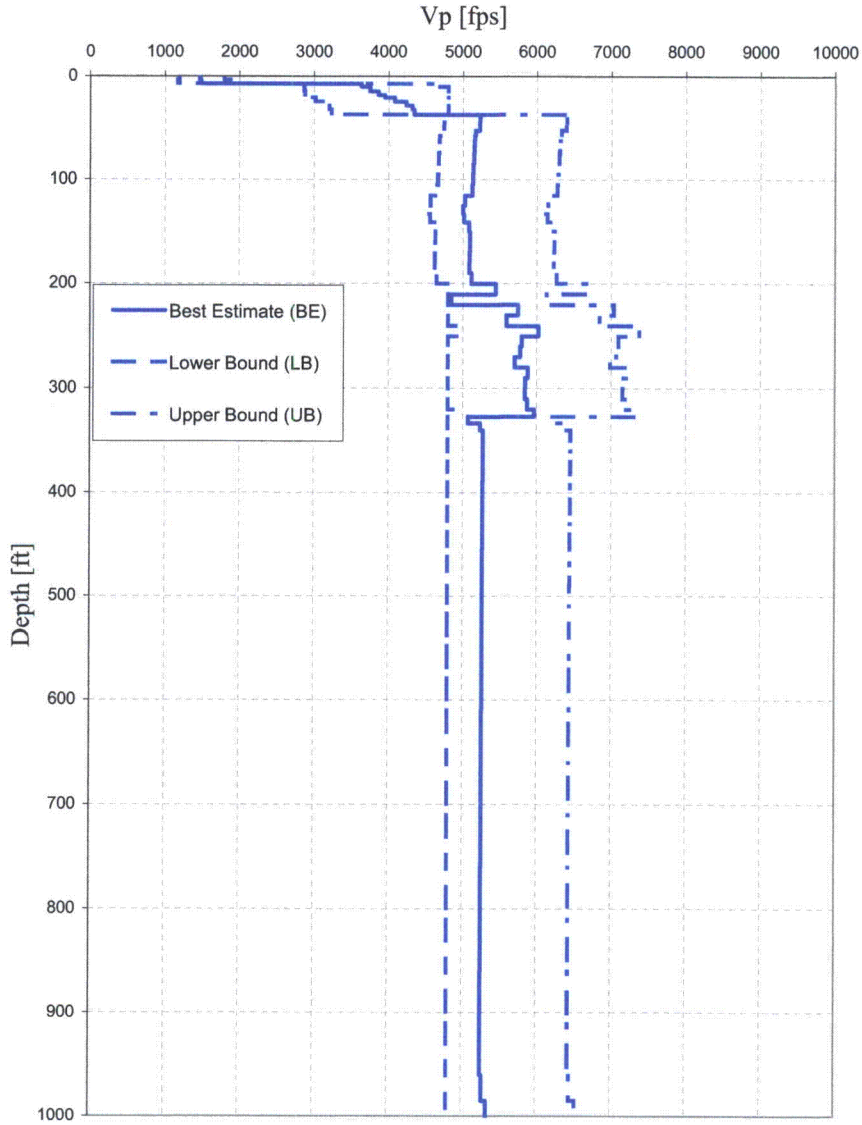


Figure 3F-20—{NEI Check for Horizontal FIRS at 37.5 ft Depth at the Intake Area}

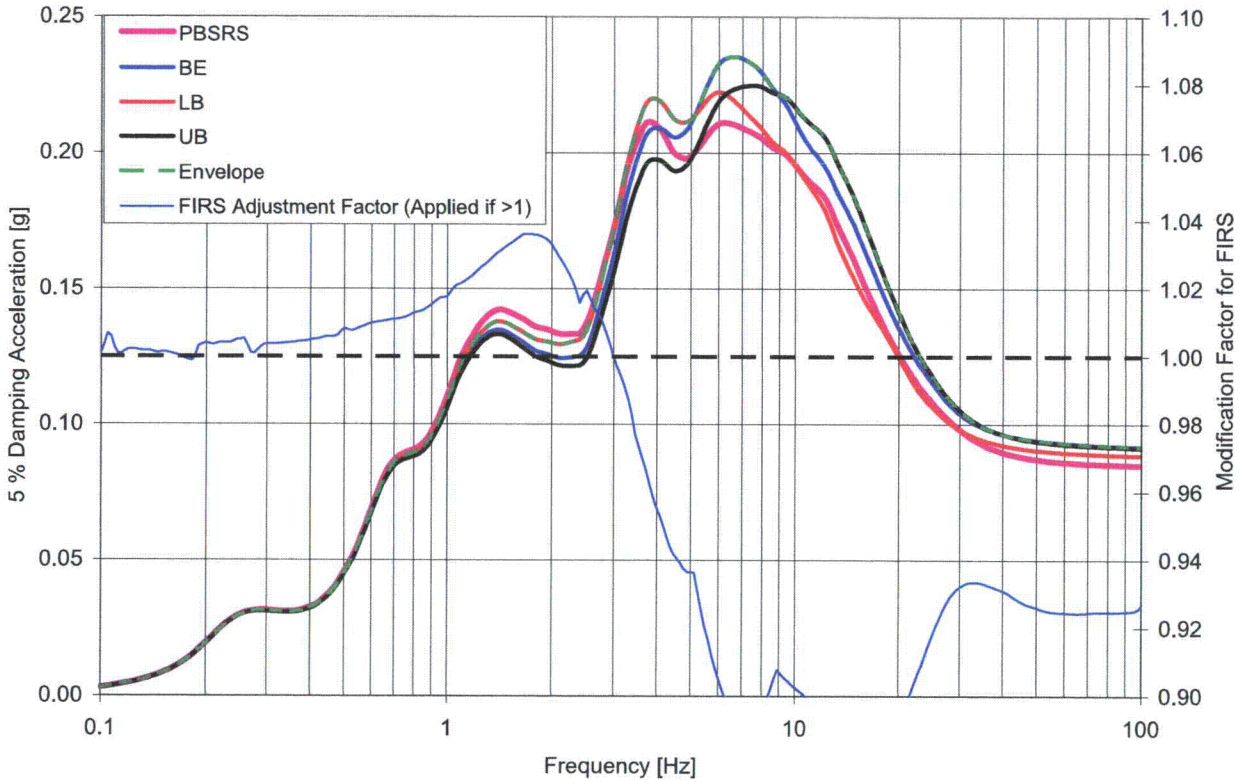


Figure 3F-21—{NEI Check for Vertical FIRS at 37.5 ft Depth at the Intake Area}

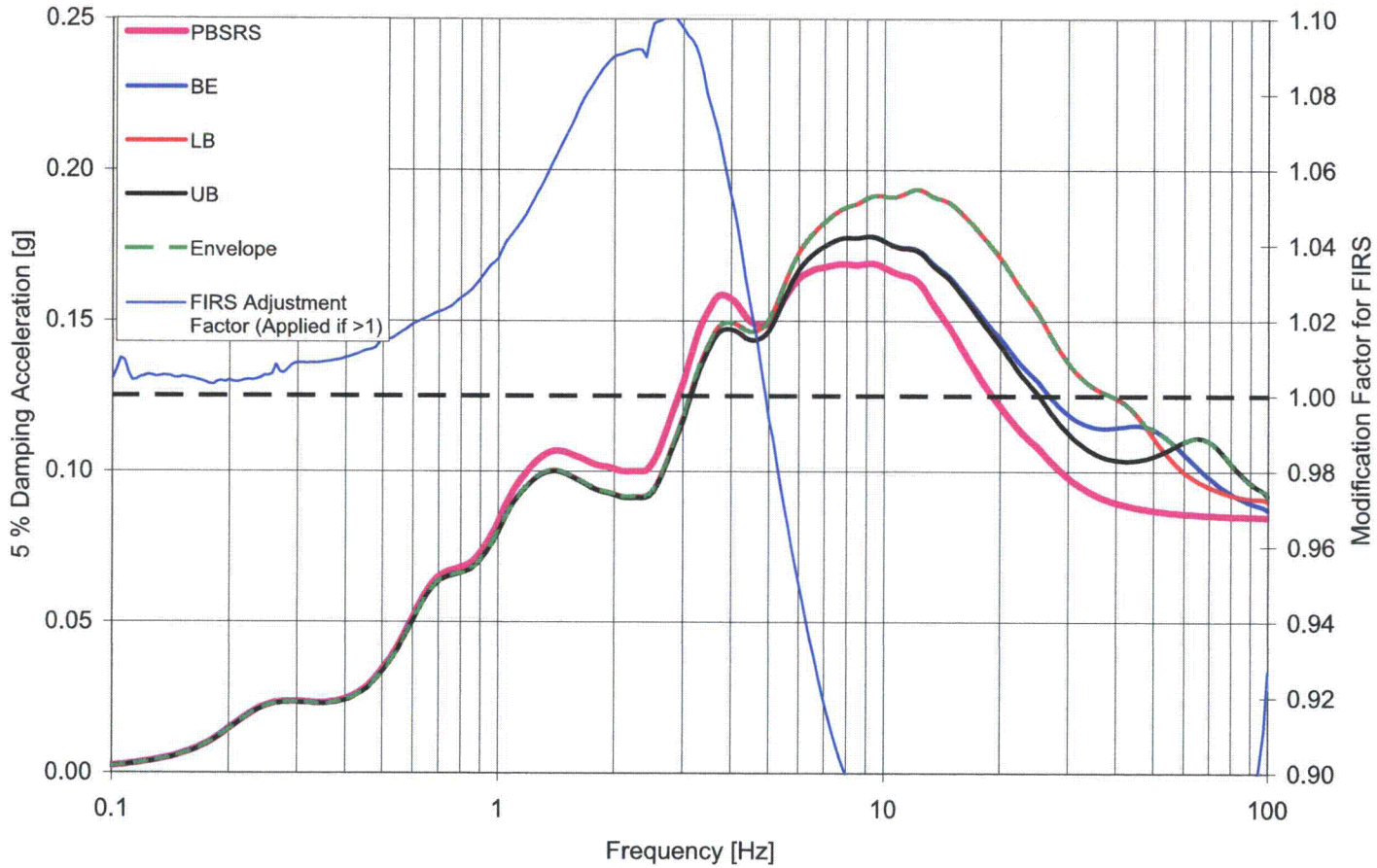


Figure 3F-22—{Envelope Horizontal Smooth Adjusted FIRS – EPGB and ESWB (No Adjustment Necessary for FIRS at 22 ft Depth)}

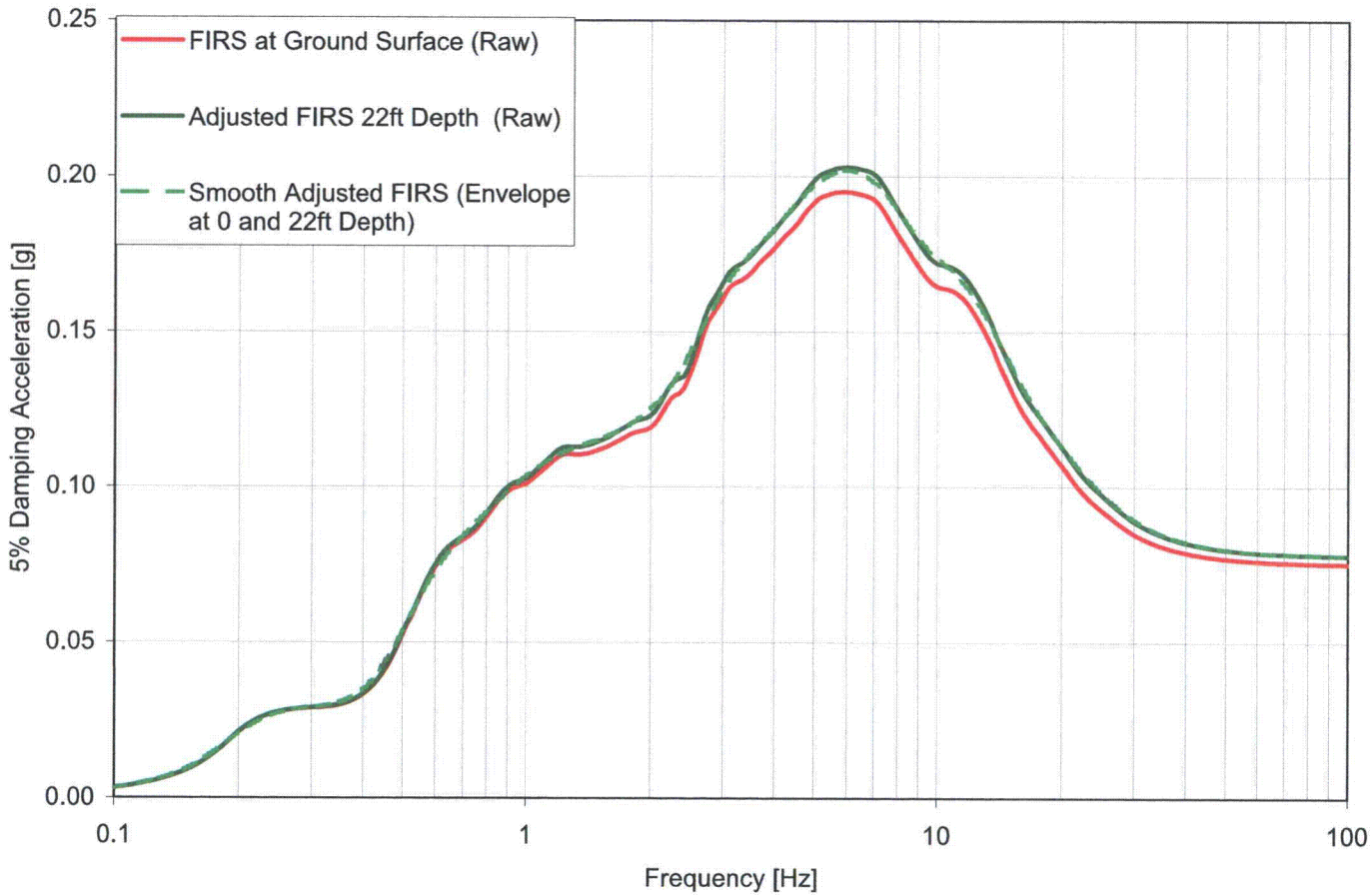


Figure 3F-23—{Envelope Vertical Smooth Adjusted FIRS – EPGB and ESWB (No Adjustment Necessary for FIRS at 22 ft Depth)}

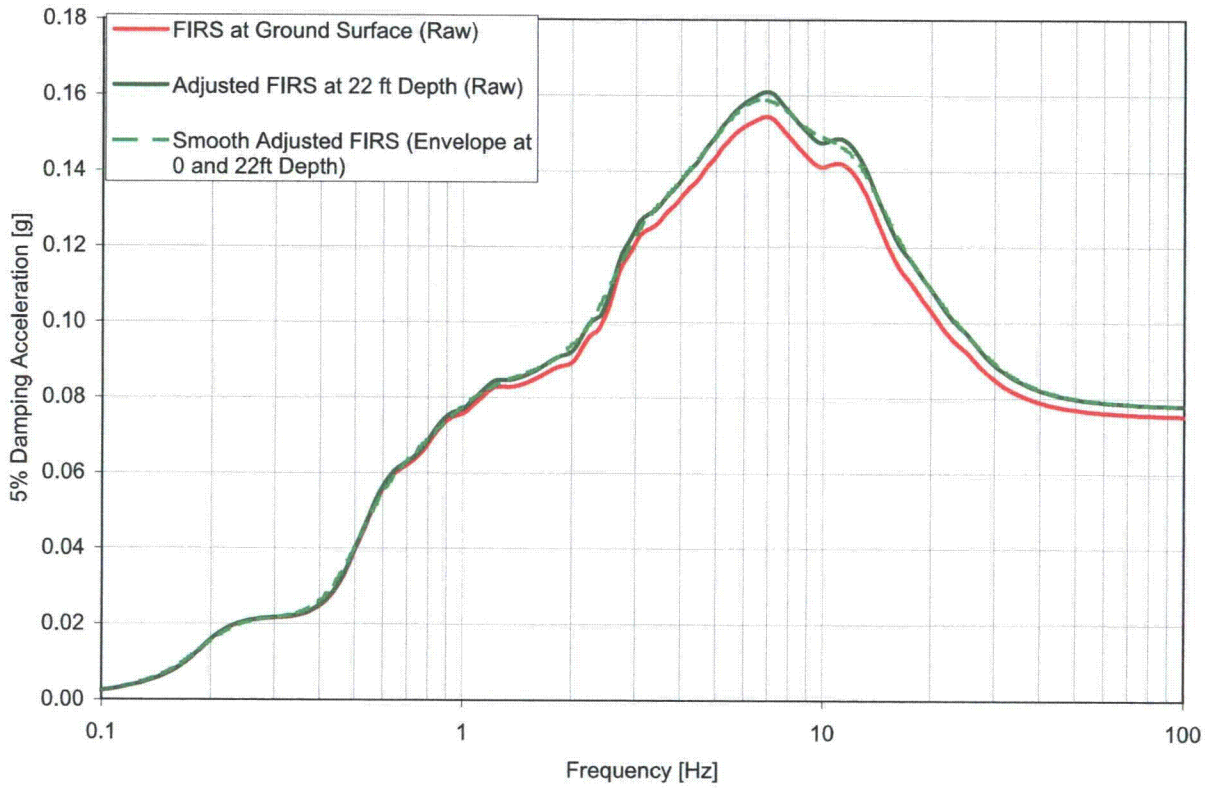


Figure 3F-24—{Envelope Horizontal Smooth Adjusted FIRS – Intake Area ~~(No Adjustment Necessary for FIRS at 20.5 ft Depth)~~}

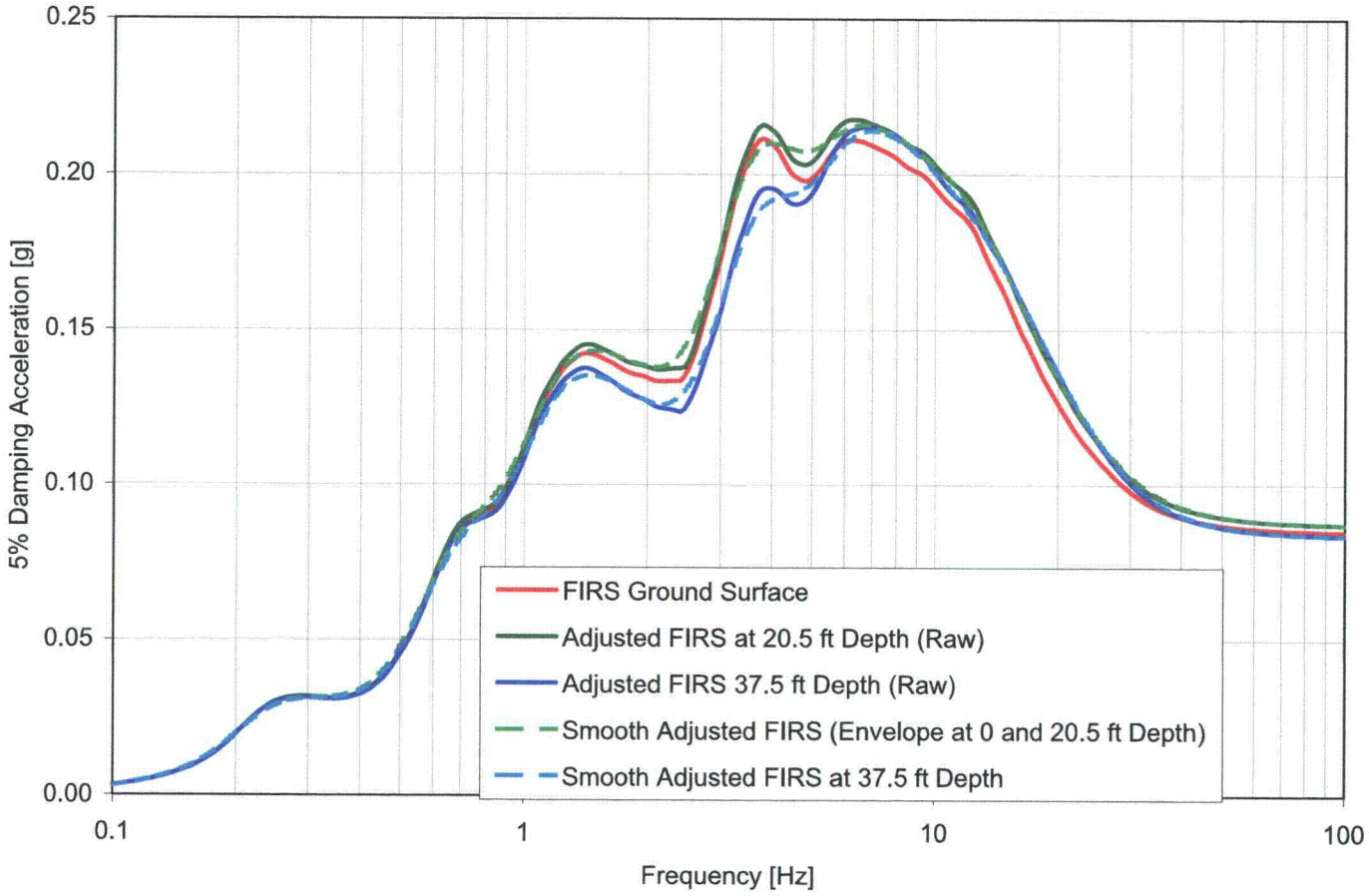


Figure 3F-25—{Envelope Vertical Smooth Adjusted FIRS – Intake Area ~~(No Adjustment Necessary for FIRS at 20.5 ft Depth)~~}

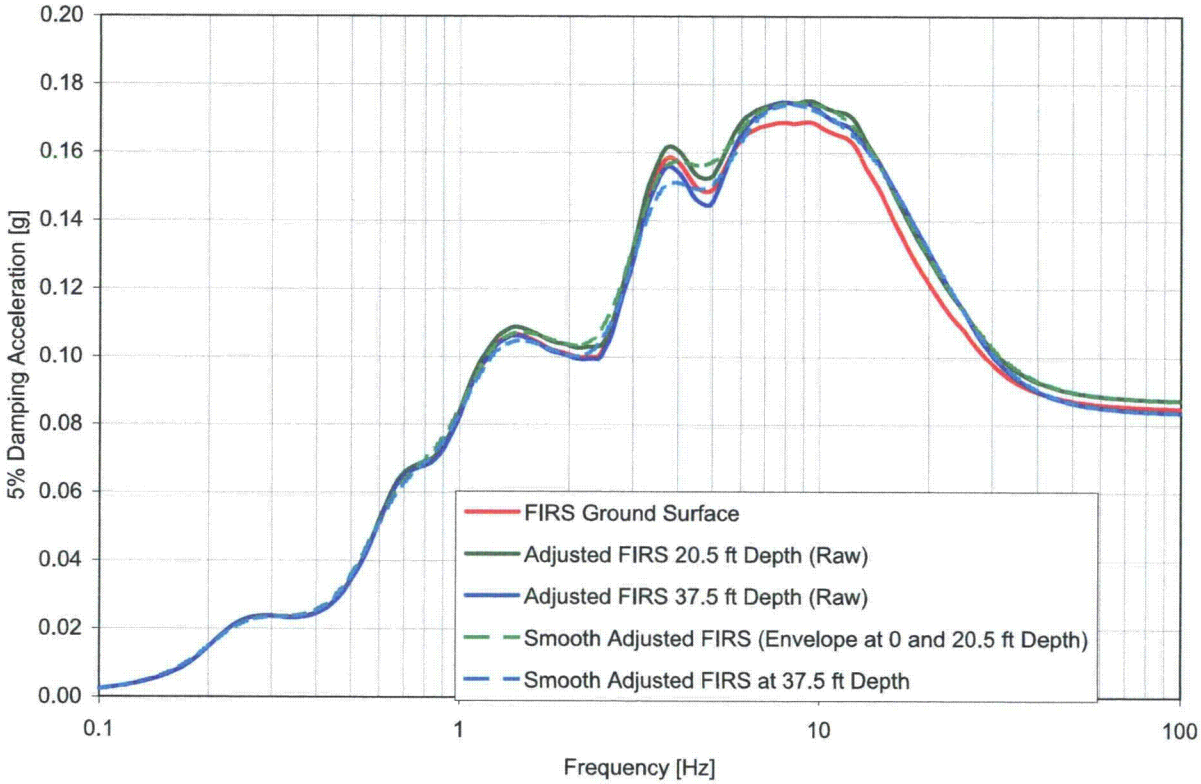


Figure 3F-26—{SSSI Effect 5% Damping ARS Amplification Functions for EPGB and ESWB}

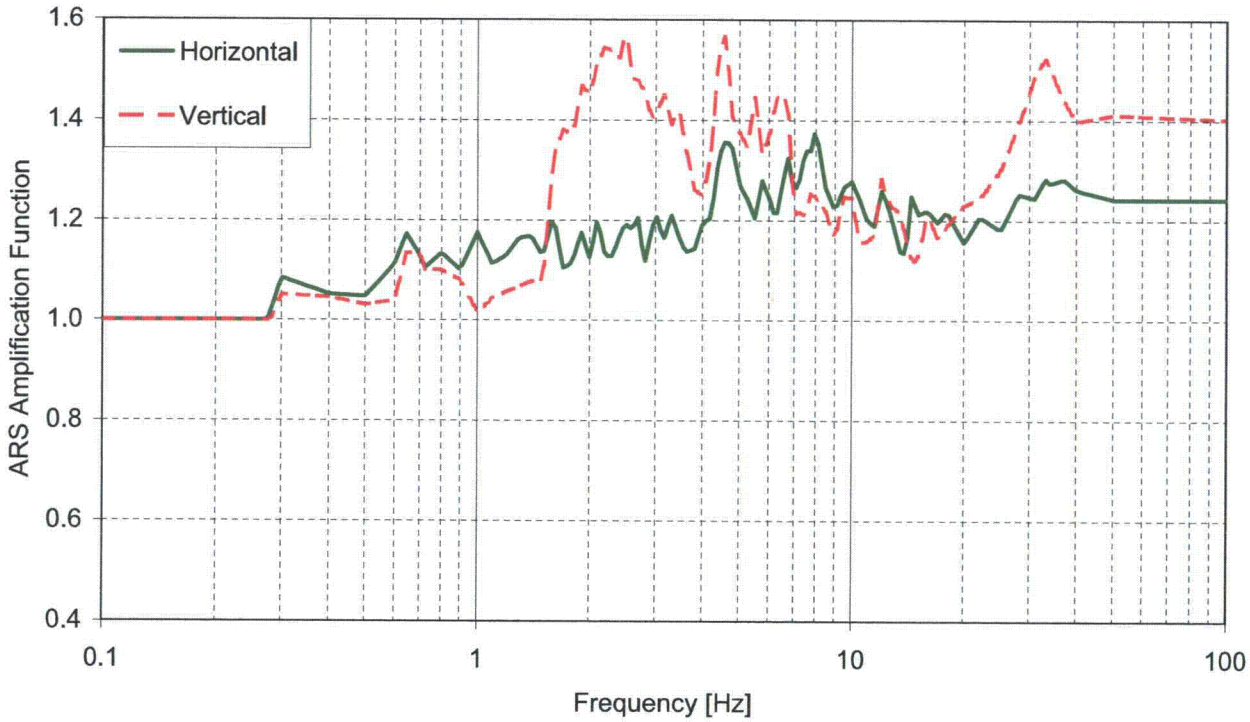


Figure 3F-27—{Site SSE Comparison with Adjusted FIRS (including NI SSSI Effects) and RG 1.60 – EPGB and ESWB}

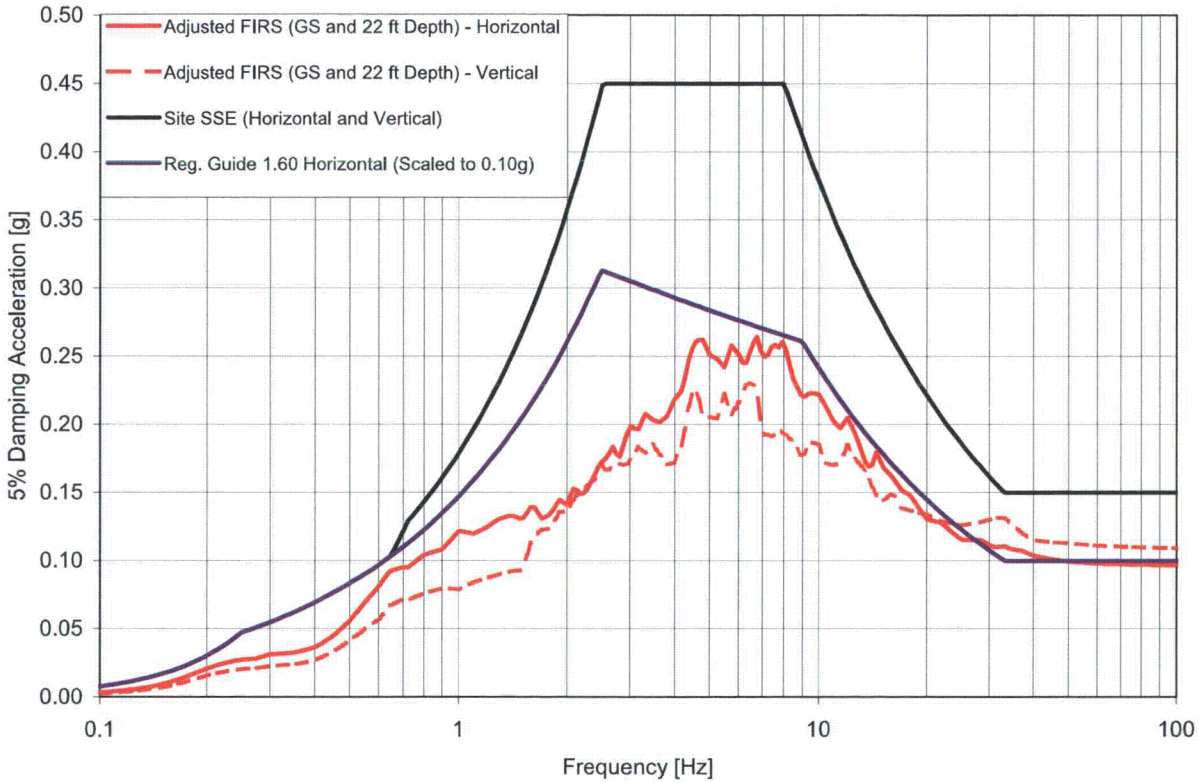


Figure 3F-28—{Site SSE Comparison with Adjusted FIRS and RG 1.60 – Intake Area}

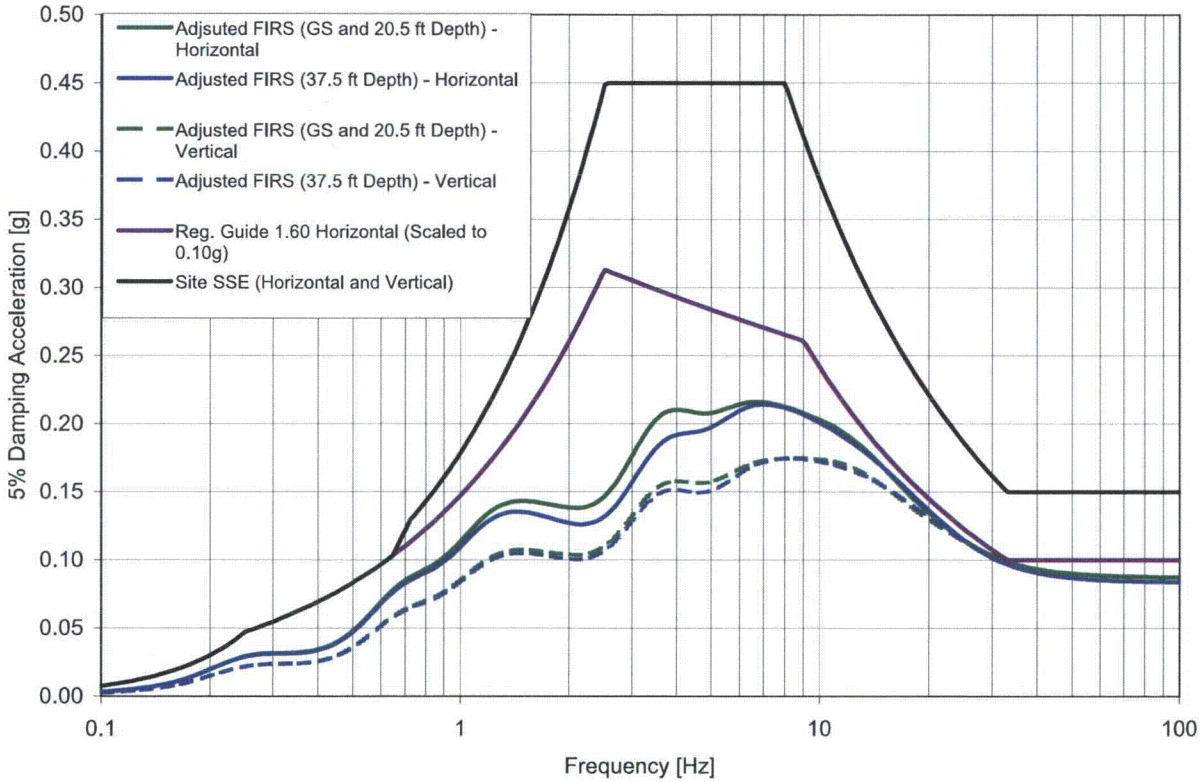


Figure 3F-29—{Shear Wave Velocity Profiles Strain-Compatible with Site SSE for the NI Area}

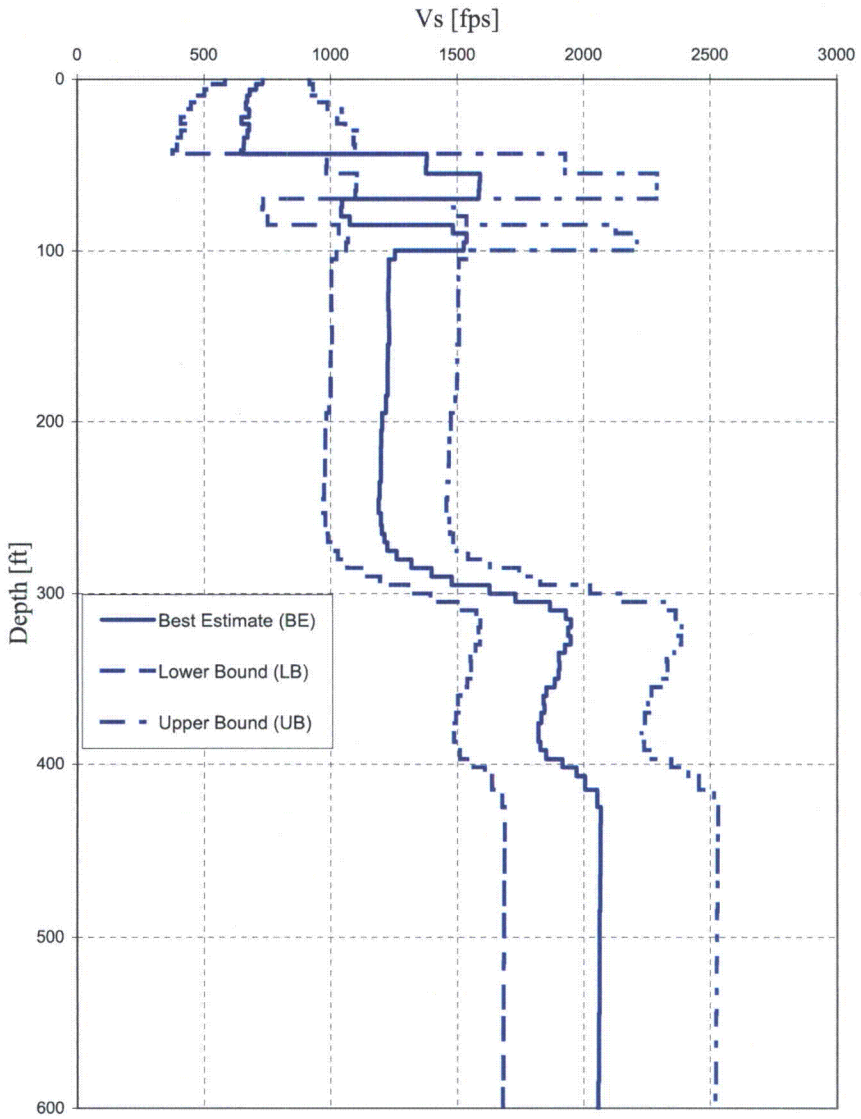


Figure 3F-30—{Damping Profiles Strain-Compatible with Site SSE for the NI Area}

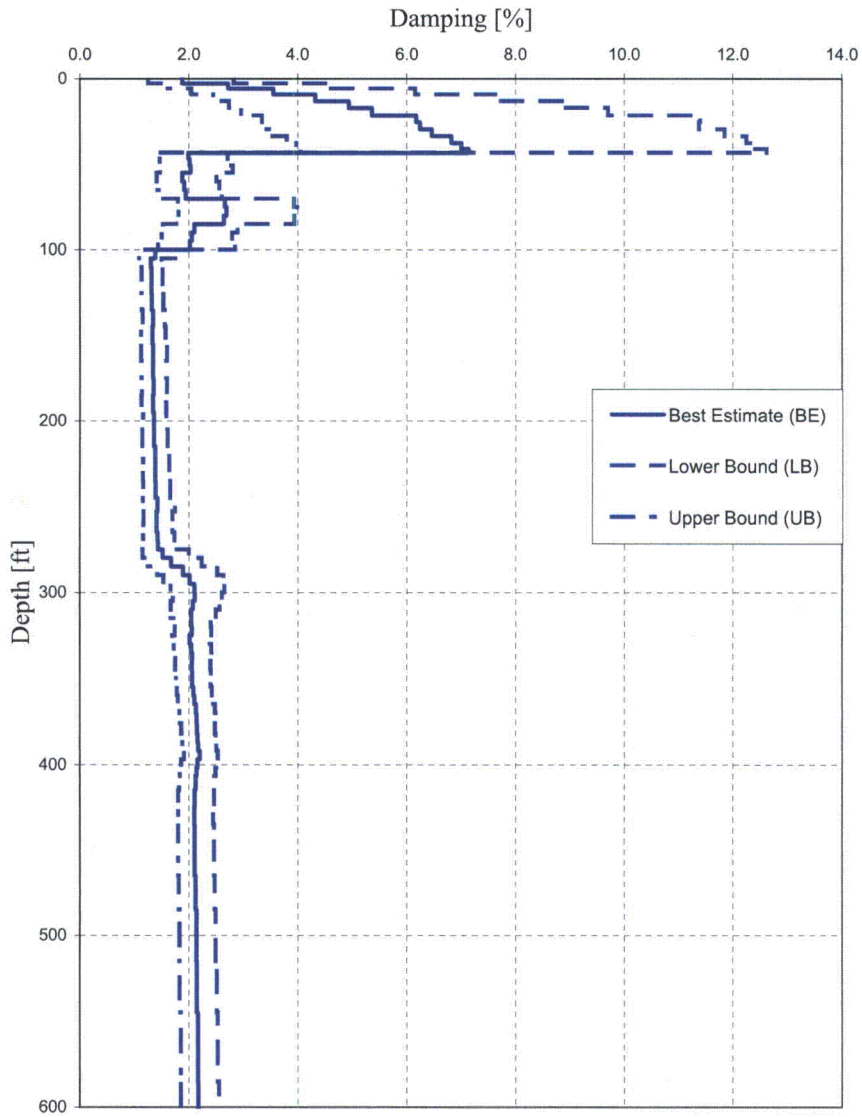


Figure 3F-31—{Site SSE P-Wave Velocity Profiles for the NI Area}

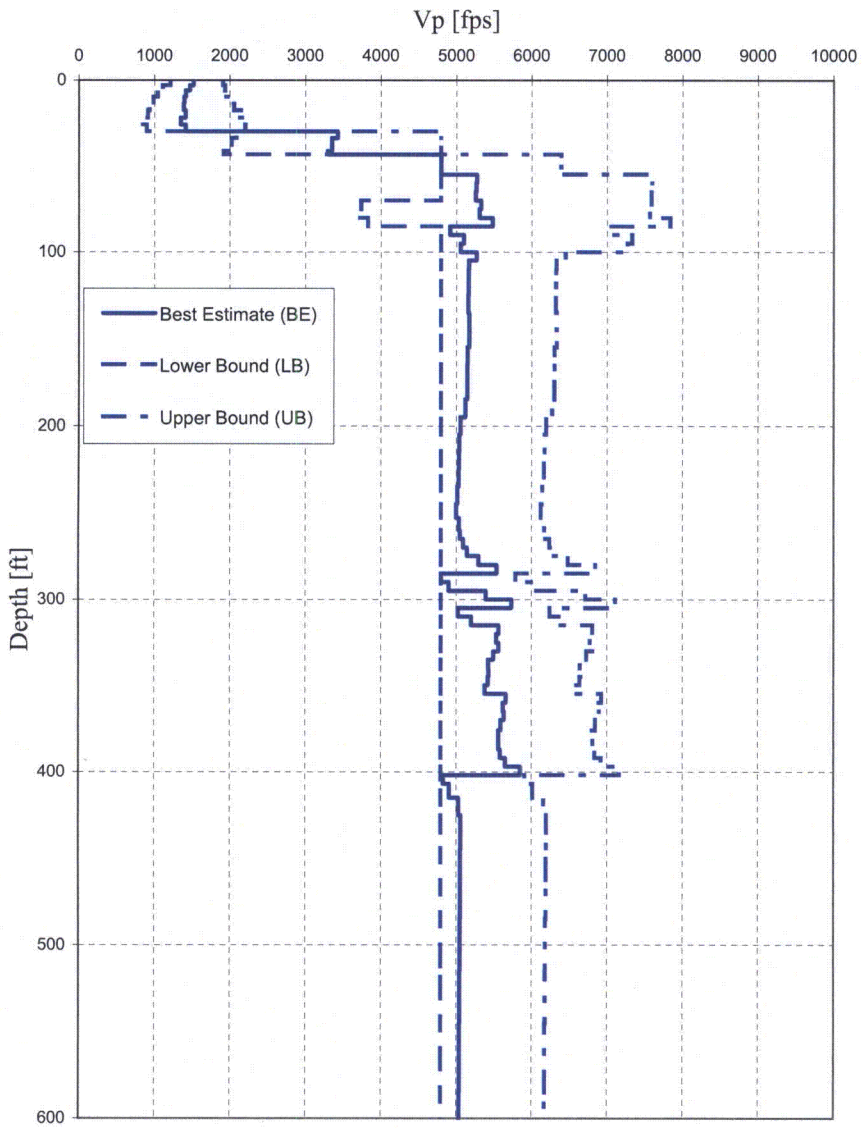


Figure 3F-32—{Shear Wave Velocity Profiles Strain-Compatible with Site SSE for the Intake Area}

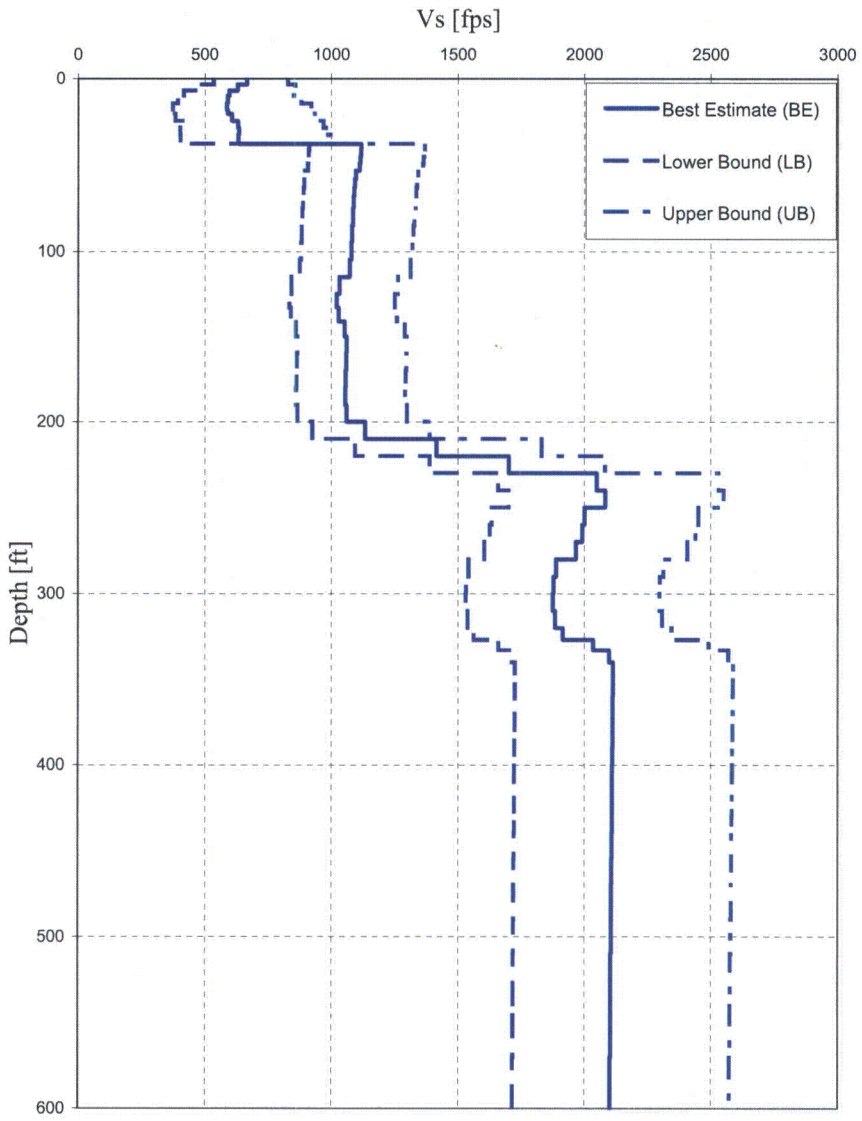


Figure 3F-33—{Damping Profiles Strain-Compatible with Site SSE for the Intake Area}

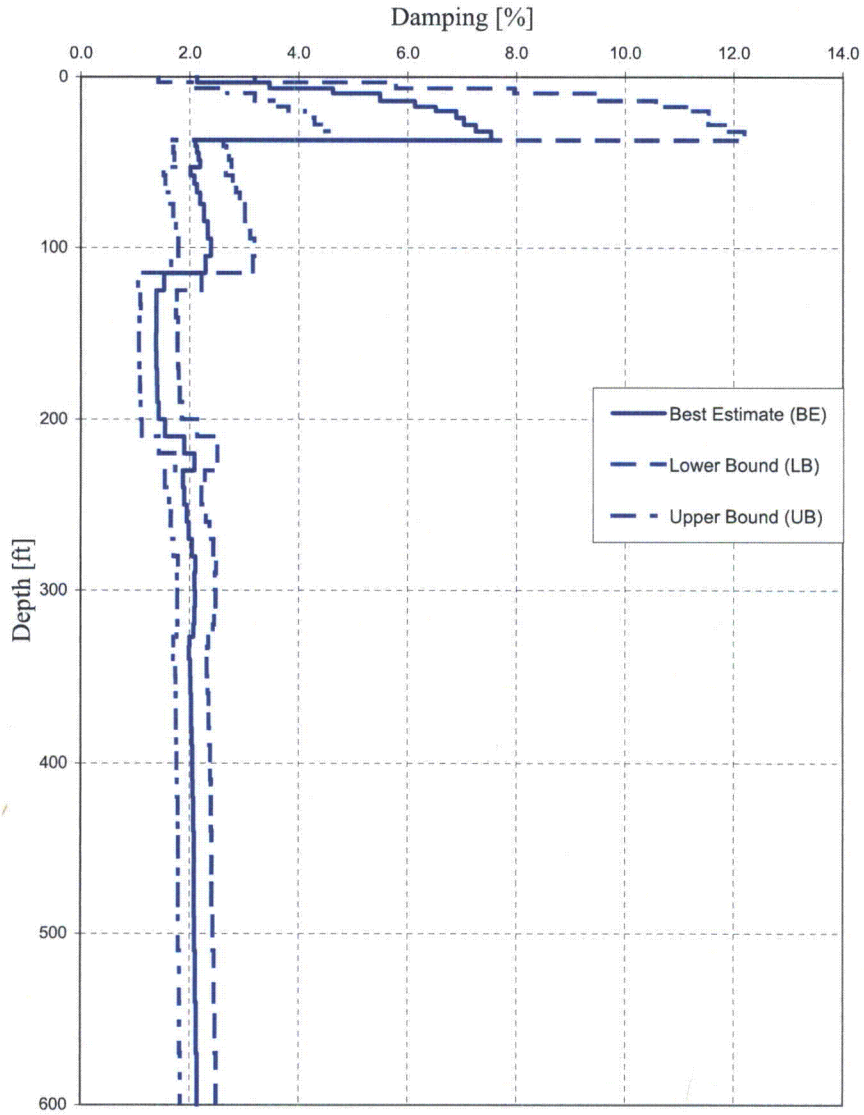


Figure 3F-34—{Site SSE P-Wave Velocity Profiles for the Intake Area}

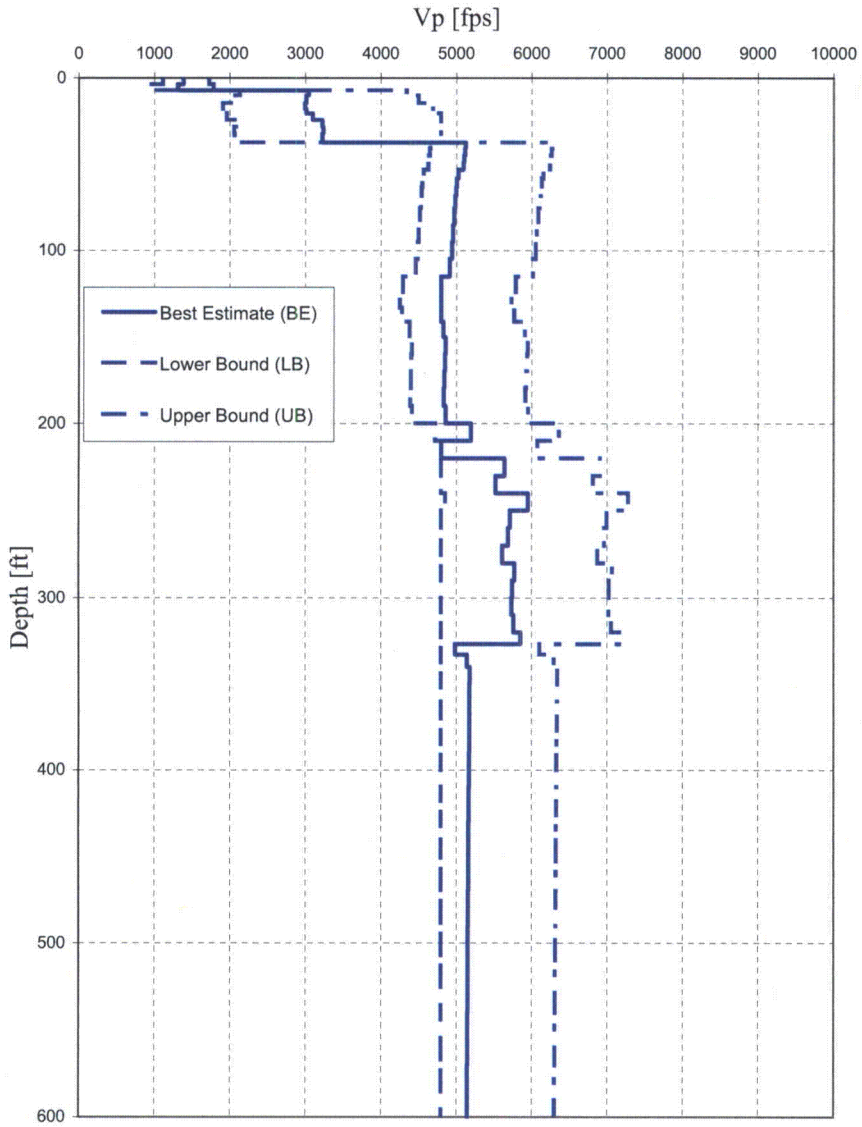
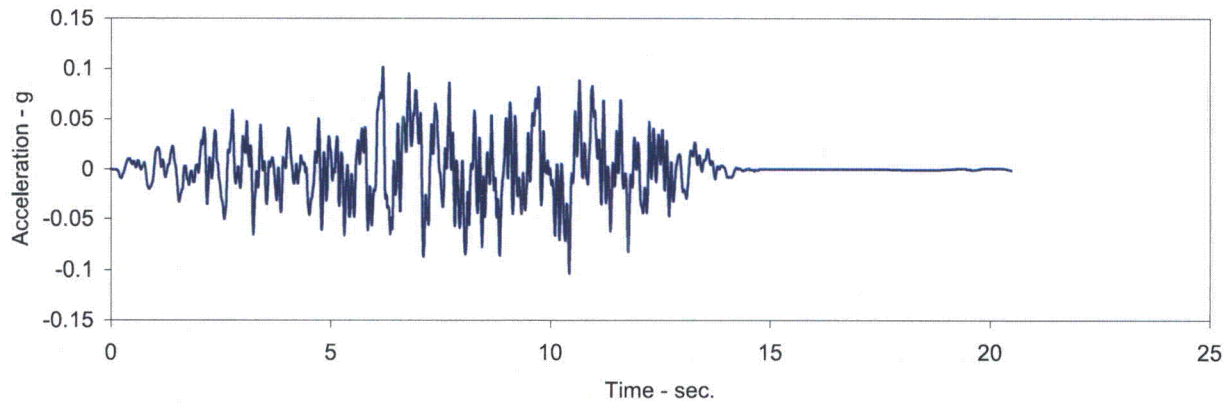
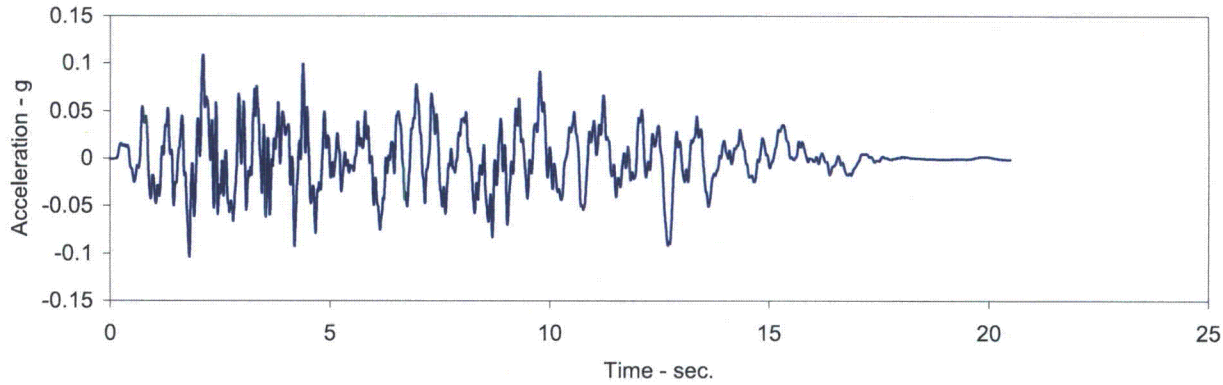


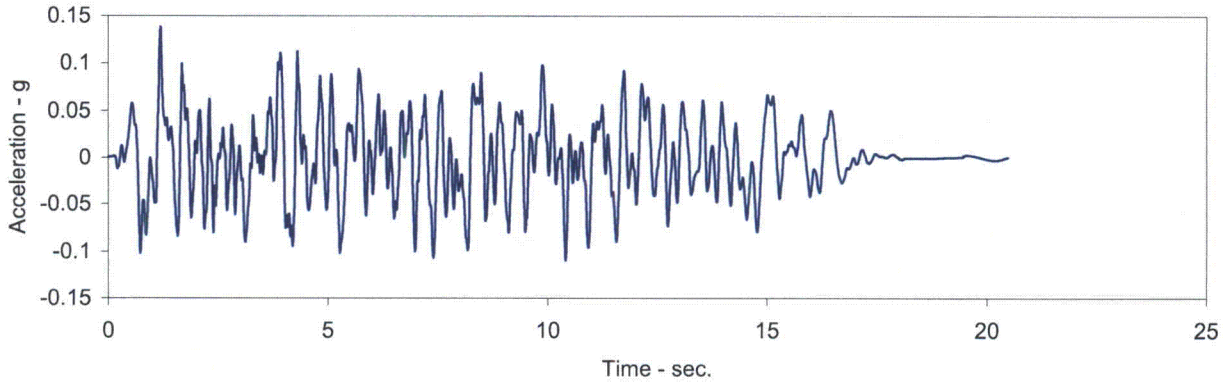
Figure 3F-35—{SSI "Within" Acceleration Time Histories for Input at ESWB Foundation (LB Soil Case)– NI Area (22 ft Depth) }



a) Horizontal Direction S1

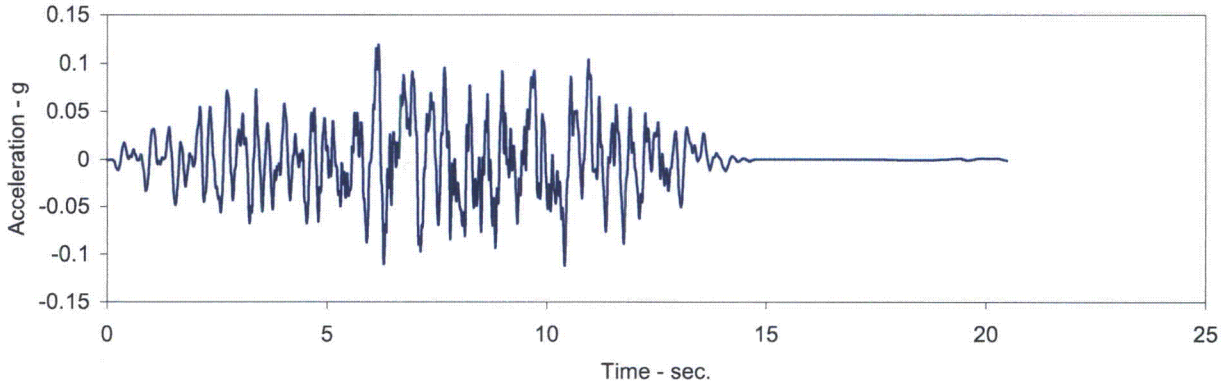


b) Horizontal Direction S2



c) Vertical Direction S3

Figure 3F-36—{SSI "Within" Acceleration Time Histories for Input at ESWB Foundation (BE Soil Case)– NI Area (22 ft Depth) }



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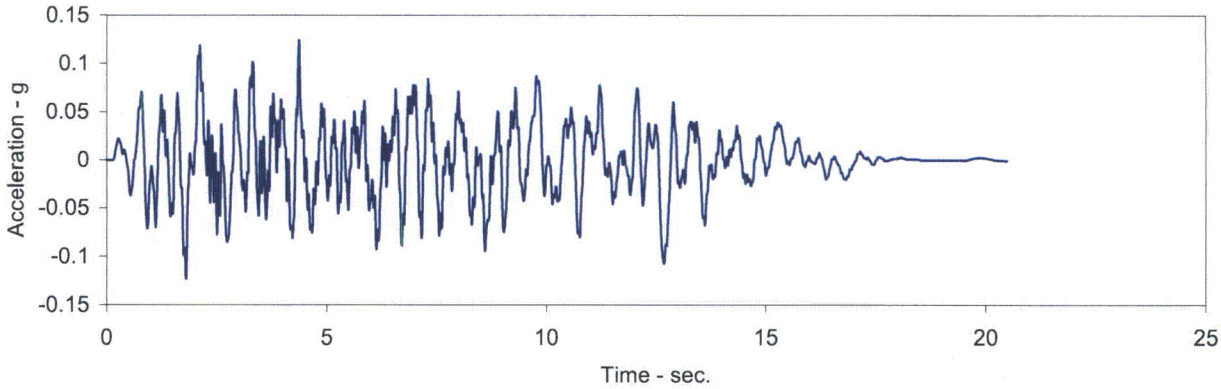

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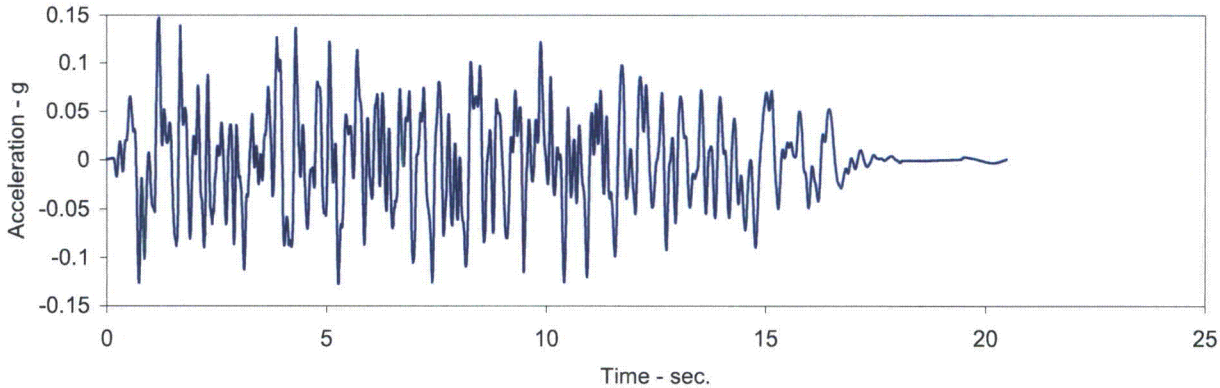
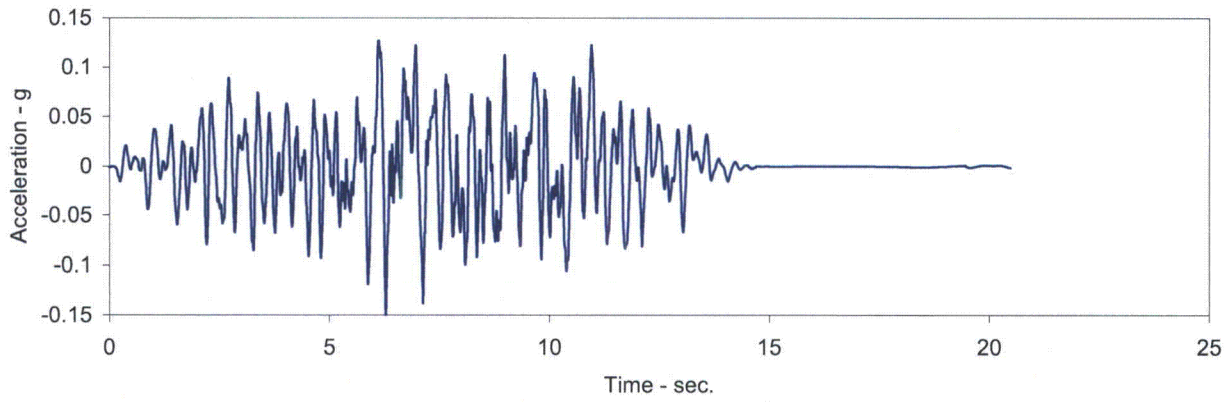
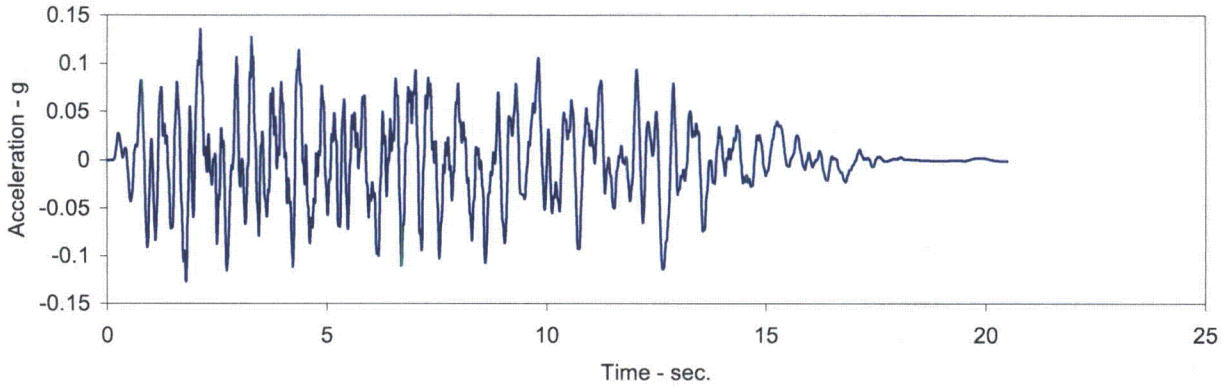


c) Vertical Direction S3

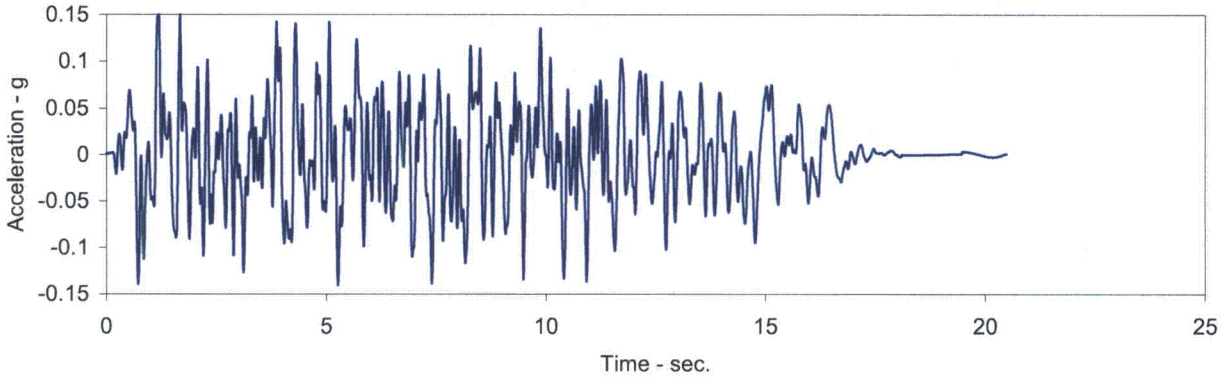
Figure 3F-37—{SSI "Within" Acceleration Time Histories for Input at ESWB Foundation (UB Soil Case)– NI Area (22 ft Depth) }



a) Horizontal Direction S1



b) Horizontal Direction S2



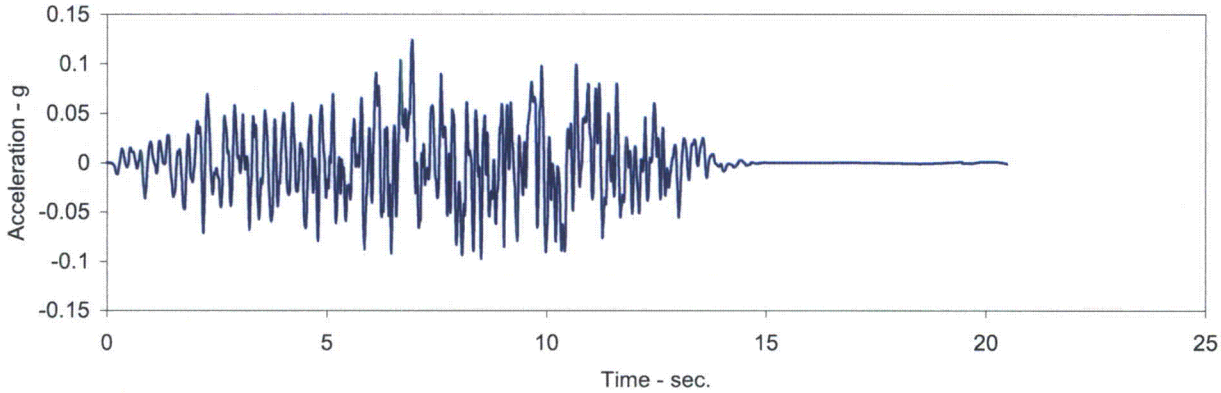
c) Vertical Direction S3

Figure 3F-38—~~{SSI "Within" Acceleration Time Histories for Input at UHS Electrical Building Foundation (LB Soil Case) - Intake Area (20.5 ft Depth)~~Not Used~~}~~

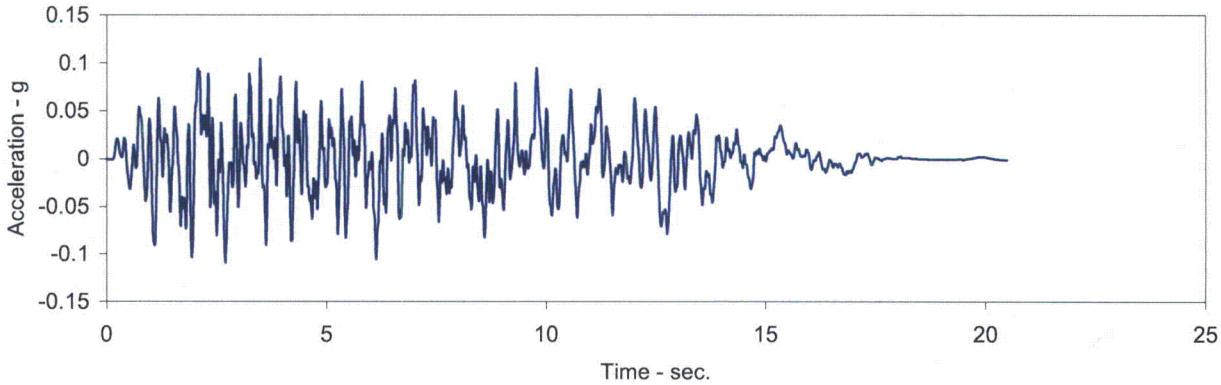
Figure 3F-39—~~{SSI "Within" Acceleration Time Histories for Input at UHS Electrical Building Foundation (BE Soil Case) - Intake Area (20.5 ft Depth)~~Not Used}

Figure 3F-40—~~{SSI "Within" Acceleration Time Histories for Input at UHS Electrical Building Foundation (UB Soil Case) - Intake Area (20.5 ft Depth)~~Not Used}

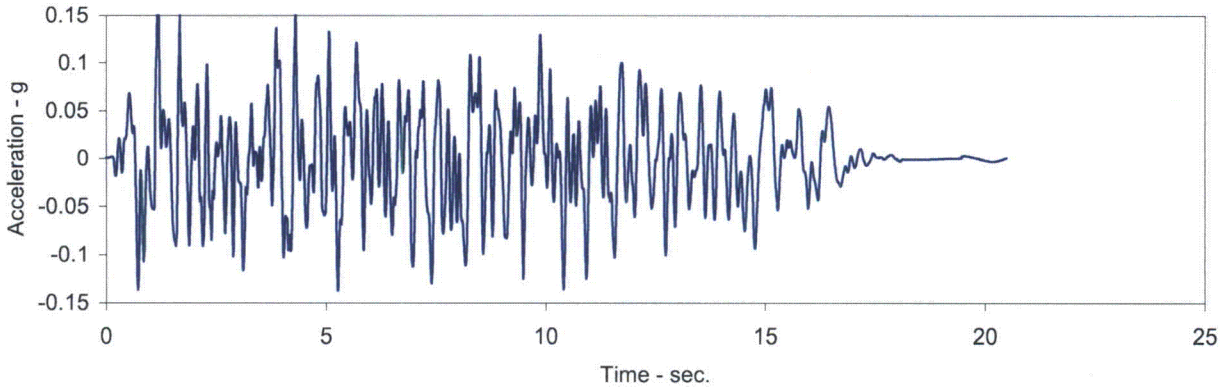
Figure 3F-41—{SSI "Within" Acceleration Time Histories for Input at CBIS Foundation (LB Soil Case)– Intake Area (37.5 ft Depth)}



a) Horizontal Direction S1

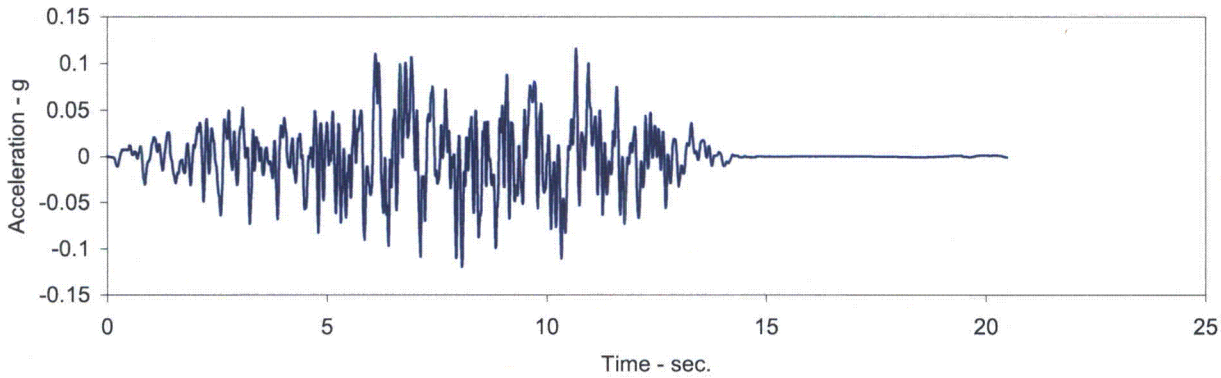


b) Horizontal Direction S2

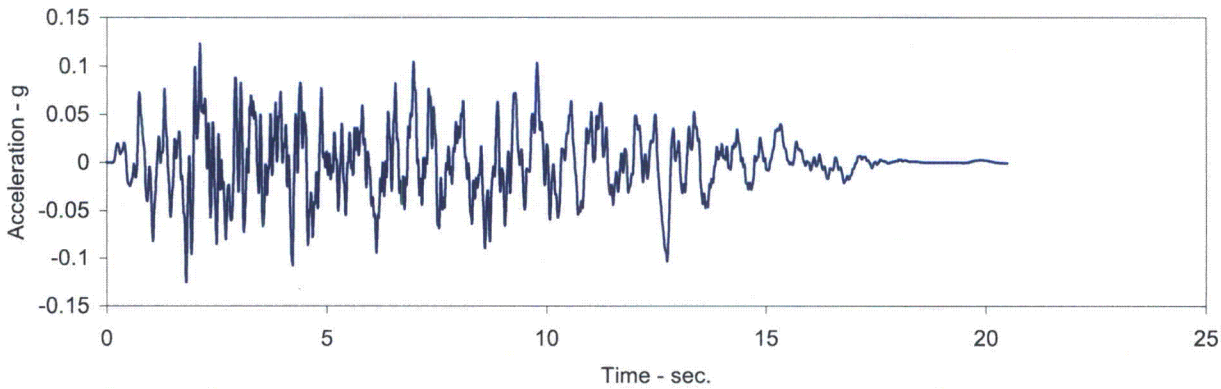


c) Vertical Direction S3

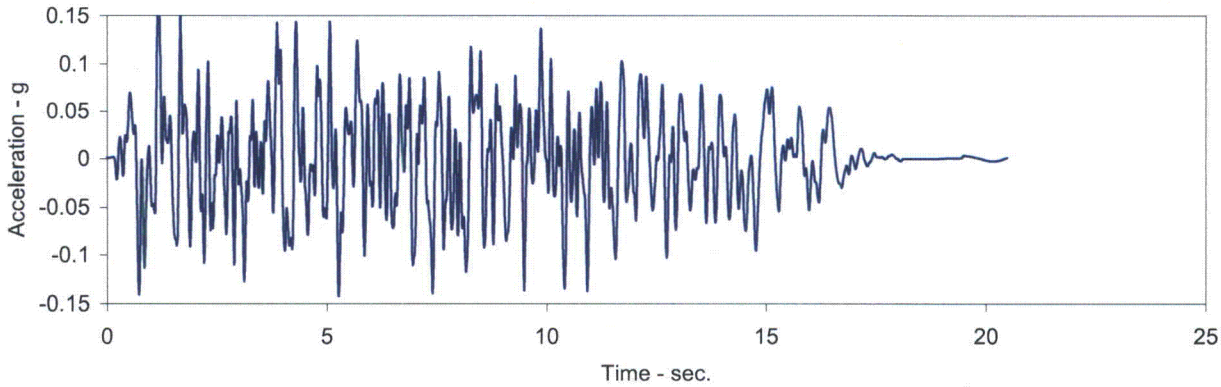
Figure 3F-42—{SSI "Within" Acceleration Time Histories for Input at CBIS Foundation (BE Soil Case)– Intake Area (37.5 ft Depth)}



a) Horizontal Direction S1

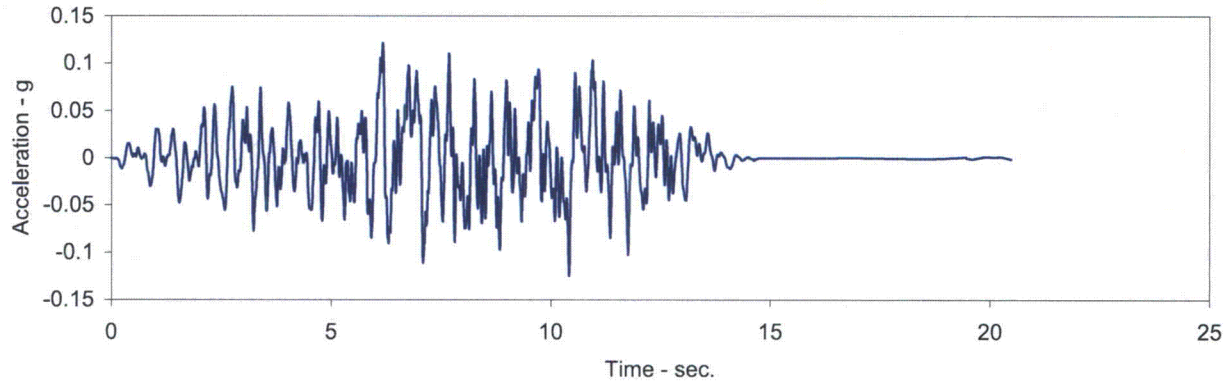


b) Horizontal Direction S2



c) Vertical Direction S3

Figure 3F-43—{SSI "Within" Acceleration Time Histories for Input at CBIS Foundation (UB Soil Case)– Intake Area (37.5 ft Depth)}



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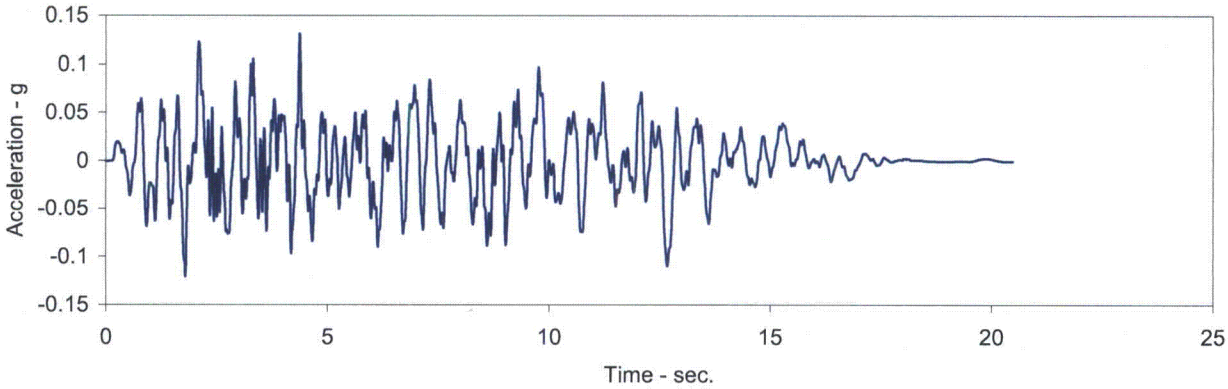
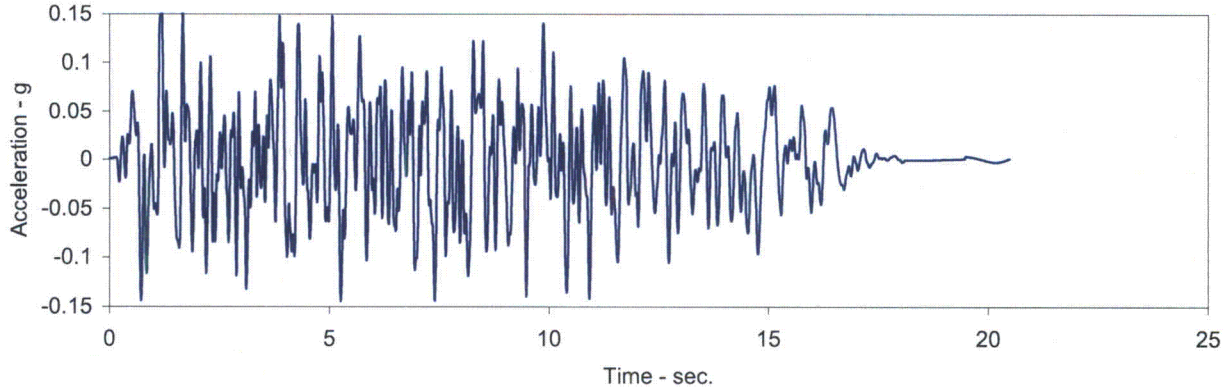


b) Horizontal Direction S2



c) Vertical Direction S3

Figure 3F-44—{5% Damping within ARS at ESWB Foundation Horizontal Direction (S1) – NI Area (22 ft Depth)}

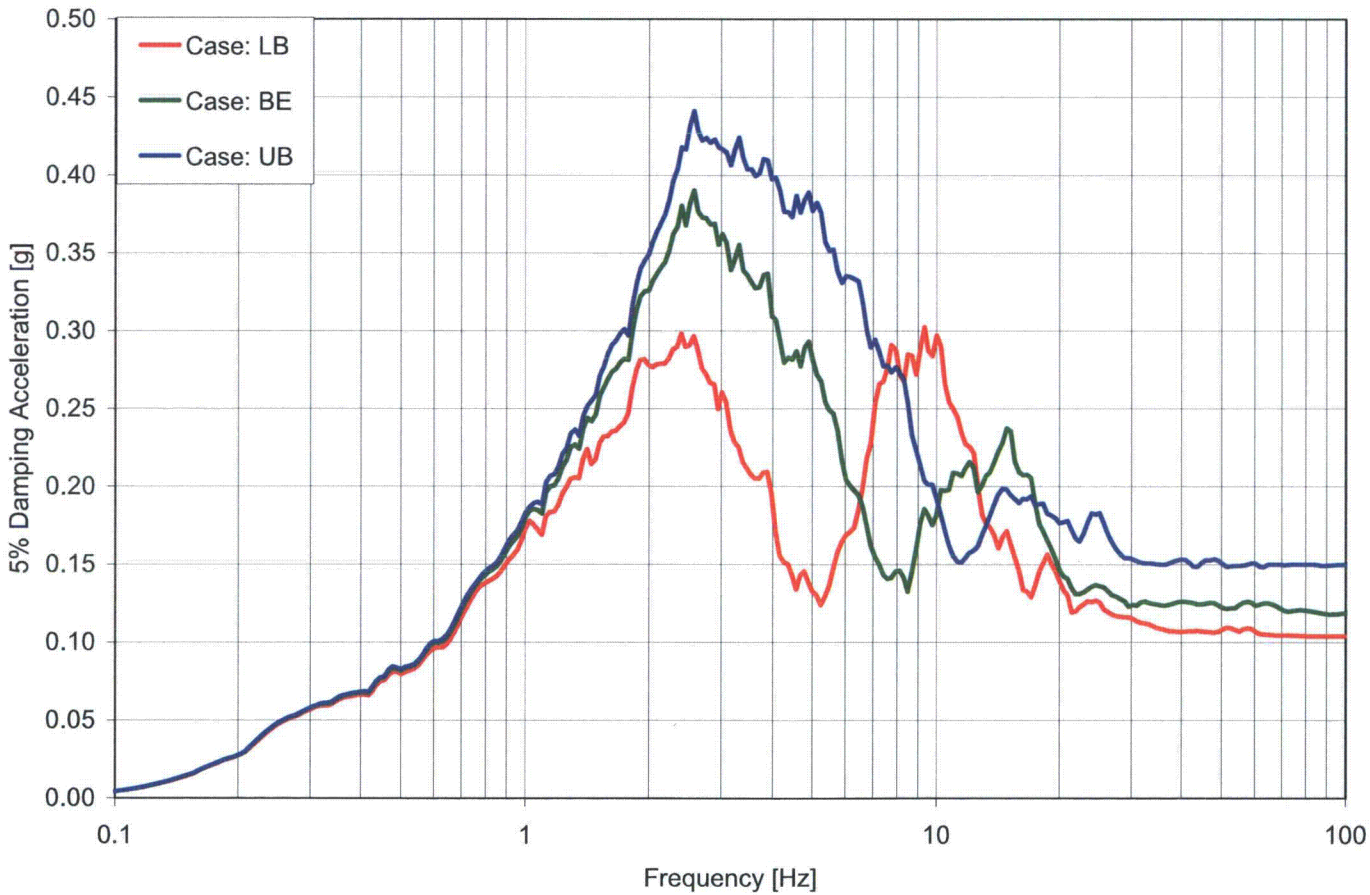


Figure 3F-45—{5% Damping within ARS at ESWB Foundation Horizontal Direction (S2) – NI Area (22 ft Depth)}

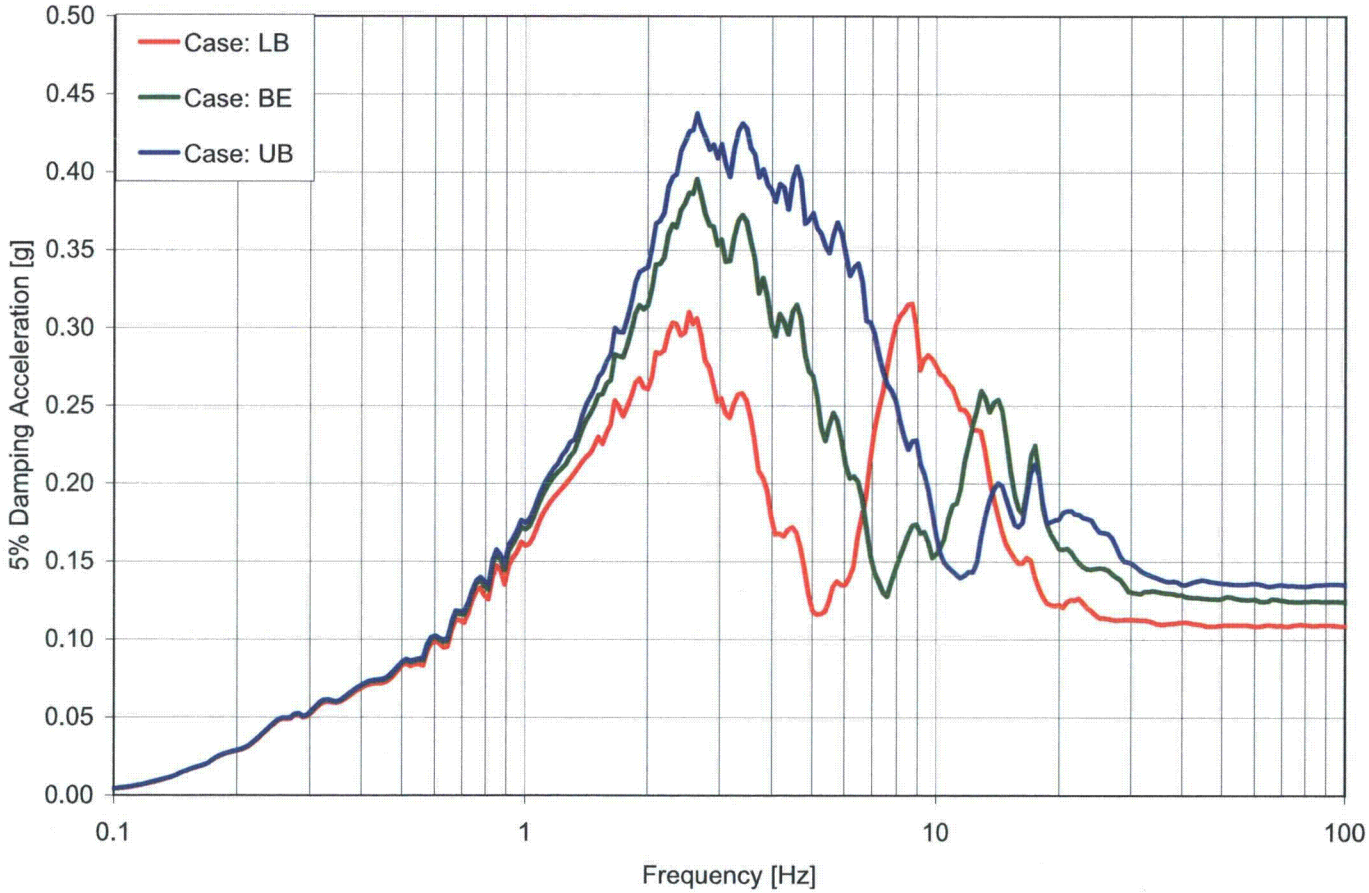


Figure 3F-46—{5% Damping within ARS at ESWB Foundation Vertical Direction (S3) – NI Area (22 ft Depth)}

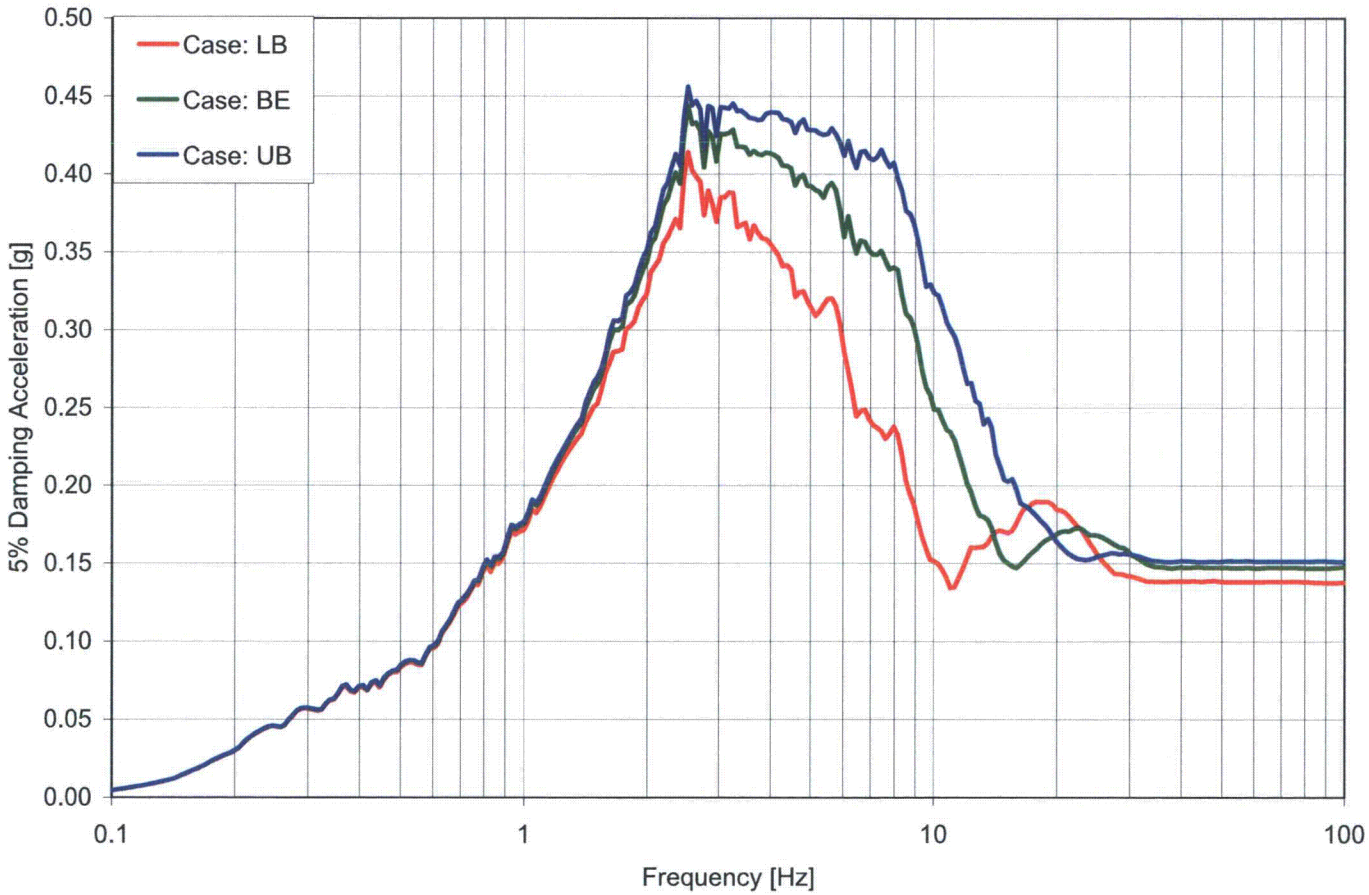


Figure 3F-47—~~{5% Damping within ARS at UHS Electrical Building Foundation Horizontal Direction (S1)- Intake Area (20.5 ft Depth)~~Not Used}

Figure 3F-48—{~~5% Damping within ARS at UHS Electrical Building Foundation Horizontal Direction (S2)– Intake Area (20.5 ft Depth~~Not Used~~}~~}

Figure 3F-49—~~{5% Damping within ARS at UHS Electrical Building Foundation Vertical Direction (S3)– Intake Area (20.5 ft Depth)~~Not Used}

Figure 3F-50—{5% Damping within ARS at CBIS Foundation Horizontal Direction (S1)– Intake Area (37.5 ft Depth)}

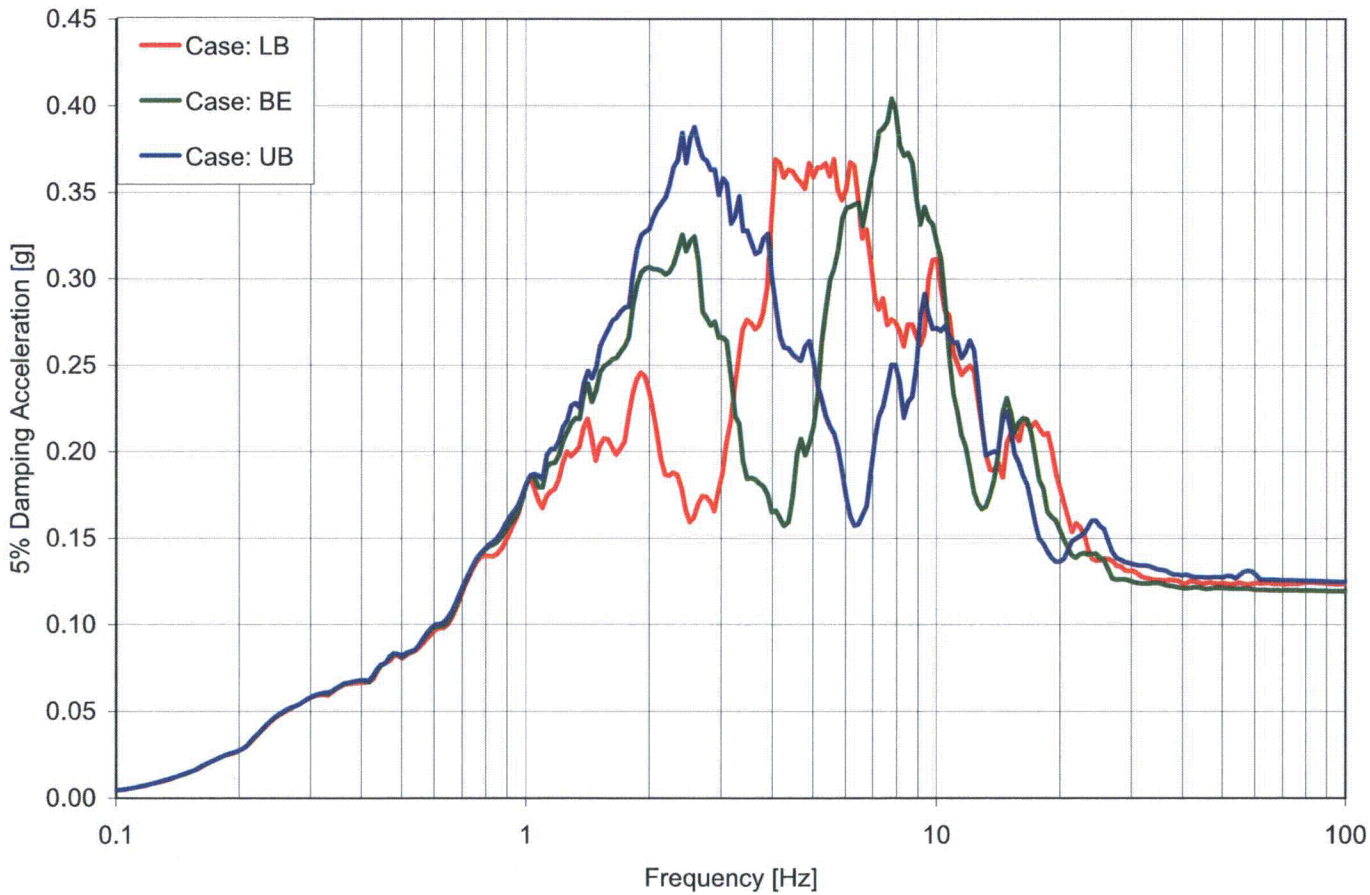


Figure 3F-51—{5% Damping within ARS at CBIS Foundation Horizontal Direction (S2)– Intake Area (37.5 ft Depth)

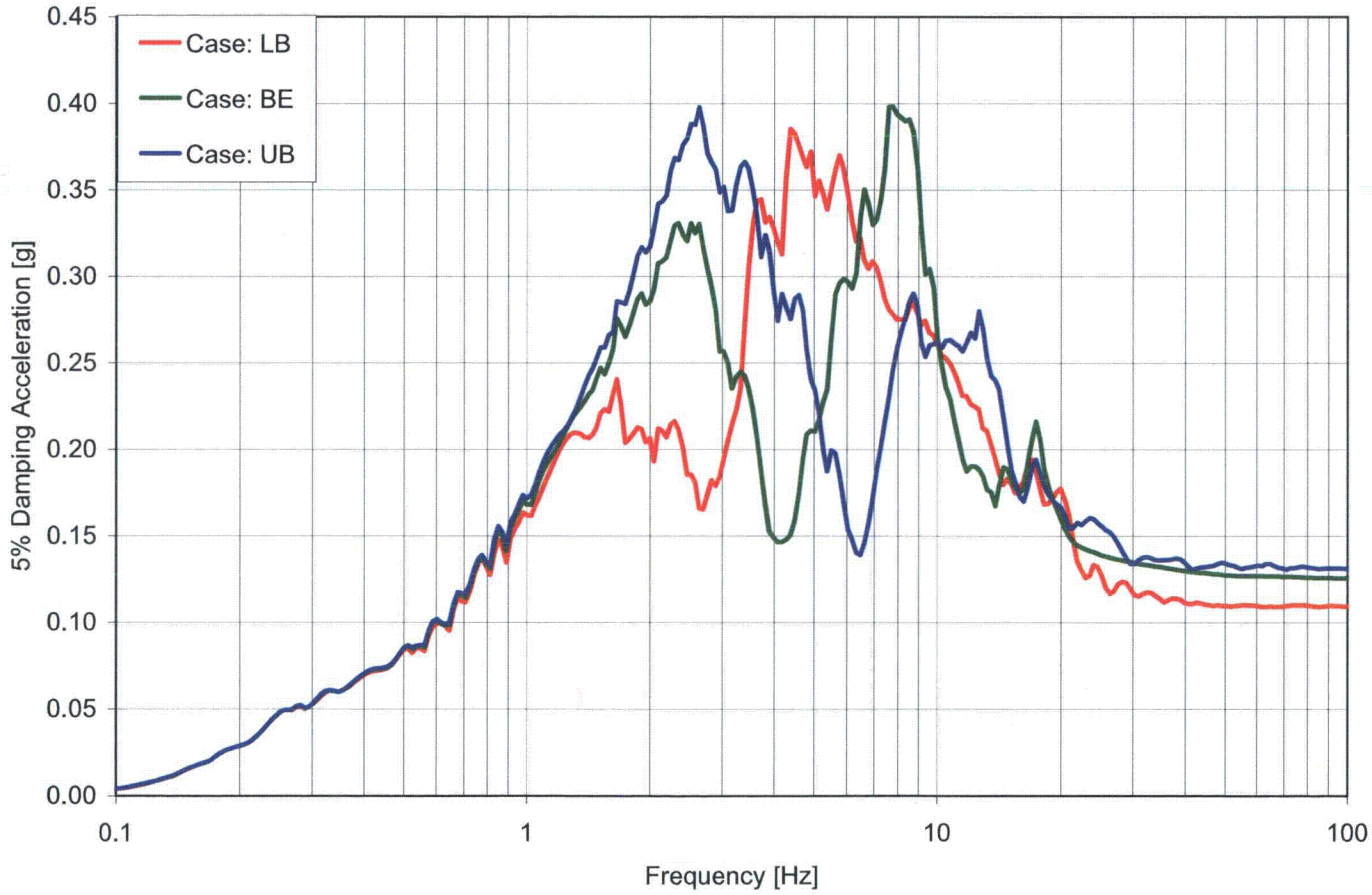
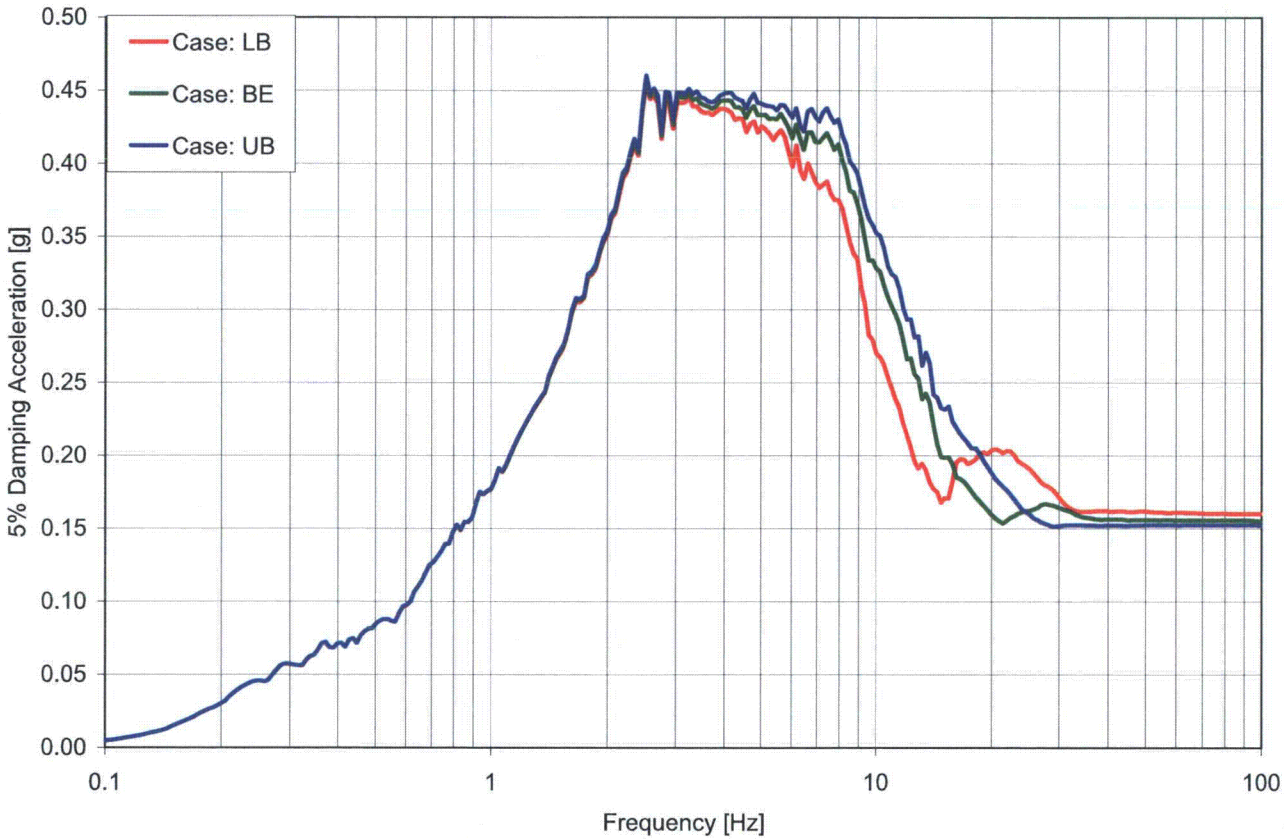


Figure 3F-52—{5% Damping within ARS at CBIS Foundation Vertical Direction (S3)– Intake Area (37.5 ft Depth)}



UN#10-285

Enclosure 3

Markup Pages of FSAR Chapter 1.0

Calvert Cliffs Nuclear Power Plant, Unit 3

1.1.1 PLANT LOCATION

The U.S. EPR FSAR includes the following COL Item in Section 1.1.1:

> A COL applicant that references the U.S. EPR design certification will identify the specific plant site location.

This COL Item is addressed as follows:

{CCNPP Unit 3 is co-located with two currently licensed reactors (CCNPP Units 1 and 2). CCNPP Unit 3 is located south of the existing nuclear power plant on the existing CCNPP site. The CCNPP site consists of 2070 acres (838 hectares) in Calvert County, Maryland, on the west bank of Chesapeake Bay, approximately halfway between the mouth of the bay and its headwaters at the Susquehanna River. As reflected in Figure 2.1-1, CCNPP Unit 3 is within the CCNPP Units 1 and 2 Exclusion Area Boundary and the CCNPP Units 1 and 2 Independent Spent Fuel Storage Installation Exclusion Area Boundary. The site is approximately 40 mi (64 km) southeast of Washington D.C. and 7.5 mi (12 km) north of Solomons Island, Maryland. Figure 1.1-1 through 1.1-3 illustrate the location of the site, and the arrangement of the three units.

CCNPP Unit 3 shares the following structures, systems, and components with CCNPP Units 1 and 2:

- Offsite transmission system
- Chesapeake Bay intake channel and embayment
- Meteorological tower
- Emergency Operations Facility (EOF)
- Barge dock

In accordance with 10 CFR 52.79(a)(31) (CFR, 2008), the following provides an assessment of the potential hazards to the structures, systems, and components (SSCs) important to safety of operating units resulting from construction activities at a multi-unit site and identifies that managerial and administrative controls are to be used to provide assurance that the limiting conditions for operation (LCOs) at the operating units, are not exceeded as a result of new plant construction activities.

The managerial and administrative controls include coordination, with CCNPP Units 1 and 2, of construction activities which have the potential for causing CCNPP Units 1 and 2 to exceed LCOs or have an adverse impact on the availability of safety and risk significant SSCs. CCNPP Units 1 and 2 procedures and processes are currently in place to control activities that could affect compliance with an LCO or availability of safety and risk significant SSCs, e.g., equipment clearance and tagout procedures, access controls, and switchyard controls.

The potential hazards associated with CCNPP Unit 3 construction activities include, but are not limited to; general construction activities such as site exploration, grading, clearing, and installation of drainage and erosion-control measures; boring, drilling, dredging, pile driving and excavating; transportation, storage and warehousing of equipment; construction, erection, and fabrication of new facilities; and connection, integration, and testing. Specific potential impacts to CCNPP Units 1 and 2 SSCs include the following:

- Relocation and construction of transmission lines/towers
- Construction of ~~intake structures on the shore of the Chesapeake Bay within an embayment shared with~~Sheetpile wall and Intake Pipes on the shore of the Chesapeake Bay next to the embayment for the intake structures for CCNPP Units 1 and 2
- Meteorological data transmission modifications (electrical and instrumentation tie-ins and connections to provide input to CCNPP Unit 3 facilities)
- Modification to the existing Emergency Operations Facility to accommodate CCNPP Unit 3 Emergency Planning activities

Table 1.1-1—{Acronyms Used in this Document}
(Page 4 of 5)

Acronym	Description
PSP	Physical Security Plan
PST	Pre-Service Testing
PTS	Pressurized Thermal Shock
QAPD	Quality Assurance Program Description
QC	Quality Control
RCA	Radiologically Controlled Area
RCTS	Resonant Column Torsional Shear
RD	Rupture Disk Valve
REMP	Radiological Environmental Monitoring Program
RETS	Radiological Effluent Technical Specifications
RMS	Records Management System
RV	Relief Valve
RVT	Random Vibration Theory
SA	Self Actuated
SAR	Safety Analysis Report
SARA	Superfund Amendments and Reauthorization Act
SCDOT	South Carolina Department of Transportation
SCR	Stable Continental Region
SDWIS	Safe Drinking Water Information System
SECPOP	Sector Population Land Fraction, and Economic Estimation Program
SEUSSN	Southeastern U.S. Seismic Network
SGA	Salisbury Geophysical Anomaly
SLOSH	Sea, Lake, and Overland Surges from Hurricanes
SOV	Solenoid-Operated Valve
SPH	Standard Project Hurricane
SPT	Standard Penetration Test
SSE	Safe Shutdown Earthquake
SSI	Soil-Structure Interaction
SSSI	Structure-Soil-Structure Interaction
STEL	Short-Term Exposure Limit
TEDE	Total Effective Dose Equivalent
TIP	Trial Implementation Project
TLD	Thermoluminescent Dosimeter
TNT	Trinitrotoluene
TOC	Top of Concrete
TRT	Test Review Team
TSU	Tsunami Model
TWA	Time Weighted Average
UB	Upper Bound
UCSS	Updated Charleston Seismic Source
UFL	Upper Flammability Limit
UFSAR	Updated Final Safety Analysis Report
UHS	Uniform Hazard Spectra or Ultimate Heat Sink
~~UHS EB~~	~~Ultimate Heat Sink Electrical Building~~
UHS MWIS	Ultimate Heat Sink Makeup Water Intake Structure
USACE	U.S. Army Corps of Engineers
USCG	United States Coast Guard
USCS	Unified Sort Classification System
USGS	U.S. Geological Survey
USNSN	U.S. National Seismograph Network

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Figure 1.1-3—{Site Area Map}

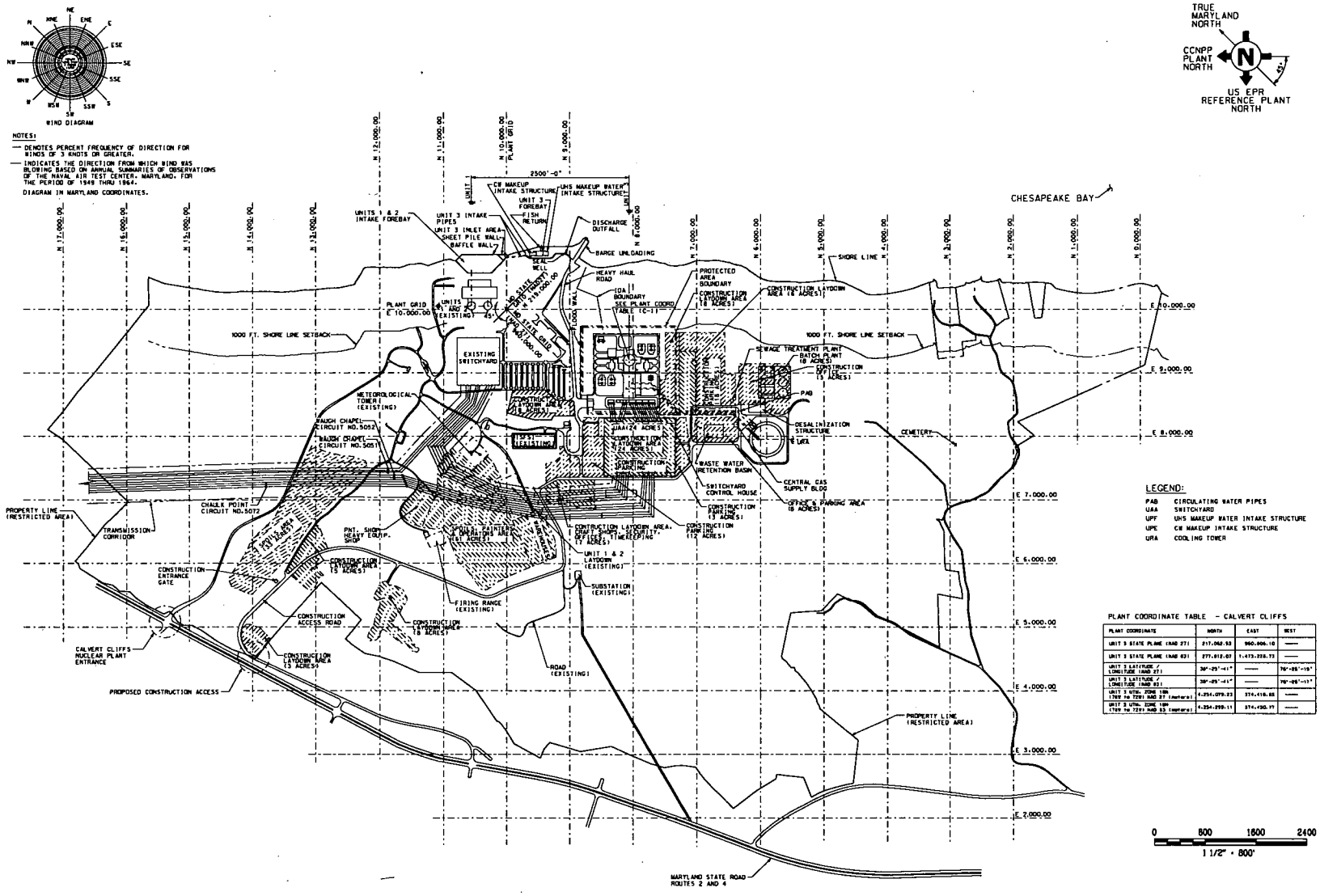

Table 1.7-2—{Piping and Instrumentation Diagrams}

FSAR Figure Number	Title
9.2-1	Potable Water System
9.2-2	Sanitary Waste Water System
9.2.-3	Normal Makeup, Ultimate Heat Sink Makeup, Blowdown & Chemical Treatment
9.2-4	Raw Water & Desalinated Water Supply
9.4-1	Turbine Building Ventilation System
9.4-1	~~Ultimate Heat Sink~~UHS Makeup Water Intake Structure Ventilation System ~~and UHS Electrical Building Ventilation System~~
9.5-2	CCNPP Unit 3 Fire Water Distribution System - Cooling Tower Loop
9.5-3	CCNPP Unit 3 Fire Water Distribution System - Intake Structure ~~Yard~~ Loop
9.5-4	CCNPP Unit 3 UHS Makeup Water Intake Structure
~~9.5-5~~	~~CCNPP Unit 3 UHS Makeup Water Intake Structure Electrical Building~~
10.4-1	Circulating Water System P& ID (Circulating Water Pump Building)
10.4-2	Circulating Water System P& ID (Turbine Building)
10.4-5	Circulating Water System P&ID (Cooling Tower)
10.4-6	Circulating Water System Makeup System P& ID
10.4-9	Circulating Water System P&ID (Blowdown Flowpath)

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Enclosure 4

Markup Pages of FSAR Chapter 2.0

Calvert Cliffs Nuclear Power Plant, Unit 3

Table 2.0-1—{U.S. EPR Site Design Envelope Comparison}

(Page 2 of 5)

	U.S. EPR FSAR Design Parameter Value	CCNPP Unit 3 Site Characteristic Value
Minimum Shear Wave Velocity (Low strain best estimate average value at bottom of basemat)	1000 fps	≥ 1000 fps for the NI and UHS MWIS and Forebay (see section 2.5.2.6 and 2.5.4) ≥ 720 fps for the ESWB (note h) ≥ 630 fps for the EPGB (note h) ~~≥ 720 fps for the UHS EB~~ ≥ 630 fps for the Cat II-SSE FP building and tanks
Liquefaction	None	None (See section 2.5.4)
Slope Failure Potential	No slope failure potential is considered in the design of safety-related SSCs for U.S. EPR design certification.	No slope failure potential that would adversely affect the safety of the proposed CCNPP Unit 3 (See Section 2.5.5)
Maximum Differential Settlement (across the basemat)	1/2 inch in 50 feet in any direction	½-1 inch in 50 ft for common Basemat. (note a) (See Sections 2.5.4 and 3.8.5.5.1) > ½ inch in 50 ft for both EPGB and ESWB (note a) (See Sections 2.5.4, 3.8.5.5.2, and 3.8.5.5.3)
Maximum Ground Water	3.3 ft below grade	Approximately 30 feet below grade (See Section 2.4.12.5)
Inventory of Radionuclides Which Could Potentially Seep Into the Groundwater		
Bounding Values for Component Radionuclide Inventory	See Table 2.1-2	U.S. EPR FSAR Table 2.1-2 used. See Table 2.4-44
Flood Level		
Maximum Flood (or Tsunami)	1 ft below grade	Approximately 3 ft below grade, except for the Forebay and UHS Makeup Water Intake Structure ~~and UHS Electrical Building which is~~which are designed to function under ~~submerged~~flood conditions (See Sections 2.4.1 and 2.4.2, 2.4.10, 3.4.2, 3.4.3.10, 3.8.4.1.11, 3.8.4.3, and 9.2.5)
Wind		
ASCE 7-05 Basic Wind Speed (3-second gust)	145 mph (Based on 3-sec gust at 33 ft above ground level and factored for 50-yr mean recurrence interval.)	95 mph (parameter referred to as Wind Gust in this FSAR) (based on 3 second gust at 33 feet for 50 year recurrence interval) (See Section 2.3.1)
Importance Factor	1.15 (Safety-related structures for 100-year mean recurrence interval.)	1.15 (used to adjust the velocity pressure from a 50-year to 100-year mean recurrence interval for safety- and quality- related structures.) (See Section 2.3.1)
Tornado		
Maximum Pressure and rate of Drop	1.2 psi at 0.5 psi/sec	0.9 psi at 0.4 psi/sec (See Section 2.3.1)

2.4.1.1 Site and Facilities

The CCNPP site covers an approximate area of 2,057 acres (832 hectares). It is located on the western shore of the Chesapeake Bay in Calvert County, MD near Maryland State Highway (MD) 2/4, approximately 110 mi (177 km) north from the Chesapeake Bay entrance.

The topography at the CCNPP site is gently rolling with steeper slopes along stream banks. Local relief ranges from the sea level up to an approximate elevation of 130 ft (39.6 m), with an average relief of approximately 100 ft (30.5 m). Along the northeastern perimeter of the CCNPP site, the Chesapeake Bay shoreline consists mostly of steep cliffs with a narrow beach area. The CCNPP site is well drained by short, ephemeral streams. A drainage divide, which is generally parallel to the shoreline, extends across the CCNPP site. The area to the northeast of the divide, which lies within Maryland Western Shore Watershed, comprises about 20% of the CCNPP site property and drains into the Chesapeake Bay. The southwestern area within the Patuxent River Watershed is drained by tributaries of Johns Creek, which flow into St. Leonard Creek, located west of (MD) 2/4, and subsequently flow into the Patuxent River. The Patuxent River empties into the Chesapeake Bay approximately 10 mi (16.1 km) to the southeast from the mouth of St. Leonard Creek. All streams that drain the CCNPP 3 site that are located east of (MD) 2/4 are non-tidal. Figure 2.4-1 shows the topography of the site, the local drainage routes near the CCNPP site and the drainage divide. The characteristics of the watersheds are described in Section 2.4.1.2.1.

Southeast of the existing CCNPP Units 1 and 2 is an abandoned recreational area known as Camp Conoy that was used by CCNPP employees and their families. The Calvert Cliff State Park is located further to the southeast outside of the CCNPP property boundary. The Flag Ponds Nature Park is located northwest of the CCNPP site.

CCNPP Unit 3 will be located southeast of and adjacent to CCNPP Units 1 and 2 as shown in Figures 2.4-1 and 2.4-2. In the western shore, Maryland's Critical Area Commission law requires a 1,000 ft (305 m) critical area along the Chesapeake Bay shoreline (CAC, 2006). The CCNPP Unit 3 power block will be located outside the critical area.

CCNPP Unit 3 will use a hybrid mechanical draft cooling tower for plant non-safety-related Circulating Water System (CWS) cooling and the makeup water will be supplied from the Chesapeake Bay. The CWS makeup water intake will be located approximately 500 ft (152.5 m) southeast of the existing CCNPP Units 1 and 2 intake structure as shown in Figure 2.4-2. Four safety-related Essential Service Water System (ESWS) cooling, mechanical draft cooling towers will also be used. The makeup water for the ESWS cooling towers will normally be supplied from the non-safety-related raw water system (i.e., desalinization plant).

ESWS cooling tower basins will also provide storage for the Ultimate Heat Sink (UHS) cooling water for use during design basis accidents (DBA). The ESWS tower basin inventory will provide cooling water for safety-related heat removal for the first 72 hours during a DBA. UHS makeup water after the first 72 hours of the DBA will be supplied directly from the Chesapeake Bay. The CCNPP Unit 3 safety-related UHS makeup water intake structure will be located southeast of the CCNPP Units 1 and 2 intake structure, as shown in Figure 2.4-2. The Unit 3 intake forebay will have an invert elevation of -22.5 ft (-6.9 m) and vertical side walls with a top elevation of approximately ~~10~~11.5 ft (~~3~~3.5 m) to provide water to the UHS makeup water intake structure. Makeup water will be conveyed to the Unit 3 forebay by two safety-related buried pipes that will withdraw water from the Chesapeake Bay at an inlet area located adjacent to the Units 1 and 2 intake forebay. The inlet area will be sheltered from the Chesapeake Bay by the Units 1 and 2 forebay baffle wall and a sheet pile wall. The sheet pile wall will extend from the shore to the southern corner of the baffle wall, as shown in Figure 2.4-51. The UHS makeup water intake structure will share the forebay with the nonsafety-related CWS makeup water intake structure. The deck of the UHS intake structure will be at approximately elevation 11.5 ft (3.5 m).

2.4.1.1 Site and Facilities (continued)

The UHS makeup water will be pumped to the safety-related ESWS (UHS) cooling ~~water~~tower basins via buried safety-related piping.

At the CCNPP Unit 3 power block site, the existing elevations will be re-graded for safety-related structures, systems and components (SSCs). Safety-related SSCs for CCNPP Unit 3 include the following: nuclear island (consisting of the reactor building, safeguard buildings, and the fuel building), two emergency diesel generator buildings, and the ESWS (UHS) cooling towers. The safety-related SSCs in the power block area will be contained within the protected area boundary, which is shown in Figure 2.4-2. Access to safety-related SSCs within the protected area boundary will be located at or above the elevation of 84.6 ft (25.8 m).

The CCNPP Unit 3 power block will be located in the Maryland Western Shore Watershed, as shown in Figure 2.4-1 and Figure 2.4-2. The CWS cooling tower and the CCNPP Unit 3 switchyard will be located in the Patuxent River watershed. The CCNPP Unit 3 power block area will affect the headwaters of the unnamed branch, Branch 2, as shown in Figure 2.4-1 and Figure 2.4-2. To the southeast of the CCNPP Unit 3, an area including the headwaters of Branch 1 and portions of the Camp Conoy Pond will be re-graded for use as construction laydown. The CWS cooling tower and the CCNPP Unit 3 switchyard will affect the unnamed branch, Branch 3, in the Patuxent River Watershed. Post-construction drainage from the CCNPP Unit 3 power block area will be directed towards the Chesapeake Bay, while drainage from the CWS cooling towers and the CCNPP Unit 3 switchyard will be directed to Johns Creek, as discussed in Section 2.4.2.3. Details of the post-construction site drainage design will be developed during the detailed design phase.

The critical flood elevation at the CCNPP Unit 3 power block area results from flooding due to local probable maximum precipitation (PMP). The maximum computed PMP water elevation in the power block area is discussed in Section 2.4.2. The elevations of safety-related SSC entrances and openings will be at or above 84.6 ft (25.8 m). This will be higher than the local PMP elevation; thus, flooding of the safety-related SSCs in the CCNPP Unit 3 power block area is precluded.

Probable maximum surge and seiche flooding on the Chesapeake Bay constitutes the design basis flood elevation for the safety-related UHS makeup water intake structure. The probable maximum storm surge (PMSS) water level is estimated to be ~~19.1~~17.6 ft (~~5.8~~5.35 m) in Section 2.4.5. Coincidental wind-wave action will produce a maximum water level of ~~36.6~~33.2 ft (~~11.2~~10.11 m). Because the deck elevation of the UHS intake structure will be about 11.5 ft (3.5 m) and the roof elevation of the ~~pump house~~first level of the UHS makeup water pump house building will be at about 26.5 ft (8.1 m), the intake deck and the ~~entire intake structure~~first level of the UHS makeup water pump house building will be submerged~~ under the maximum water level of 36.6 ft (11.2 m)~~. The CCNPP Unit 3 UHS makeup water intake structure will include protection measures against flooding and wind-wave impact as discussed in Section 2.4.10.

The design low water level in the Chesapeake Bay at the inlet of the intake pipes is estimated to be -6.0 ft (-1.8 m) as discussed in Section 2.4.11. The general arrangement of the UHS makeup water intake structure is described in Section 9.2.5. The invert elevation of the UHS makeup water intake pump sump will be set at -22.5 ft (-6.9 m) to ensure that the available water depth under the minimum design water level will be adequate to satisfy the pump submergence and the net positive suction head requirements, taking into account the head losses in the intake pipes and screens.

2.4.2.2 Flood Design Considerations

The design basis flood elevation for the CCNPP site is determined by considering a number of different flooding possibilities. The possibilities applicable and investigated for the site include the probable maximum flood (PMF) on streams and rivers, potential dam failures, probable maximum surge and seiche flooding, probable maximum tsunami, and ice effect flooding. Each of these flooding scenarios was investigated in conjunction with other flooding and meteorological events, such as wind generated waves, as required in accordance with guidelines presented in ANSI/ANS 2.8-1992 (ANS, 1992). Detailed discussions on each of these flooding events and how they were estimated are found in Section 2.4.3 through Section 2.4.7.

The estimation of the PMF water level on Johns Creek, located just west of the CCNPP Unit 3 substation/switchyard area is discussed in detail in Section 2.4.3. The maximum PMF water level for Johns Creek is Elevation 65.0 ft (19.8 m). All safety-related facilities for CCNPP Unit 3 are located in the Maryland Western Shore watershed. The low point of the drainage divide between the Maryland Western Shore watershed and the Johns Creek watershed is at Elevation 98.0 ft (29.9 m) and passes through the CCNPP Unit 3 switchyard as shown on Figure 2.4-7. Since the maximum PMF water level is 33 ft (10.1 m) below the drainage divide, the Johns Creek PMF does not pose a flooding risk to the CCNPP Unit 3 safety-related facilities.

Section 2.4.4 presents a detailed discussion on potential flood elevations on Johns Creek from dam failures on the Patuxent River. The resulting water level increase in the tidal portions of Johns Creek and St. Leonard Creek would be about 2.0 ft (0.6 m). This water level increase poses no risk to the CCNPP site.

Probable maximum surge and seiche flooding on the Chesapeake Bay as a result of the probable maximum hurricane (PMH) is discussed in Section 2.4.5. The probable maximum storm surge (PMSS) water level is estimated to be at Elevation 17.6 ft (5.35 m). Wave action from coincident winds associated with the storm surge produce a wave run-up height of 16.3 ft (4.96 m) above the PMSS resulting in a maximum flood level of Elevation 33.9 ft (10.31 m) on the slope to the CCNPP Unit 3 power block. The grade elevation of the Ultimate Heat Sink (UHS) makeup intake structure area is at Elevation 10.0 ft (3.0 m) and the UHS makeup water intake building will ~~be completely submerged~~experience flooding as a result of the PMH as described in Section 2.4.5. The PMSS and coincident wave run-up water level at the CCNPP Unit 3 site produce the highest potential water levels on the Chesapeake Bay and become the design basis flood elevation for the CCNPP Unit 3 UHS makeup intake structure area. The UHS makeup intake structure will be provided with flood protection measures such as water tight doors, roof vents, and piping and conduit penetrations. Flood protection measures are discussed in Section 2.4.10. The CCNPP Unit 3 power block site grade is at nominal Elevation 85.0 ft (25.9 m) and all safety-related facilities other than the UHS makeup intake structure are located above the PMSS and wave run-up water level.

Section 2.4.6 describes the derivation of the probable maximum tsunami (PMT) water level. The maximum water level associated with a PMT at the CCNPP site is 3.8 ft (1.2 m). This is much lower than the flood level due to the PMH and thus, the PMT does not pose a flood risk to the CCNPP site.

2.4.2.3 Effects of Local Intense Precipitation

The design basis for the local intense precipitation is the all season 1 square mile or point PMP as obtained from the U.S. National Weather Service (NWS) Hydro-meteorological Report Number 52 (NOAA, 1982). Table 2.4-18 presents the 1 square mile PMP for various durations at the CCNPP site.

< Text suppressed for clarity >

Based on the CCNPP Unit 3 power block grading, entrance locations, and peak PMP water levels in the site ditches, all safety-related facility entrances, except for the UHS makeup intake structure, are located above peak PMP ditch water levels and PMP sheet flows are prevented from reaching safety-related entrances.

Flood protection measures are required for the CCNPP Unit 3 UHS makeup water intake structure ~~and its associated electrical building~~. The grade level at the UHS makeup water intake structure location is at Elevation 10.0 ft (3.0 m). The maximum flood level at the intake location is Elevation 33.2 ft (10.11 m) as a result of the surge, wave heights, and wave run-up associated with the probable maximum hurricane (PMH) as discussed in Section 2.4.5. Thus, the UHS makeup water intake structure ~~and the electrical building associated with the UHS makeup pumps~~ would experience flooding during a PMH and flood protection measures are required ~~for these buildings~~.

The general arrangement of the UHS makeup water intake area is described in Section 9.2.5. Flood protection for the UHS makeup water intake structure ~~and electrical building~~, as described in Section 2.4.10, will consist of structural measures to withstand the static and dynamic flooding forces as well as water proofing measures to prevent the flooding of the interior of the structures where pump motors and electrical or other equipment associated with the operation of the intake are located.

2.4.5.2.2.2 Empirical Method for Estimating Probable Maximum Storm Surge

Based on USACE Hurricane Surge Predictions for Chesapeake Bay (USACE, 1959) and USACE Coastal Engineering Manual (USACE, 2008), storm surge in the open ocean due to a PMH can be estimated by empirical methods. The probable maximum surge on the open ocean is composed of the wind setup and pressure setup.

The USACE published the results of hurricane surge study specific to the Chesapeake Bay which is based on the August 1933 hurricane (USACE, 1959) because it caused the highest surge within the Chesapeake Bay. The storm surge in the open ocean due to the PMH just outside of the entrance to the Chesapeake Bay is calculated using the value given in Regulatory Guide 1.59 (NRC, 1977). The primary component of the surge just inside the mouth of the Chesapeake Bay is calculated according to the relationship between the surge at this point and the open ocean surge provided in Figure 15 of USACE (1959). The primary component of the surge is defined as the wave of water which enters through the mouth of the Chesapeake Bay and travels up the bay. Once the surge height just inside the Chesapeake Bay is known, the surge hydrographs provided in Table II of USACE (1959) are used to proportion the surge at the mouth of the Chesapeake Bay to obtain the surge height closest to CCNPP Unit 3 site. The effect (i.e., setup) of local cross-winds is added to this primary surge height, along with the 10% exceedence high spring tide, sea level anomaly (i.e., initial rise), and long term-rise to the primary component of the surge at CCNPP Unit 3 site to obtain the probable maximum storm surge (PMSS). The PMSS closest to CCNPP Unit 3 was computed by this approach to be ~~17.4~~20.4 ft (~~5.29~~6.22 m) NGVD 29.

2.4.5.2.2.4 Probable Maximum Storm Surge Elevation at CCNPP Unit 3

The SLOSH model predicted a maximum surge elevation at the site of 11.0 ft (3.35 m) from a water level of 0.0 NGVD 29. The simulated surge height was then adjusted to take into account the 20% margin (SLOSH model uncertainties) suggested in Technical Report NWS 48 (Jelesnianski, 1992) and the antecedent water level of 4.4 ft (1.34 m) NGVD 29. The surge over time is shown in Figure 2.4 23. The final PMSS elevation thus obtained is 17.6 ft (5.35 m) NGVD 29.

Using the empirical method, the PMSS was computed to be ~~17.4 ft (5.29 m) NGVD 29, indicating a strong agreement between the empirical method and the SLOSH model~~20.4 ft (6.22 m) NGVD 29 indicating that the empirical method is over-predicting the storm surge when compared to the SLOSH model results. The High PMSS value can be attributed to the fact that the USACE method is based upon the one hurricane of 1993. See Table 2.4-24 for comparison of results between SLOSH and empirical method.

2.4.5.3 Wave Action

With the exception of the intake structures, CCNPP Unit 3 is approximately at 85 ft (26 m) NGVD 29 and beyond 1,000 ft (305 m) from the shoreline and is not expected to be affected by the PMSS including wave action. The safety-related forebay~~,~~ and UHS Makeup Water Intake Structure (MWIS)~~, and UHS Electrical Building~~, shown in Figure 2.4-25, are affected by the PMSS and by wind waves generated during a PMH event.

2.4.5.3.3 Effect on Safety-Related Structures

Because the grade elevation of the CCNPP Unit 3 power block is approximately 85 ft (26 m) NGVD 29 and the power block is located approximately 1,000 ft (305 m) from the shoreline, the CCNPP Unit 3 power block will not be impacted by the PMH-induced flood events.

The safety-related UHS MWIS~~ and Electrical Building~~ will be flooded during the PMSS and~~ the UHS MWIS will be over-topped by waves. These structures are~~is designed to meet the requirements of Regulatory Guide 1.27 (NRC, 1976b). Access into the UHS MWIS~~ and UHS Electrical Building~~ below the maximum water level during the PMH is designed to be watertight to prevent the internal flooding of the structures. The design of the UHS MWIS~~ and Electrical Building~~ is discussed in Section 3.8 and Section 9.2.5.

2.4.5.5 Protective Structure

The shoreline near the UHS makeup water intake structure will be protected against the PMH and coincident wind-wave conditions. The design crest elevation of the shore protection structure will be 10 ft (3 m) NGVD 29. Flood protection measures for the UHS MWIS ~~and Electrical Building~~ are discussed in Section 2.4.10.

2.4.10 FLOODING PROTECTION REQUIREMENTS

The U.S. EPR FSAR includes the following COL Item in Section 2.4.10:

> A COL applicant that references the U.S. EPR design certification will use site-specific information to compare the location and elevations of safety-related facilities, and of structures and components required for protection of safety-related facilities, with the estimated static and dynamic effects of the design basis flood conditions.

This COL Item is addressed as follows:

{References to elevation values in this section are based on the National Geodetic Vertical Datum of 1929 (NGVD 29), unless stated otherwise.

This section discusses the locations and elevations of safety-related facilities to identify the structures and components exposed to flooding. The safety-related facilities are compared to design basis flood conditions to determine if flood effects need to be considered in plant design or in emergency procedures.

All safety-related facilities are located in the power block area with the exception of the Ultimate Heat Sink (UHS) makeup water intake structure~~ and its associated electrical building~~. The CCNPP Unit 3 UHS makeup water intake structure and the makeup water intake for the Circulating Water System (CWS) are located on the Chesapeake Bay shore southeast of the CCNPP Units 1 and 2 intake structure as shown in Figure 2.4-51. As discussed in Section 2.4.2, the maximum water level in the power block area due to a local PMP is Elevation 81.5 ft (24.8 m). All safety-related structures in the power block area have a minimum grade slab or entrance at Elevation 84.6 ft (25.8 m) or higher. Grading in the power block area around the safety-related facilities is such that all grades slope away from the structures at a minimum of 1% towards runoff collection ditches.

Additionally, the maximum estimated water surface elevations resulting from all design basis flood considerations discussed in Section 2.4.2 through Section 2.4.7 are below the entrance and grade slab elevations for the power block safety-related facilities. Therefore, flood protection measures are not required in the CCNPP Unit 3 power block area.

Flood protection measures are required for the CCNPP Unit 3 UHS makeup water intake structure~~ and its associated electrical building~~. The nominal grade at the UHS makeup water intake structure is approximately at Elevation 10.0 ft (3.0 m). The maximum flood level at the UHS makeup water intake structure location is Elevation 33.2 ft (10.11 m) as a result of the surge and wave run-up associated with the probable maximum hurricane (PMH) as discussed in Section 2.4.5. Thus, the UHS makeup water intake structure~~ and the associated electrical building~~ would experience flooding during a PMH and flood protection measures are required~~ for these buildings~~.

The general arrangement of the CCNPP Unit 3 UHS makeup water intake structure is described in Section 9.2.5. Flood protection for the UHS makeup water intake structure including water screens, pump house and electrical building consists of structural measures to withstand the static and dynamic flooding forces. Flood protection measures also include water proofing to prevent the flooding of the interior of the structures where pump motors and electrical equipment associated with the operation of the intake are located.

The static and dynamic flood forces that the CCNPP Unit 3 UHS makeup water intake structure~~ and electrical building~~ will encounter during a PMH event include: the static water pressure from the maximum flood elevation, uplift pressures on the pump deck as well as uplift pressures on the entire intake structure, and dynamic wave forces on the structure walls and roof. A detailed description of these forces and other design basis loadings including seismic loadings, and the structural measures incorporated to withstand them, is found in Section 3.8.

2.4.12.5 Site Characteristics for Subsurface Hydrostatic Loading and Dewatering

Ground water conditions relative to the foundation stability of safety-related facilities and plans for the analysis of seepage and piping conditions during construction are discussed in Section 2.5.4.6. The completed surface grade for CCNPP Unit 3 is expected to range between elevations of 72 to 85 ft (21.9 to 25.9 m) msl, requiring cut and fill across the site area. The proposed maximum grade elevation of the nuclear island is approximately 83 ft (25.3 m) msl. The design depth for foundations of structures within the nuclear island is estimated to be at an approximate elevation of 40 ft (12.2 m) msl for the reactor containment structure.

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The Power Block excavation is approximately 1,080 ft wide by 1,080 ft long. The bottom of the excavation is at elevation 32 ft msl, with the reactor tendon galleries extending to 30 ft msl. Plant grade is 85 ft msl. For the Surficial aquifer, the saturated thickness is estimated to be 20 ft, with an effective porosity of 25.2%. For the Upper Chesapeake unit, the saturated thickness is estimated to be 13.1 ft, with an effective porosity of 26.4%. The amount of water entering the excavation from precipitation is estimated to be 16,826 gpm for the Representative case, and 30,046 gpm for the Upper Bound case. The ground water stored in the excavation is estimated to be 74,147,852 gallons (43,972,347 gallons in the Surficial aquifer and 30,175,505 gallons in the Upper Chesapeake unit). Assuming a three month period for pumping, the equivalent pumping rate to remove the stored water would be 572 gpm. Ground water flow into the excavation is calculated to be 35 gpm (20 gpm from the Surficial aquifer and 15 gpm from the Upper Chesapeake unit) for the Representative case. The Upper Bound ground water flow into the excavation is calculated to be 250 gpm (140 gpm from the Surficial aquifer and 110 gpm from the Upper Chesapeake unit).

The UHS Makeup Water Intake Structure/Forebay/CWS Intake Structure~~Electrical Building~~ excavation is approximately 100 ft wide by 300 ft long by 37 ft deep. The grade in the area is approximately 10 ft msl. In this location, the Surficial aquifer is absent, and the Upper Chesapeake unit is estimated to have a saturated thickness of 30 ft and an effective porosity of 26.4%. Precipitation into the excavation is estimated to be 433 gpm for the Representative case and 773 gpm for the Upper Bound case. Ground water stored in the excavation is estimated to be 1,777,372 gallons. Assuming a three month period for pumping, the equivalent pumping rate to remove the stored water would be 14 gpm. The ground water flow into the excavation is calculated to be 20 gpm for the Representative case and 110 gpm for the Upper Bound case.

Based on current ground water conditions and the anticipated facility surface grade between elevations of 72 to 85 ft (21.9 to 25.9 m), ground water is expected to be encountered at pre-construction depths from grade level to 16 ft (4.9 m) below grade. Surface water controls to minimize precipitation infiltration and the redirection of surface runoff away from the excavation and temporary construction dewatering areas are expected. A permanent ground water dewatering system is not anticipated to be a design feature for the CCNPP Unit 3 facility.

2.4.14.1 Need for Technical Specifications and Emergency Operations Requirements

The preceding subsections of Section 2.4 provide an in-depth evaluation of the site's hydrologic acceptability for locating CCNPP Unit 3. The information provided below concludes that there is no need for emergency protective measures designed to minimize the impact of hydrology-related events on safety-related facilities. Therefore, the requirements of 10 CFR 50.36 (CFR, 2007a), 10 CFR Part 50, Appendix A, General Design Criteria 2 (CFR, 2007b), and 10 CFR Part 100 (CFR, 2007c) are met with respect to determining the acceptability of the site.

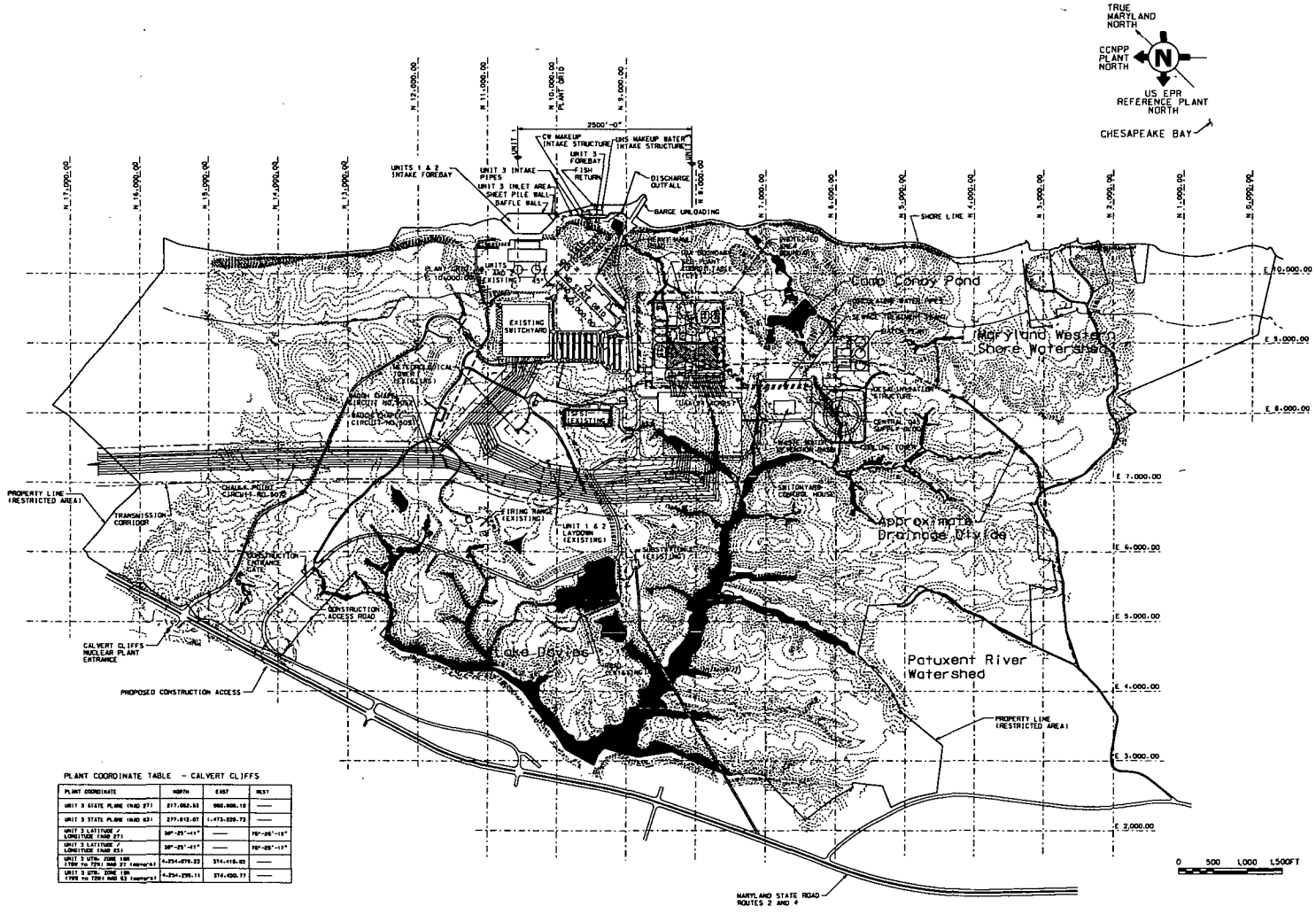
Sections 2.4.1 through 2.4.11 present a comprehensive discussion of the potential for flooding and low water at the site, including details of each potential cause and the resulting effects. These evaluations conclude that the probable maximum storm surge (PMSS) plus wave action during the probable maximum hurricane (PMH), the limiting case for flooding of safety related structures, systems, and components (SSCs) in the safety related Ultimate Heat Sink (UHS) Makeup Intake Structure on the Chesapeake Bay, results in a maximum bay water level of elevation ~~39.4~~33.2 ft (~~12.12~~10.11 m). They also conclude that flooding at the power block location, on the cliff above the Chesapeake Bay at elevation 84.6 ft (26.03 m), is not a credible threat from local watercourses due to intervening topography between those sources and the CCNPP site. These evaluations further conclude that flooding in the power block area of safety related SSCs due to local intense precipitation, or local probable maximum precipitation (PMP), will be prevented by the site drainage features engineered and constructed for that purpose. Still further, the evaluations conclude that the worst case low water event causes a drawdown of the Chesapeake Bay water level, at low tide, to elevation -6 ft (-1.85 m), which establishes the design low water level for adequate pump operation.

CCNPP Unit 3 is designed such that no actions need be captured in Technical Specifications or Emergency Operating Procedures to protect the facility from flooding or interruption of water supply for shutdown and cooldown purposes.

Table 2.4-24—{Comparison of Surge Results}

Method	Primary Surge	Cross Wind Setup	Initial Rise	High Tide (NGVD 29)	Long Term Sea level Rise	PMSS (NGVD 29)
Empirical	~~12.1~~15.2 ft (~~3.69~~4.63 m)	0.9 ft (0.27 m)	1.1 ft (0.34 m)	2.2 ft (0.67 m)	1.1 ft (0.33 m)	~~17.4~~20.4 ft (~~5.29~~6.22 m)
SLOSH	13.2 ft (4.02 m)		1.1 ft (0.34 m)	2.2 ft (0.67 m)	1.1 ft (0.33 m)	17.6 ft (5.35 m)

{Figure Replaced
Figure 2.4-2—Site Utilization Plot Plan}



PLANT COORDINATE TABLE – CALVERT CLIFFS

PLANT COORDINATE	NORTH	EAST	WEST
UNIT 3 STATE PLANE (NAD 27)	217,062.53	980,606.10	—
UNIT 3 STATE PLANE (NAD 83)	277,012.07	1,473,229.73	—
UNIT 3 LATITUDE / LONGITUDE (NAD 27)	38°-25'-41"	—	76°-26'-19"
UNIT 3 LATITUDE / LONGITUDE (NAD 83)	38°-25'-41"	—	76°-26'-13"
UNIT 3 UTM, ZONE 18N (TRN to TZN) NAD 27 (meters)	4,254,078.23	374,418.85	—
UNIT 3 UTM, ZONE 18N (TRN to TZN) NAD 83 (meters)	4,254,259.11	374,430.77	—

Figure Replaced

Figure 2.4-26—{Schematic Diagram Wave Runup on the UHS Makeup Water Intake Structure (MWIS)}

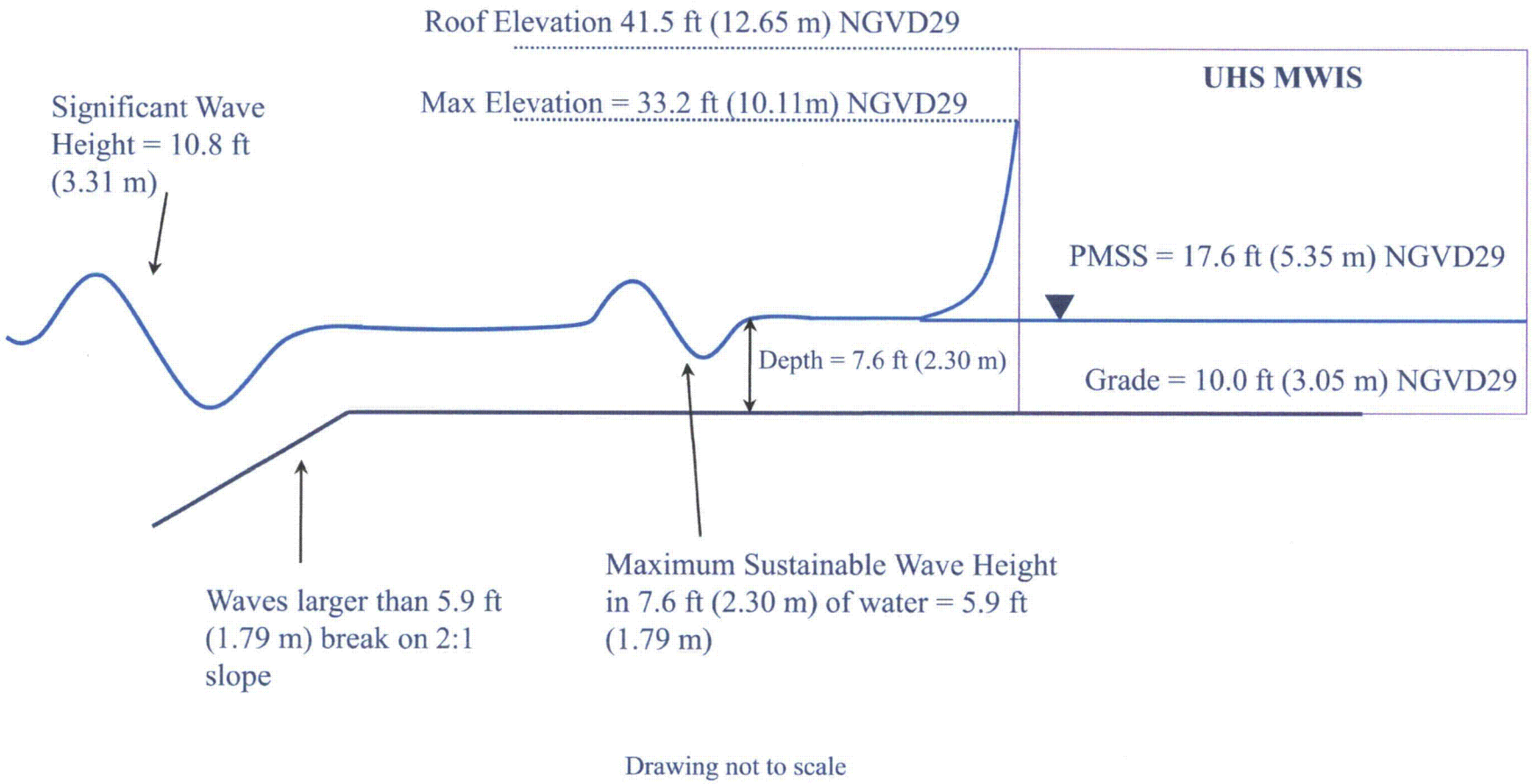
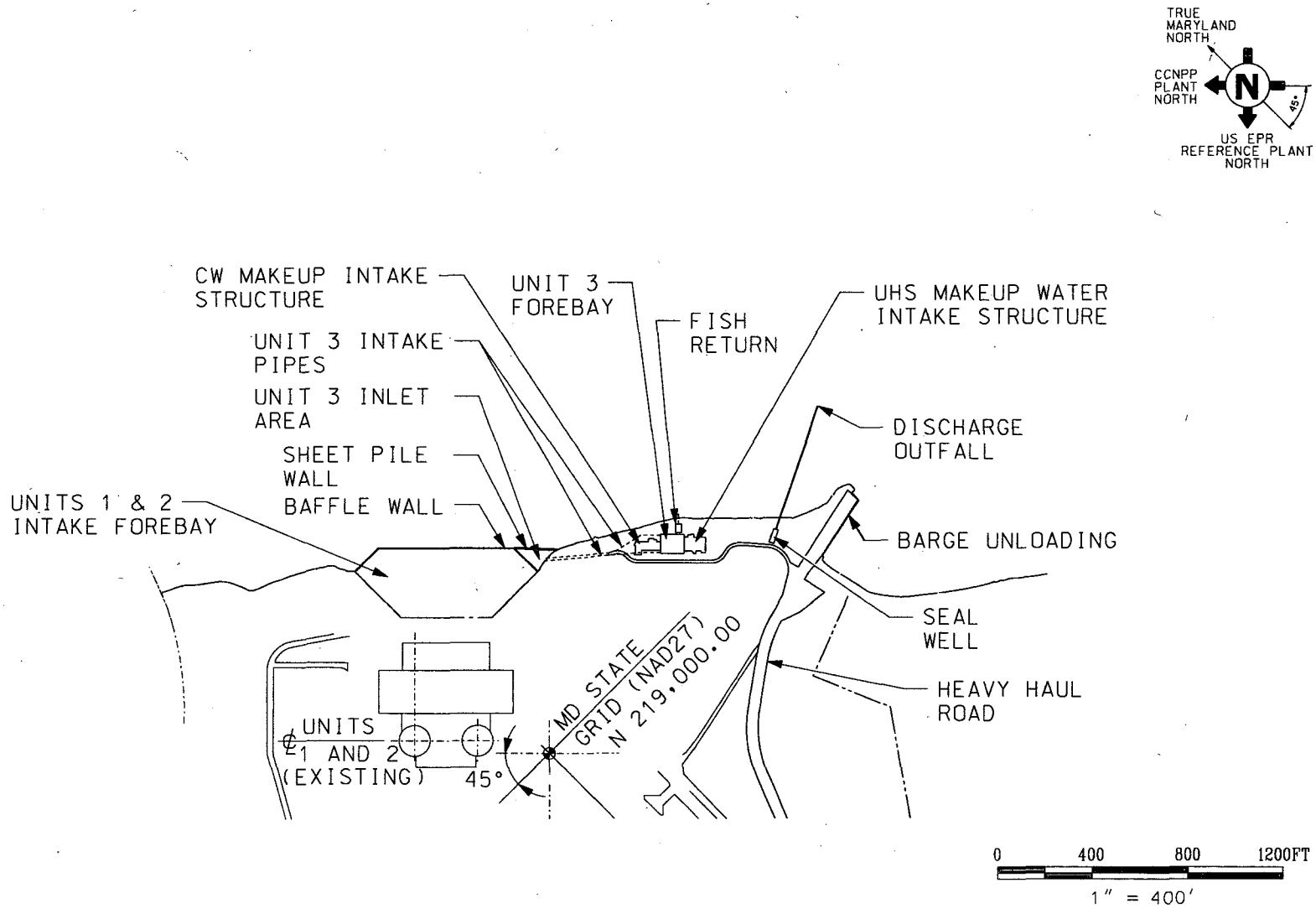


Figure Replaced
Figure 2.4-51—{UHS Make-Up Intake Structure}



2.5.4 STABILITY OF SUBSURFACE MATERIALS AND FOUNDATIONS

The U.S. EPR FSAR includes the following COL Item for Section 2.5.4:

> A COL applicant that references the U.S. EPR design certification will present site-specific information about the properties and stability of soils and rocks that may affect the nuclear power plant facilities, under both static and dynamic conditions including the vibratory ground motions associated with the CSDRS and the site-specific SSE.

This COL Item is addressed as follows:

{This section addresses site-specific subsurface materials and foundation conditions. It was prepared based on the guidance in relevant sections of NRC Regulatory Guide 1.206, Combined License Applications for Nuclear Power Plants (LWR Edition) (USNRC, 2007a).

< Text suppressed for clarity >

The CCNNP3 Unit 3 site covers an area of approximately 460 acres. Figure 2.5-103 provides the site utilization plan. The following areas are identified:

1. Powerblock Area – Safety-related facilities in this area include the Reactor Building (RB), Fuel Building (FB) and Safeguard Buildings (Nuclear Island, NI), Essential Service Water Buildings (ESWB), and Emergency Power Generation Buildings (EPGB); other important facilities are the Nuclear Auxiliary Building (NAB), the Radioactive Waste Processing Building (RWPB), the Access Building (AB), and the Turbine Building (TB). The Powerblock Area is enlarged in Figure 2.5-104.

2. Intake Area – Safety-related facilities in this area include the Ultimate Heat Sink Makeup Water Intake Structure (UHS-MWIS)~~, the Ultimate Heat Sink Electrical Building (UHS-EB),~~ and the ~~Ultimate Heat Sink~~ Forebay. Other facilities are the Circulating Water Makeup Intake Structure and the Fish Return. The Intake Area is enlarged in Figure 2.5-105.

3. Utility Corridor Area.

4. Construction Laydown Area (CLA).

5. Unit 3 Switchyard.

6. Unit 3 Cooling Basin and Cooling Tower.

The Powerblock, Construction Laydown Area, switchyard and cooling tower and basin are collectively referred to as the CCNPP Unit 3 Area.

2.5.4.2.1 Description Of Subsurface Materials

The site geology is comprised of deep Coastal Plain sediments underlain by bedrock, which is about 2,500 ft below the ground surface for CCNPP Units 1 and 2 UFSAR (BGE, 1982). The site soils consist of marine and fluvial deposits. The upper 400 ft of the site soils were the subject of the CCNPP Unit 3 subsurface investigation. In general, the soils at the site can be divided into the following stratigraphic units:

- ***Stratum I: Terrace Sand*** – light brown to brown sand with varying amounts of silt, clay, and/or gravel, sometimes with silt or clay interbedded layers.
- ***Stratum IIa: Chesapeake Clay/Silt*** – light to dark gray clay and/or silt, predominantly clay, with varying amounts of sand.
- ***Stratum IIb: Chesapeake Cemented Sand*** – interbedded layers of light to dark gray silty/clayey sands, sandy silts, and low to high plasticity clays, with varying amounts of shell fragments and with varying degrees of cementation. For the purposes of settlement analysis, Stratum IIb was further divided into three sub-layers. The investigation encountered variation of SPT values both in depth and horizontal distribution. The position of the sub layers beneath the Powerblock Area footprint is variable and this condition needs to be accounted for in a detailed three dimensional settlement analysis. Section 2.5.4.10 provides the details of the settlement model.
- ***Stratum IIc: Chesapeake Clay/Silt*** – gray to greenish gray clay/silt soils, they contain interbedded layers of sandy silt, silty sand, and cemented sands with varying amount of shell fragments.
- ***Stratum III: Nanjemoy Sand*** – primarily dark greenish-gray glauconitic sand with interbedded layers of silt, clay, and cemented sands with varying amounts of shell fragments and varying degrees of cementation.

Figure 2.5-106 provides an idealized soil column for the CCNPP Unit 3 site. The actual depth of layer interfaces varies throughout the site. This condition is revealed by the following subsurface profiles identified on Figure 2.5-103, Figure 2.5-104, and Figure 2.5-105:

Figure 2.5-107	Subsurface profile A-A' at the Powerblock looking east through the NI (local plant coordinates).
Figure 2.5-108	Subsurface profile B-B' at the Powerblock looking east through the EPGBs and NI.
Figure 2.5-109	Subsurface profile C-C' at the Powerblock looking south through the NI and TB.
Figure 2.5-110	Subsurface profile D-D' at the Powerblock looking south through 1EPBG, 3ESWB, and the RWPB.
Figure 2.5-111	Subsurface profile E-E' at the Powerblock looking east through the RWPB, NAB, NI (Safeguard North), 2ESWB and 1ESWB.
Figure 2.5-112	Subsurface profile F-F' at the Intake Area, looking east through the UHS-MWIS~~ and UHS-EB~~.

The recommendations for soil properties (Section 2.5.4.2.5) to be used for analysis and design of foundation are provided in tabular form for each layer identified. Table 2.5-25 presents the depths and thicknesses of the layers encountered at the site. The data is provided for the entire site and independently for the Powerblock Area and the Intake Area. Information on deeper soils (below 400 ft) was obtained from literature research and it is discussed in Section 2.5.4.2.5.

2.5.4.5.2 Extent of Excavations, Fills, and Slopes

In the area of CCNPP Unit 3, the current ground elevations range from approximately El. 50 ft to El. 120 ft, with an approximate average El. 88 ft. The finished grade in CCNPP Unit 3 Powerblock Area ranges from about El. 75 ft to El. 85 ft; with the centerline of Unit 3 at approximately El. 85 ft. Earthwork operations are performed to achieve the planned site grades, as shown on the grading plan in Figure 2.5-173. All safety-related structures are contained within the outline of CCNPP Unit 3, except for the water intake structures that are located near the existing intake basin, also shown in Figure 2.5-173. Seismic Category I structures with their corresponding foundation are:

- Nuclear Island Common Basemat (El. 41.5).
- Emergency Power Generating Building (El. 76).
- Essential Service Water Buildings (El. 61.0).
- Ultimate Heat Sink Makeup Water Intake Structure (El. -26.5).
- ~~Ultimate Heat Sink Electrical Building (El. -10.5).~~

Excavation profiles (at the corresponding locations shown in Figure 2.5-103, Figure 2.5-104, and Figure 2.5-105) are shown in:

- Subsurface and excavation profile Powerblock Area A-A': Figure 2.5-160.
- Subsurface and excavation profile Powerblock Area B-B': Figure 2.5-161.
- Subsurface and excavation profile Powerblock Area C-C': Figure 2.5-162.
- Subsurface and excavation profile Powerblock Area D-D': Figure 2.5-163.
- Subsurface and excavation profile Powerblock Area E-E': Figure 2.5-164.
- Subsurface and excavation profile Intake Area F-F': Figure 2.5-165.

These figures illustrate that excavations for foundations of Seismic Category I structures will result in removing Stratum I Terrace Sand and Stratum IIa Chesapeake Clay/Silt in their entirety, and will extend to the top of Stratum IIb Chesapeake Cemented Sand, except in the Intake Area. In the Intake Area, the foundations are supported on Stratum IIc soils, given the interface proximity of Strata IIb and IIc.

The depth of excavations to reach Stratum IIb is approximately 40 ft to 45 ft below the final site grade in the Powerblock Area. Since foundations derive support from these soils, variations in the top of this stratum were evaluated, reflected as elevation contours for the top of Stratum IIb in CCNPP Unit 3 and in CLA areas, as shown in Figure 2.5-174. The variation in top elevation of these soils is very little, approximately 5 ft or less (about 1 percent) across each major foundation area. The extent of excavations to final subgrade, however, is determined during construction based on observation of the actual soil conditions encountered and verification of their suitability for foundation support. Once subgrade suitability in Stratum IIb soils is confirmed, the excavations are backfilled with compacted structural fill or, if necessary, lean concrete is placed in lieu of structural fill.

2.5.4.5.2 Extent of Excavations, Fills, and Slopes (continued)

The properties of lean concrete are controlled through controlling its compressive strength. A minimum 28-day compressive strength of 2,500 psi is used. Properties of lean concrete are controlled during construction. Detailed project specifications include requirements for mix design, placement, sampling and testing, frequency of testing, applicable standards, and acceptance criteria. Lean concrete may be used in lieu of structural fill in the following cases: below the foundations as leveling mats, to counteract seepage forces at the bottom of the excavation and to help preserve soil subgrade integrity, and in restricted spaces to expedite construction.

Subsequent to foundation construction, the structural fill is extended to the final site grade, or near the final site grade, depending on the details of the final civil design for the project. Compaction and quality control/quality assurance programs for backfilling are addressed in Section 2.5.4.5.3.

Once the design foundation elevation is reached, two methods of verifying the competent foundation soils may be used. The first method is to proof roll the entire excavated area with a compaction vehicle or approved equivalent until the grade offers a relatively unyielding surface (i.e., less than one inch). Any areas that exhibit excessive (i.e., greater than one inch) rutting, pumping or yielding will be identified by the Geotechnical Engineer and the construction contractor will undercut these areas until the intended competent Stratum is encountered as verified by additional proof rolling. The second method is to perform in-situ compaction testing by means of ASTM D7380-08 "Standard Test Method for Soil Compaction Determination (Dynamic Cone Penetration)" (ASTM 2008b) and/or ASTM D1556 "Test Method for Density and Unit Weight of Soil in-Place by Sand-Cone Method" (ASTM 2007b). Structural backfill placement will not begin until the unsuitable material of the final excavation grade has been verified and approval received from the Geotechnical Engineer.

Permanent excavation and fill slopes, created due to site grading, are addressed in Section 2.5.5. Temporary excavation slopes, such as those for foundation excavation, are graded on an inclination not steeper than 2:1 horizontal:vertical (H:V) or even extended to inclination 3:1 H:V, if found necessary, and having a factor of safety for stability of at least 1.30 for static conditions.

Excavation for the Ultimate Heat Sink Makeup Water Intake Structure ~~and the Ultimate Heat Sink Electrical Building~~ is different than that for other CCNPP Unit 3 structures, as shown in Figure 2.5-165. Given the proximity of this excavation to the Chesapeake Bay, this excavation is made by installing a sheetpile cofferdam that not only provides excavation support but also aids with the dewatering needs. This is addressed further in Section 2.5.4.5.4.

Excavation for Seismic Category I electrical duct banks and pipes in the Powerblock Area involve the removal of Stratum I Terrace Sand in its entirety to the top of Stratum IIa Chesapeake Clay/Silt. Such excavation is required since the Stratum I layer has potential for liquefaction, as indicated in Section 2.5.4.8.

2.5.4.10.2.3 Settlement in the Intake Area

The settlement model in the Intake Area is developed in a similar form. The model is much simpler and the influence of neighboring structures is negligible. The size of the foundation is very small compared to the variability in layer thickness throughout the footprint. Soil layers, as shown in Figure 2.5-165 are horizontal. There is no additional complication introduced by asymmetric topography. The loading sequence for the Intake Area facilities is applied in a single step. Figure 2.5-196 provides the FEM model for the UHS MWIS~~ and UHS EB facilities~~.

The total settlement at the end of construction for the facilities in the Intake Area is provided in Table 2.5-70. The maximum total settlement is ~~3.5~~3.6 in and the maximum estimated tilt is ~~0.7~~0.4 in/50 ft.

~~The 0.7 inch estimate for the Electrical Building will be mitigated during construction. The UHS settlement model applies building loads simultaneously. The tilt reported for the EB is influenced by the adjacent structures, but no construction baseline correction is performed. This correction cannot be applied in the model. However, in reality, The EB will be erected after the adjacent deeper founded structures. The foundation surface will be leveled prior to beginning construction of the building, This releveling will reduce tilt.}~~

2.5.5.1.1 Characteristics of Constructed Slopes

Site grading for CCNPP Unit 3 structures will include such areas as the powerblock, switchyard, cooling tower (collectively identified as the CCNPP Unit 3 area), the intake area and the utility corridor between the CCNPP Unit 3 area and the intake area. The powerblock includes the Reactor Building, Fuel Building, Safeguard Buildings, Emergency Power Generating Building (EPGB), Essential Service Water Building (ESWB), Nuclear Auxiliary Building (NAB), Access Building, Radioactive Waste Building, Turbine Building, Fire Protection Building and Switchgear Building. The intake area includes the Ultimate Heat Sink Makeup Water Intake Structure (UHS MWIS), Circulating Makeup Water Intake Structure (CW MWIS)~~, UHS Electrical Building~~, Forebay and Fish Return. All the safety related structures are in these two areas. Natural ground surface elevations within the powerblock range from approximately Elevation 47 ft to Elevation 121 ft, and approximately Elevation 8 ft to Elevation 11 ft within the intake area, as shown in Figure 2.5-103. The centerline of the CCNPP Unit 3 powerblock is graded to approximately Elevation 85 ft. The finished grade in each major area will be approximately:

- Powerblock: Elevation 80 ft to Elevation 85 ft.
- Intake Area: Elevation 10 ft.
- Switchyard: Elevation 90 ft to 98 ft.
- Cooling Tower: Elevation 94 ft to 100 ft.
- Utility Corridor: Elevation 80 ft near proposed CCNPP Unit 3 to Elevation 8 ft near the Barge Slip.

Table 2.5-64—{Building Elevation, Depth, Area, and Load}

	Building	El. [ft]	Depth [ft]	Area [ft^2]	Load [kips]	Pressure [ksf]	Eq. Shape [ft] (1)
Nuclear Island	Reactor Building (RB)	41.5	41.5	26268	313477	11.9	270 x 300
	Fuel Building (FB)	41.5	41.5	14545	216806	14.9	
	Safeguard Building 1 (SGB1)	41.5	41.5	9198	108064	11.7	
	Safeguard 2&3 Buildings (SGB23)	41.5	41.5	20952	200814	9.6	
	Safeguard Building 4 (SGB4)	41.5	41.5	9247	104079	11.3	
Other Buildings	Nuclear Auxiliary Building (NAB)	48.0	35.0	12559	122000	9.7	105 x 120
	Access Building (AB)	48.0	35.0	7620	49300	6.5	95 x 80
	Rad. Waste Building (RWPB)	47.0	36.0	16970	109700	6.5	130 x 130
	E. Power Gen. Buildings (EPGB)	76.0	7.0	12611	40200	3.2	84 x 150
	E. Service Water Building (ESWB)	61.0	22.0	16284	88700	5.4	105 x 155
	Turbine Building (TB)	60.5	22.5	101305	446600	4.4	270 x 380
Intake Area	UHS Makeup Water Intake Structure (UHS MWIS)	~~26.5~~ -27.5	~~36.5~~ 37.5	~~4284~~ 5162	~~24900~~ 34146	~~5.8~~ 7.1	~~63 x 68~~ 58 x 89
	~~UHS Electrical Building (UHS EB)~~	~~-10.5~~	~~20.5~~	~~2660~~	~~5050~~	~~1.9~~	~~35 x 76~~

Notes:
- (1) Equivalent Rectangular shape
Depth is based on average site grade elevation of 83 ft

Table 2.5-65—{Bearing Capacity}

Building	Bulding Load [ksf]	Ultimate Bearing Capacity q_{ult} [ksf]			Allowable Bearing Capacity q_a [ksf] (1)	
		VESIC		MEYERHOF	STATIC	DYNAMIC
		Case a	Case b	Case c (2)		
NI Common Mat	11.8	192.7	228.9	70.5	23.5	35.2
NAB	9.7	170.7	179.1	105.8	35.3	52.9
EPGB	3.2	113.6	102.2	115.0	34.1	51.1
ESWB	5.4	145.7	153.8	118.0	39.3	59.0
UHS MWIS (3)	~~5.8~~7.1	NA	~~36.0~~35.2	NA	~~12.0~~11.7	~~18.0~~17.6
~~UHS EB (3)~~	~~1.9~~	~~NA~~	~~33.0~~	~~NA~~	~~11.0~~	~~16.5~~

Notes:
- *(1) With FS = 3.0 for static conditions and FS = 2.0 for dynamic condition (minimum q_{ult} used)*
- *(2) Case c, Dense sand over soft clay*
- *(3) Case b with Stratum II-C used for UHS, other scenarios are not applicable (NA).*

Table 2.5-70—{Settlement and Tilt for UHS Facilities}

Building	Δ Center [in]	~~Δ Edge [in]~~	Maximum Tilt (1) [in/50 ft]
Ultimate Heat Sink Makeup Water Intake Structure (UHS MWIS)	3.5	~~3.5~~	0.1
~~Ultimate Heat Sink Electrical Building (UHS RB)~~Forebay	~~3.1~~3.4	~~3.3~~	~~0.7~~0.1
Cooling Water Makeup Intake Structure (CW MIS)	~~3.2~~3.6	~~3.2~~	~~0.1~~0.4

Notes
- (1) Adjustment for construction not incorporated.

Figure Replaced

Figure 2.5-103—{Site Utilization Plan with Boring Locations}

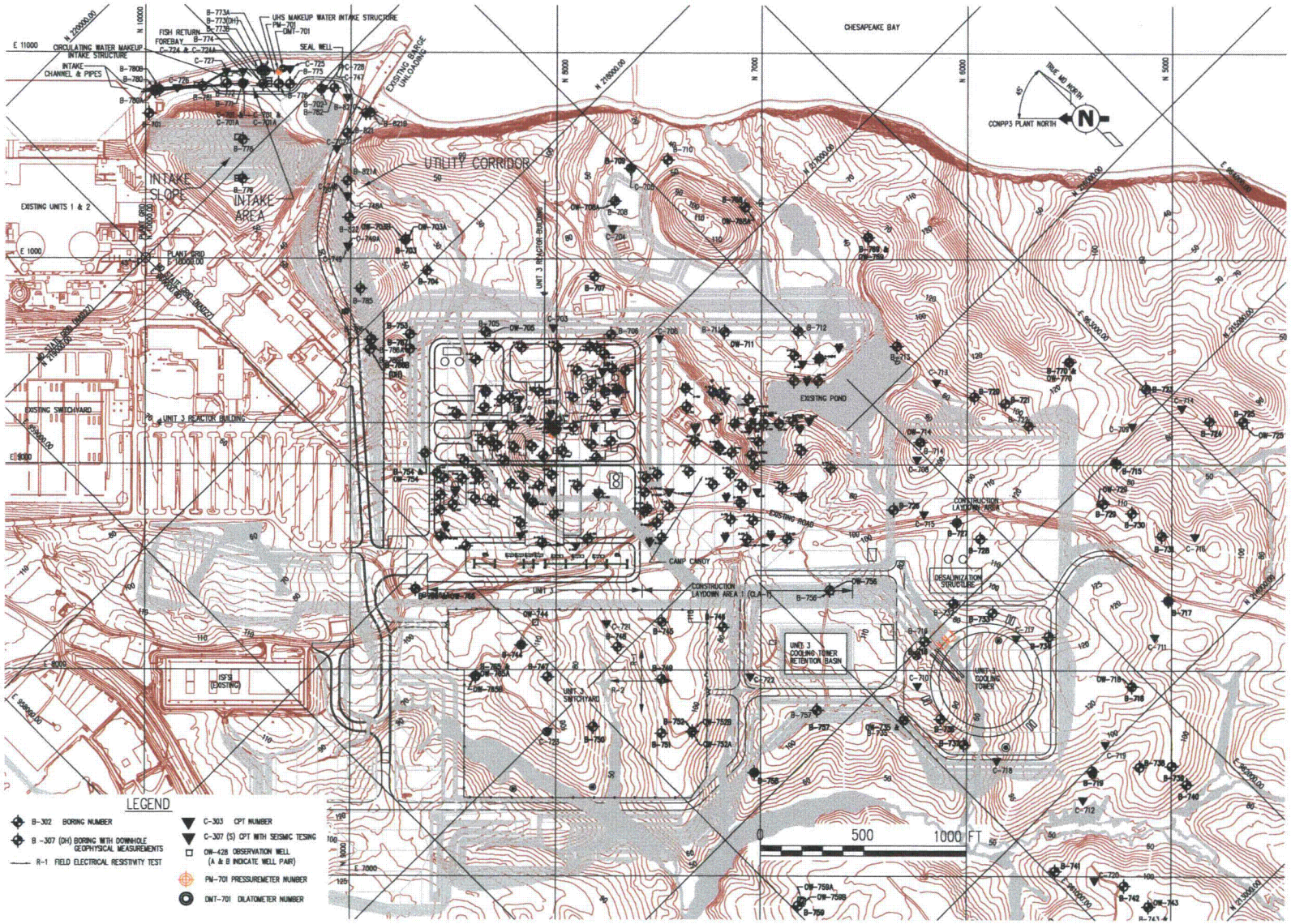


Figure Replaced

Figure 2.5-105—{Intake Area Profile Location}

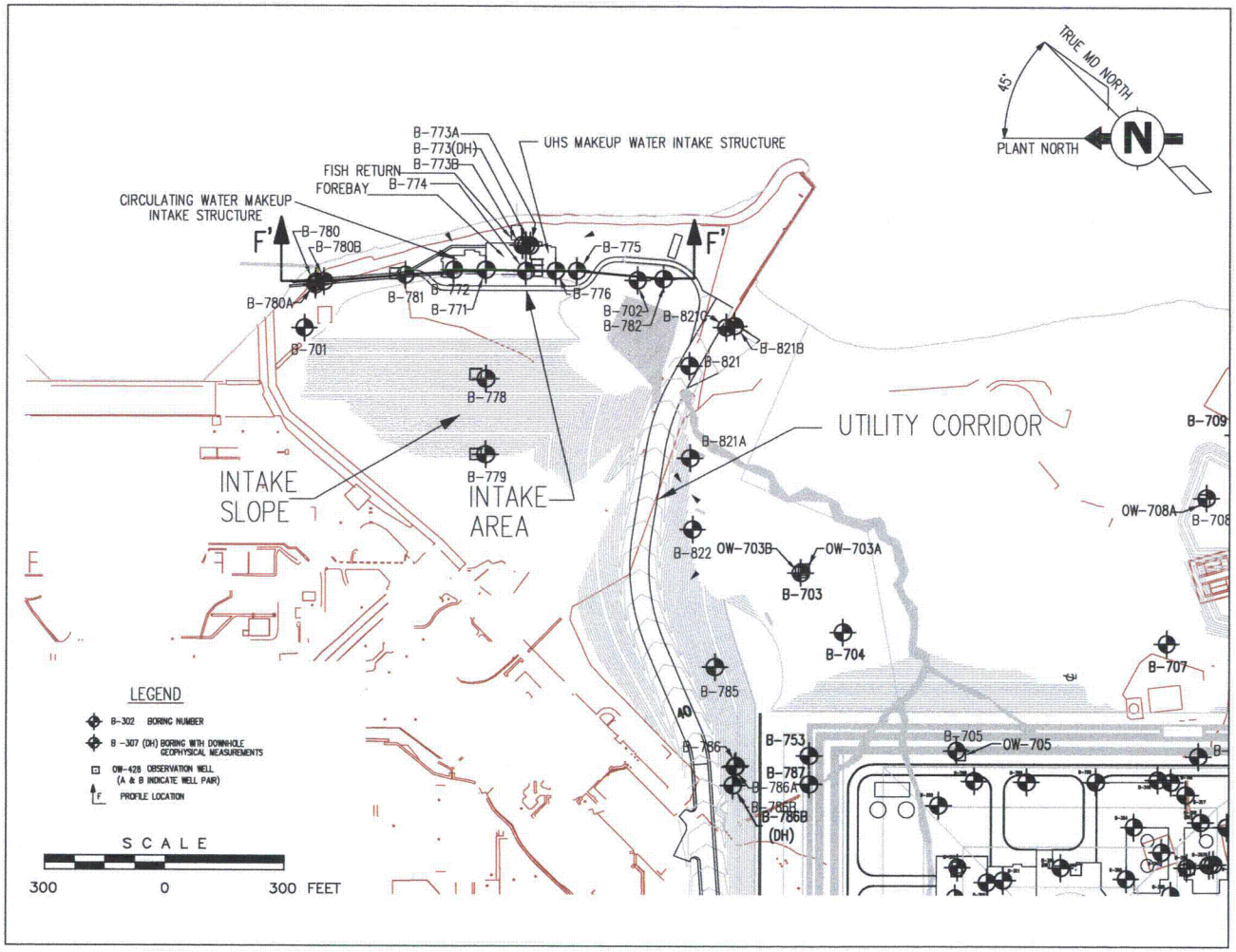


Figure Replaced

Figure 2.5-165—{Excavation Profile FF, Intake Area}

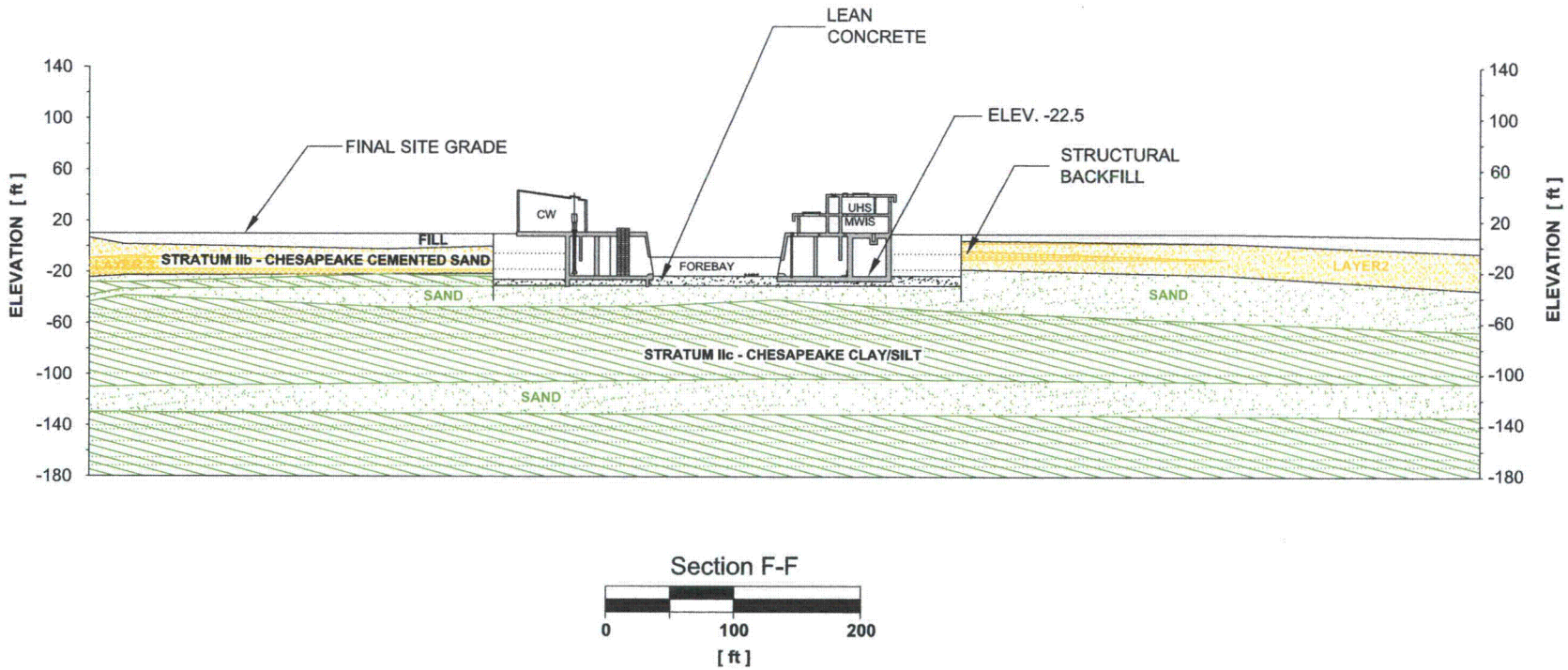


Figure Replaced

Figure 2.5-168—{Best Estimate Velocity Profiles, In-Situ Condition, Intake Area}

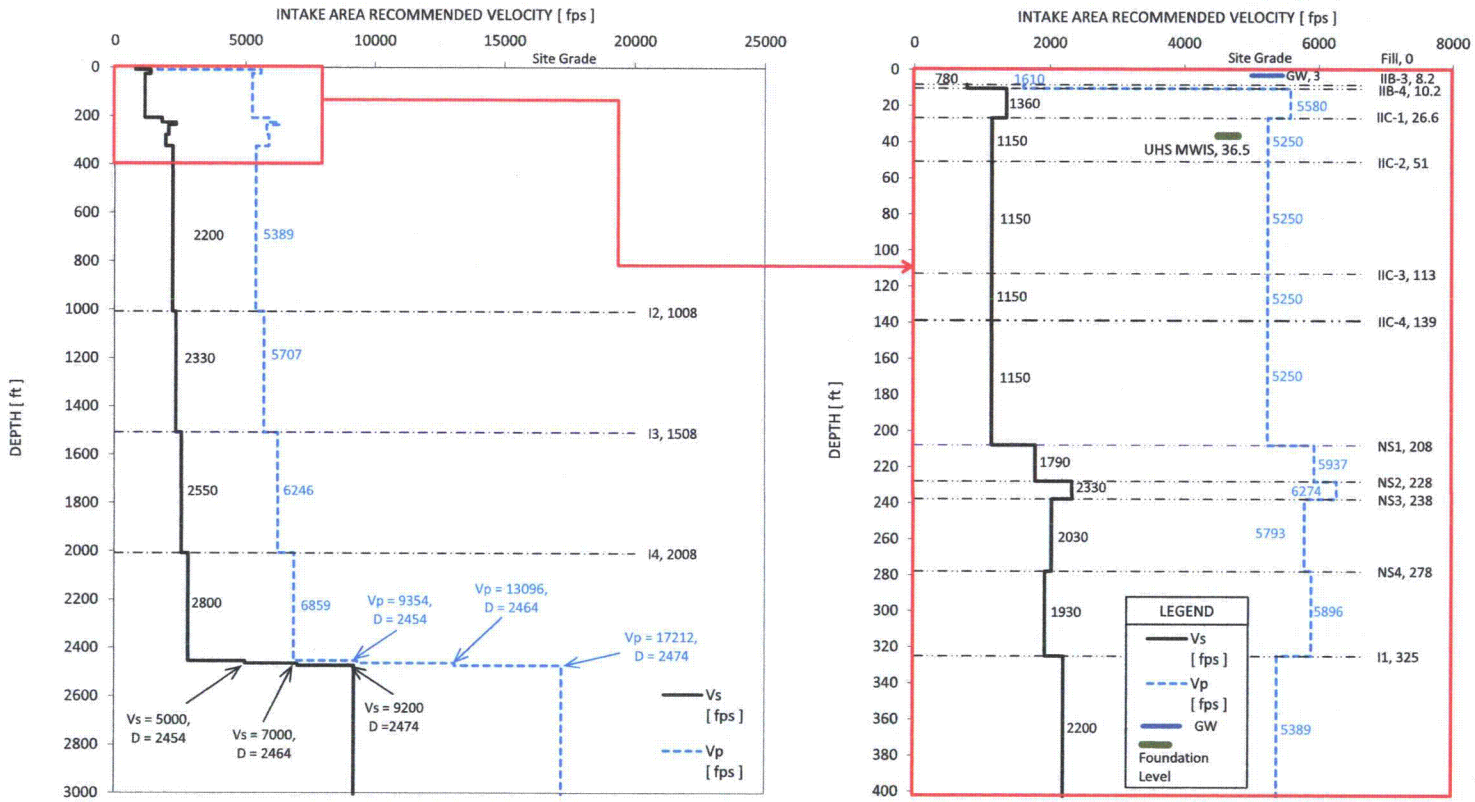


Figure Replaced

Figure 2.5-169—{Best Estimate Velocity Profiles with Fill Placement, Intake Area}

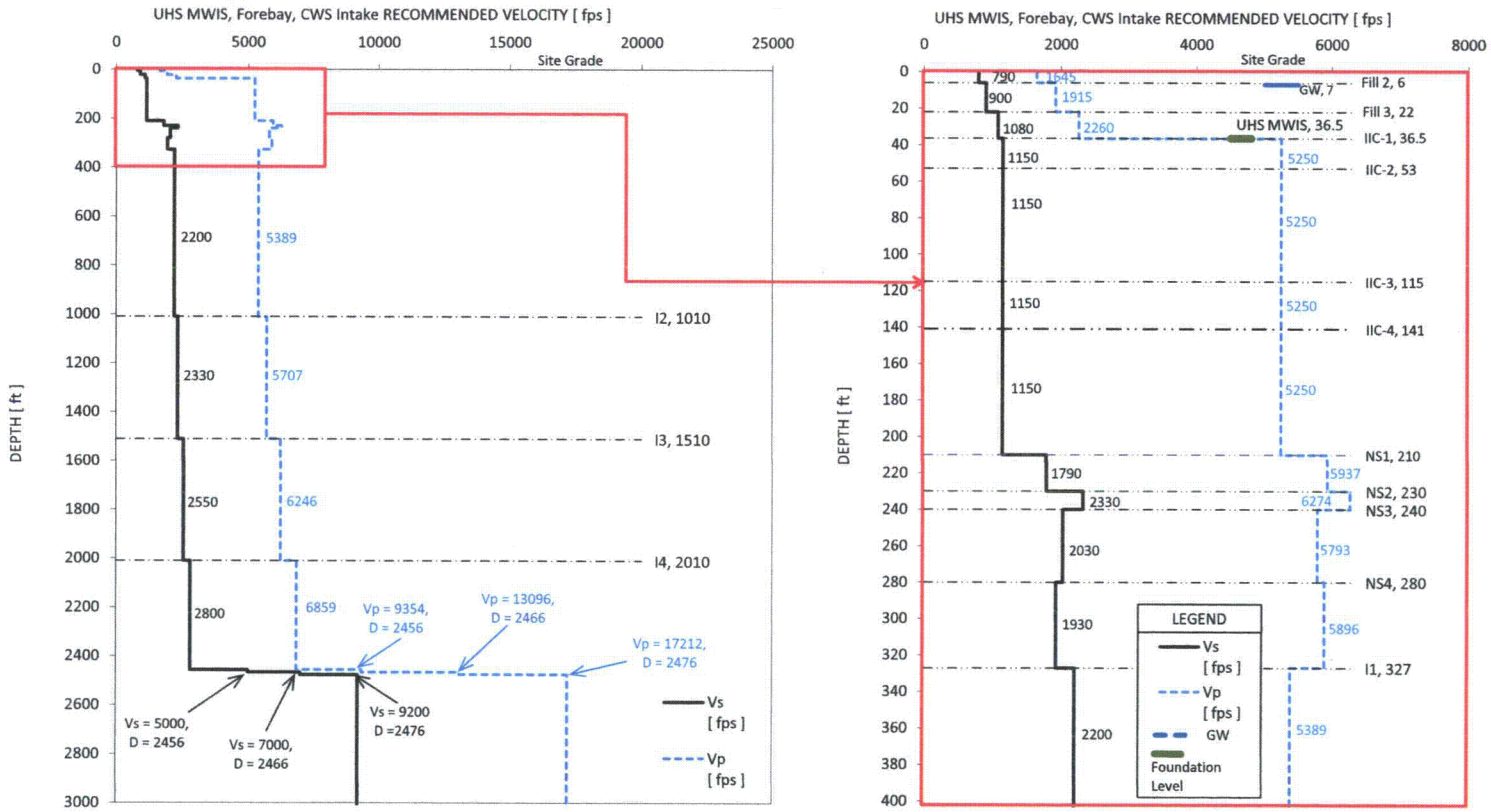


Figure Replaced

Figure 2.5-173—{Site Grading Plan}

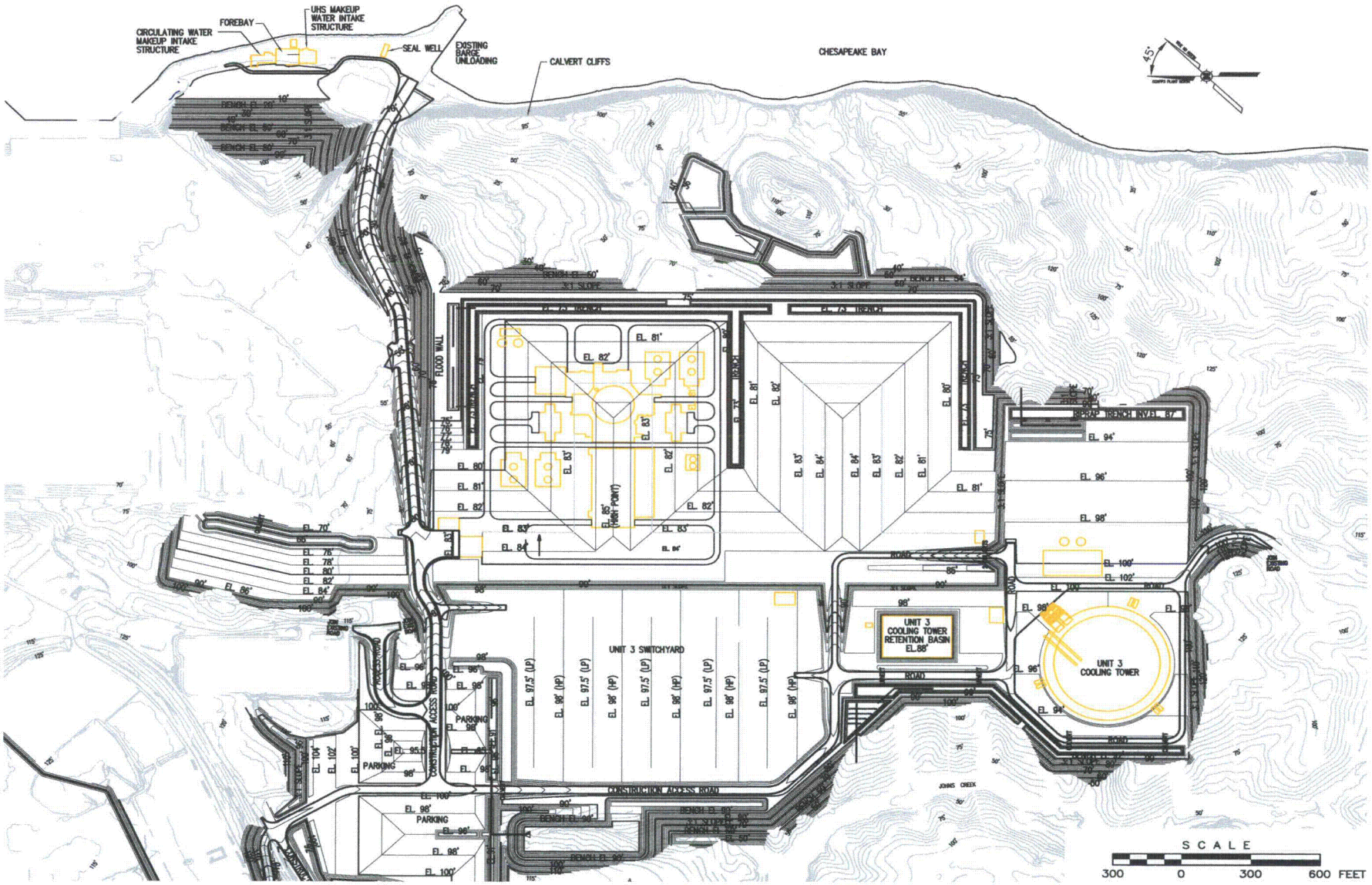
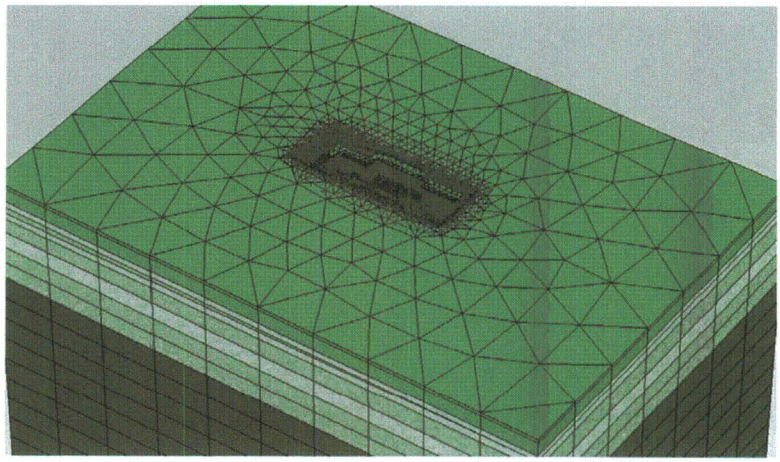
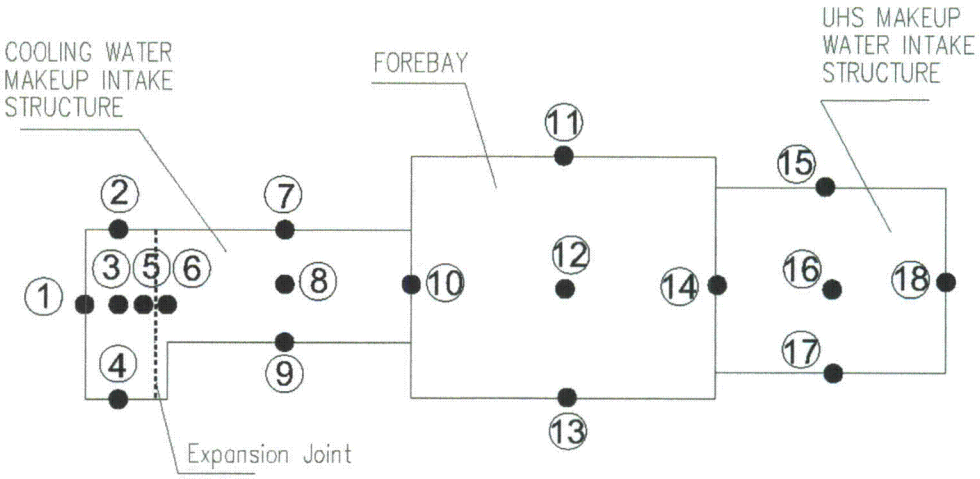


Figure Replaced

Figure 2.5-196—{UHS FEM Model}





Note: Numbers correspond to the settlement and tilt calculation points in the settlement analysis model.

Figure Replaced

Figure 2.5-198—{Site Grading Plan with Slope Cross-Sections}

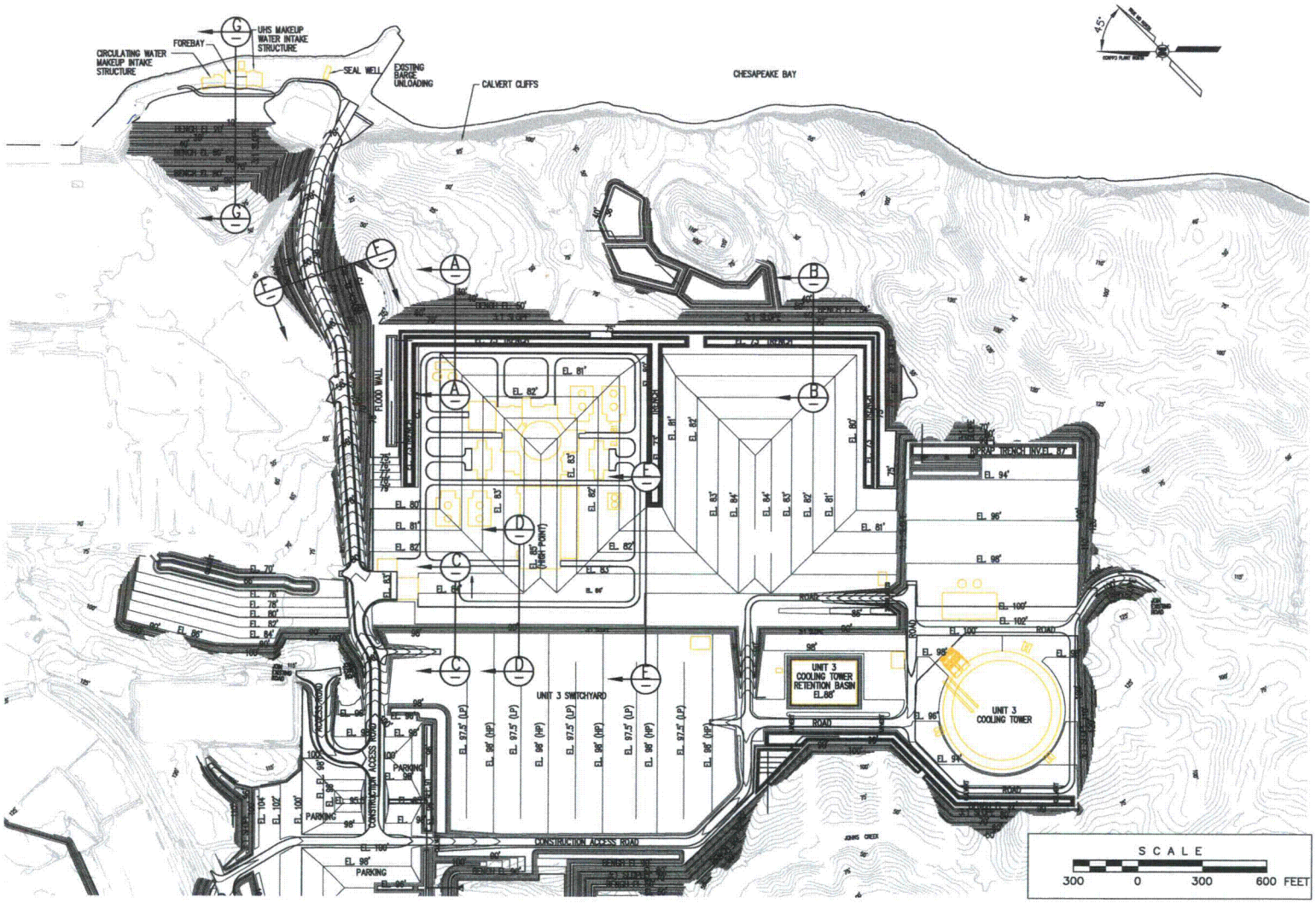


Figure Replaced

Figure 2.5-201—{Location of Excavation Cross-sections in CCNPP Unit 3}

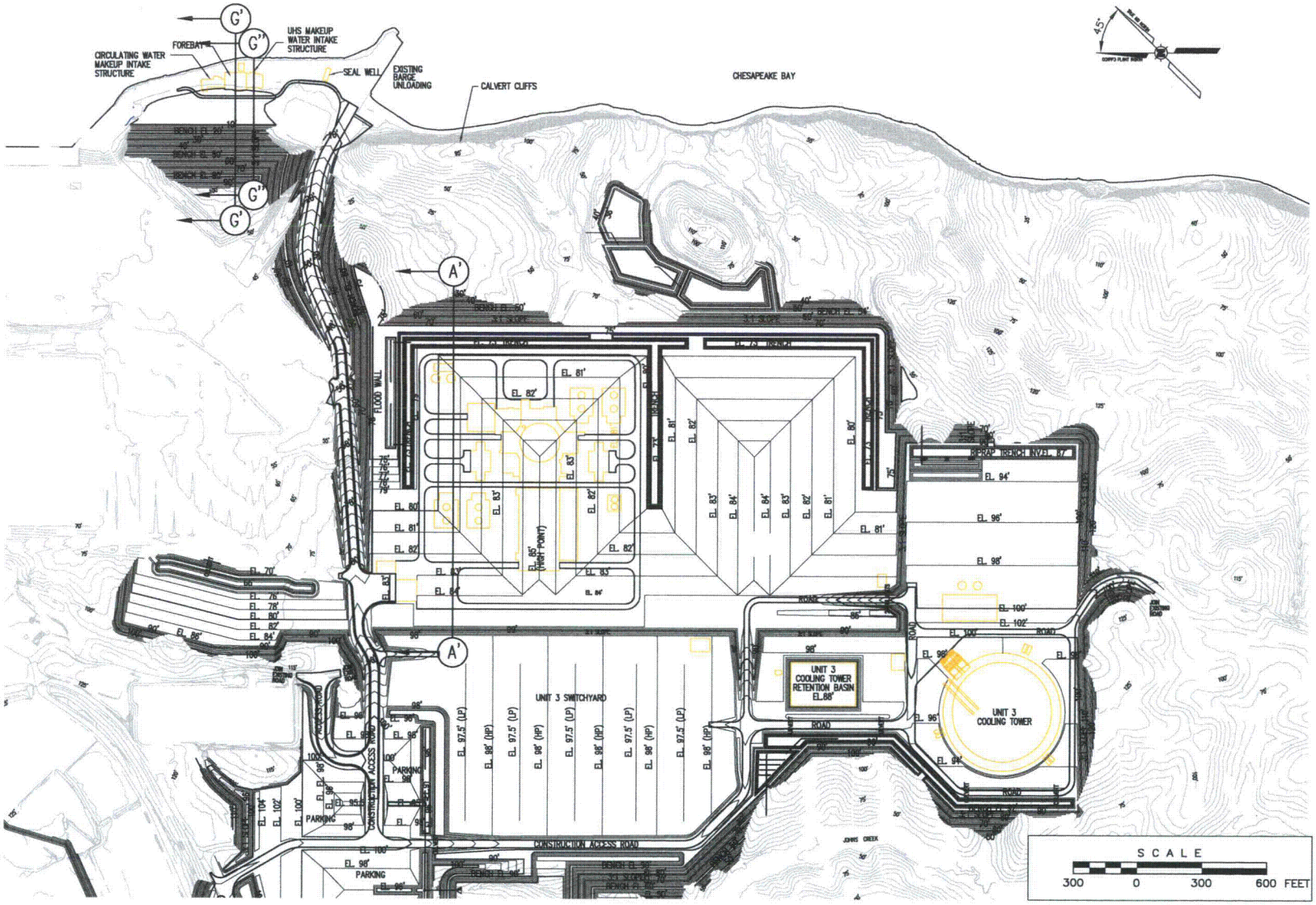
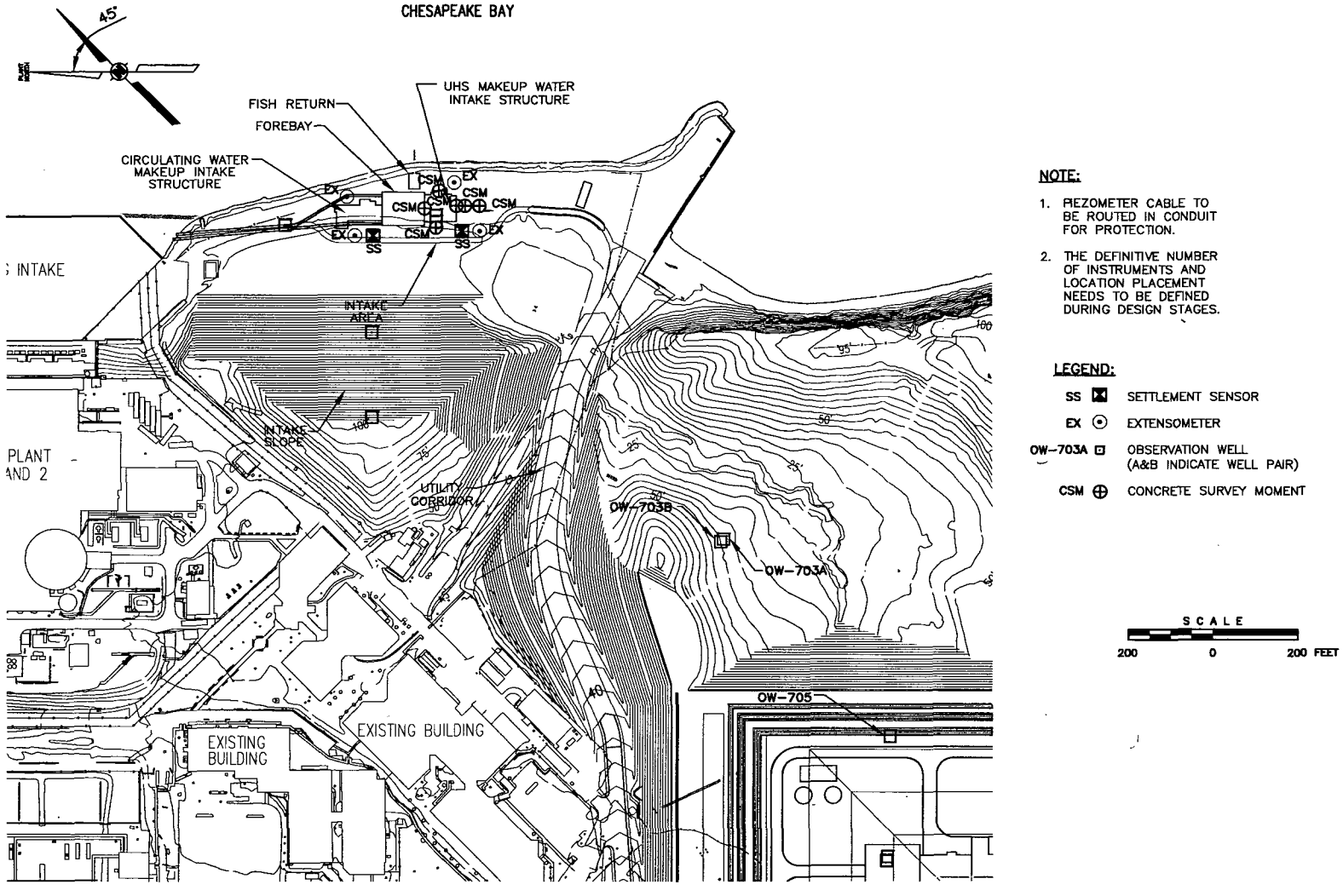


Figure Replaced

Figure 2.5-404—{Settlement Monitoring Instrumentation at the Intake Area}



UN#10-285

Enclosure 5

Markup pages of the Remaining Sections of FSAR Chapter 3.0

Calvert Cliffs Nuclear Power Plant, Unit 3

Table 3.2-1—{Classification Summary for Site-Specific SSCs}
(Page 1 of 9)

KKS System or Component Code	SSC Description	Safety Classification (Note 1)	Quality Group Classification	Seismic Category (Note 2)	10CFR50 Appendix B Program (Note 5)	Location (Note 3)	Comments/ Commercial Code (Note 10)
Table 3.2.2-1 of the U.S. EPR FSAR contains the following conceptual design information for the SM, SN, Cranes, Hoists, and Elevators category for: UKE, Access Building, and UBZ, Buried Conduit Duct Bank.							
[[UKE	Access Building	NS-AQ	N/A	CS	No	UKE	
UBZ	Buried Conduit Duct Bank	S	N/A	I	Yes	UBZ]]	
The U.S. EPR FSAR descriptions provided in U.S. EPR FSAR Table 3.2.2-1 regarding the SM, SN, Cranes, Hoists, and Elevators category for: UKE, Access Building, and UBZ, Buried Conduit Duct Bank are applicable to CCNPP Unit 3, and are incorporated by reference.							
PED UHS Makeup Water System							
30PED 10/20/30/40/A P001	UHS Makeup Water Pumps	S	C	I	Yes	UPF	ASME III ANSI/HI 2.3
30PED 10/20/30/40/A H001	UHS Makeup Water Pump Motors (30 PED 10/20/30/40/ AH001)	S	N/A	I	Yes	UPF	(Note 8)
PED	Piping (30PED 10/20/30/40) to Cooling Tower	S	C	I	Yes	UPF, UZT	ASME III
30PED 10/20/30/40/~~A T 001/AT002~~	Discharge Strainer	S	C	I	Yes	UPF	ASME III
~~30~~PED ~~10/20/30/40/ AA001, 30 PED 10/20/30/40/~~ AA005	Isolation Valves	S	C	I	Yes	UPF/ UZT	ASME III (Note 8)
PED	Ventilation Equipment Piping	S	C	I	Yes	UPF	ASME III
PED	Air Conditioning Unit	S	C	I	Yes	UPF	ASME III / ASME AG-1
PED	Air Cooled Condenser	S	C	I	Yes	UPF	ASME III / ASME AG-1
PED	Ventilation Equipment Including Ventilation Louvers and Tornado Dampers	S	C	I	Yes	UPF	ASME III / ASME AG-1
PED	Ventilation Equipment	NS-AQ	D	II	No	UPF	(Note 12)
30 PED 11/21/31/41/A C001	Isolation Valves for Equipment	S	C	I	Yes	UPF	ASME III
PED	Isolation valves for Equipment	NS-AQ	D	II	No	UPF	ASME B31.1
PED	Piping and Valves	S	C	I	Yes	UPF/UZT	ASME III /ASCE 4
30UPF10 01/02/03/04	UHS Makeup Water Intake Structure~~, UHS Makeup Pump Rooms~~	S	N/A	I	Yes	UPF	ANSI/HI 9.8/ACI 349/ ANSI/AISC N690
PED	Instrument and Controls in the UHS Makeup Water Intake Structure	S	C	I	Yes	UPF	ASME III (Note 8)
PED	Instrument and Controls in the UHS Makeup Water Intake Structure	NS-AQ	D	II	No	UPF	(Note 12)
PED	UHS Makeup Water System Electrical Distribution System Equipment	S	N/A	I	Yes	UPF	(Note 8)

Table 3.2-1—{Classification Summary for Site-Specific SSCs}
(Page 2 of 9)

KKS System or Component Code	SSC Description	Safety Classification (Note 1)	Quality Group Classification	Seismic Category (Note 2)	10CFR50 Appendix B Program (Note 5)	Location (Note 3)	Comments/ Commercial Code (Note 10)
UPF	UHS ~~Electrical Building~~Makeup Water System Electrical Distribution System Equipment	~~S~~NS-AQ	N/A	~~II~~	~~Yes~~No	UPF	~~ACI 349/ ANSI/AISC N690~~(Note 11)
PED	Miscellaneous piping and valves	NS-AQ	D	II	Yes		ASME B31.1
PED	Traveling Screens	NS-AQ	N/A	II (Note 9)	Yes	UPF	(Note 6)
PED	Screen Wash Pumps	NS-AQ	D	II	Yes	UPE/UPF	ASME B31.1/ANSI/HI 2.3
PED	Bar Screens	NS-AQ	N/A	II	Yes	UPE/UPF	(Note 6)
PED	Buried Intake Pipes	S	C	I	Yes	UPE/ UPF	ASME III/ASCE 4-98/ ASME B31.1, App. VII
PED	Forebay	S	N/A	I	No	UPE/ UPF	ACI 349
PED	Sheet Pile Wall	NS-AQ	N/A	CS	No		IBC / AISC N690
~~PED~~	~~Electrical Duct Banks traversing from the UHS Makeup Water Intake Structure and the UHS Electrical Building~~	~~S~~	~~N/A~~	~~I~~	~~Yes~~	~~UPF/ UZT~~	~~ACI 349 (Note 8)~~
PED	Electrical Duct Banks traversing from each Essential Service Water Building to the UHS ~~Electrical Building~~Makeup Water Intake Structure	S	N/A	I	Yes	UPF/ UQB/ UZT	ACI 349 (Note 8)
PA, PAA, PAB, PAC Circulating Water System							
URA	Circulating Water Cooling Tower and Basin	NS	N/A	CS	No	URA	IBC
UPE	Circulating Water System Makeup Intake Structure	NS-AQ	E	II	No	UPE	IBC /ACI 349
30 PAC10/20/30 AP 001	Circ Water Pumps	NS	E	NSC	No	UQA	ASME B31.1/ANSI/HI 2.3
PAC	Circ Water Pump Fans	NS	N/A	NSC	No	UQA	(Note 8)
30 PAC10/20/30 AH 001	Circ Water Pump Motors	NS	N/A	NSC	No	UQA	(Note 8)
30PAA10/20/30 AT001	Removable Screens	NS	E	NSC	No	UQA	(Note 6)
PAB	Circ Water Piping	NS	E	NSC	No	UQA	ASME B31.1/AWWA
PAB	Circ Water Valves	NS	E	NSC	No	UQA	AWWA/ASME B31.1
PAB	Instrumentation and Controls in Circ Water Piping	NS	E	NSC	No	UQA/UZT	AWWA/ASME B31.1
30 PAC10/20/30 AP 001	Circ Water Makeup Pumps	NS	E	NSC	No	UPE	ASME B31.1/ANSI/HI 2.3
UQA	Circ Water Pump Bldg	NS	N/A	CS	No	UQA	IBC
30 PAC10/20/30 AH 001	Circ Water Makeup Pump Motors	NS	N/A	NSC	No	UPE	(Note 8)

Table 3.2-1—{Classification Summary for Site-Specific SSCs}
(Page 3 of 9)

KKS System or Component Code	SSC Description	Safety Classification (Note 1)	Quality Group Classification	Seismic Category (Note 2)	10CFR50 Appendix B Program (Note 5)	Location (Note 3)	Comments/ Commercial Code (Note 10)
PAB	Circ Water Makeup Piping	NS	E	NSC	No	UPE/ UZT	AWWA/ ASME B31.1
PAB	Circ Water Chemical Treatment Piping	NS	E	NSC	No	UZT/UPE/ UQA	ASME B31.1
PAB	Circ Water Cooling Tower Blowdown Piping	NS	E	NSC	No	UQA/ UZT	AWWA/ ASME B31.1
PAB	Circ Water Bypass Piping	NS	E	NSC	No	UQA/ UZT	AWWA/ASME B31.1
PAA	Traveling Screens	NS	E	NSC	No	UPE	
PAB	Makeup piping Valves	NS	E	NSC	No	UPE	AWWA/ASME B31.1
PAB	Instrumentation and Controls in Makeup Piping	NS	E	NSC	No	UQA/UZT	AWWA/ASME B31.1
PAA	Removable Trash Screen / Drive	NS	E	NSC	No	UPE	(Note 6)
PA	Circ Water System Electrical Distribution Equipment	NS	N/A	NSC	No	UQA	(Note 8)
GW Raw Water System, includes Essential Service Water Normal Makeup Supply							
GW	Desalinization Transfer Pumps	NS	E	NSC	No	UPQ	ASME B31.1/ANSI (Note 8)
GW	Desalinization Transfer Pump Motors	NS	N/A	NSC	No	UPQ	(Note 8)
GW	Desalinization Water Storage Tanks	NS	E	CS	No	UPQ	AWWA D100/IBC
GW	Recirculation Valves	NS	E	NSC	No	UPQ	ASME B31.1
GW	Raw Water System Piping	NS	E	NSC	No	UPQ	ASME B31.1
GW	Water Heaters	NS	E	NSC	No	UPQ	ASME Section VIII
UPQ	Desalination/Water Treatment Building	NS	N/A	CS	No	UPQ	IBC
GW	Piping	NS	E	NSC	No	UPQ/ UZT	ASME B31.1
GW	Valves	NS	E	NSC	No	UPQ	ASME B31.1(Note 8)
GW	RO Equipment	NS	E	NSC	No	UPQ	ASME B31.1
GW	Tanks	NS	E	CS	No	UPQ	AWWA D100/IBC
GW	Filters	NS	E	NSC	No	UPQ	ASME B31.1
GW	Pumps	NS	E	NSC	No	UPQ	ASME B31.1/ANSI/NEMA
GW	Motors	NS	N/A	NSC	No	UPQ	(Note 8)
GW	Blowers	NS	E	NSC	No	UPQ	ASME B31.1
GW	System Electrical Distribution Equipment	NS	N/A	NSC	No	UPQ	(Note 8)
GR Sewage Water Treatment System							
GR	Waste Water Treatment Facility	NS	N/A	CS	No	UGU/UZT	IBC
GR	Debris Tank	NS	E	CS	No	UGU/UZT	AWWA D100/IBC
GR	Macerating Pumps	NS	E	NSC	No	UGU/UZT	ASME B31.1/ANSI/NEMA
GR	Macerating Pump Motors	NS	N/A	NSC	No	UZT	(Note 8)
GR	Aeration Chamber	NS	E	NSC	No	UGU/UZT	(Note 6)

Table 3.2-1—{Classification Summary for Site-Specific SSCs}
(Page 4 of 9)

KKS System or Component Code	SSC Description	Safety Classification (Note 1)	Quality Group Classification	Seismic Category (Note 2)	10CFR50 Appendix B Program (Note 5)	Location (Note 3)	Comments/ Commercial Code (Note 10)
GR	Aeration Blower	NS	E	NSC	No	UGU/UZT	(Note 6)
GR	Underground Piping	NS	E	NSC	No	UGU/UZT	ASME B31.1
GR	Sewage Treatment System Piping	NS	E	NSC	No	UGU/UZT	ASME B31.1
GR	Sewage System Electrical Distribution Equipment	NS	N/A	NSC	No	UGU/UZT	(Note 8)
UYF, USU Security Access Facility, including Warehouse							
USU	Storage / Warehouse	NS	N/A	CS	No	USU	IBC
UYF	Security Access Building	NS	N/A	CS	No	UYF	IBC
UYF	Security Access Electrical Distribution Equipment	NS	N/A	NSC	No	UYF	(Note 8)
QJ Central Gas Distribution System							
UTG	Central Gas Supply Bldg	NS	N/A	CS	No	UTG	IBC
QJ	Piping	NS	E	NSC	No	UTG	ASME B31.1
QJ	Valves	NS	E	NSC	No	UTG	ASME B31.1
QJ	Compressed Gas Tanks	NS	E	NSC	No	UTG	DOT Standards
QJ	Central Gas Supply Electrical Distribution Equipment	NS	N/A	NSC	No	UTG	(Note 8)
GK, Potable and Sanitary Water Systems							
GK	Piping	NS	E	NSC	No		ASME B31.1
GK	Valves	NS	E	NSC	No		ASME B31.1
GK	Tanks	NS	E	CS	No		AWWA D100/ASME VIII/IBC
GK	Pump	NS	E	NSC	No		ASME B31.1/ANSI (Note 8)
GK	Motors	NS	N/A	NSC	No		(Note 8)
GK	Potable Water System Electrical Distribution Equipment	NS	N/A	NSC	No		(Note 8)
SG, SGA, SGAO, SGM Fire Water Supply System							
SGA	Fire Water Distribution System, including valves and hydrants, Balance of Plant (Not providing Safe Shutdown Earthquake Protection)	NS-AQ	D	NSC	No		NFPA 24 NFPA 25 NFPA 214 NFPA 804 (Note 8)
SGA	Fire Water Distribution System, including valves and hydrants, Balance of Plant (Safe Shutdown Equipment Protection following SSE)	NS-AQ	D	II-SSE	Yes		NFPA 24 NFPA 25 NFPA 804 ANSI/ASME B31.1 (Note 8)
USG	Fire Water Storage Tanks	NS-AQ	D	II-SSE	Yes	USG/ UZT	NFPA 20 NFPA 22 NFPA 25 AWWA D100. ACI 395/ANSI/AISC N690/ASCE 4-98 ASCE 43 ANSI/ASME B31.1 ASCE 4 (Note 8)
USQ	Fire Protection Building	NS-AQ	N/A	II-SSE	Yes	USG/ UZT	ASCE 43

Table 3.2-1—{Classification Summary for Site-Specific SSCs}
(Page 5 of 9)

KKS System or Component Code	SSC Description	Safety Classification (Note 1)	Quality Group Classification	Seismic Category (Note 2)	10CFR50 Appendix B Program (Note 5)	Location (Note 3)	Comments/ Commercial Code (Note 10)
SGM	Diesel Engine Driven Pumps and Drivers and subsystems, including diesel fuel oil supply	NS-AQ	D	II-SSE	Yes	USG	NFPA 20 NFPA 25 NFPA 804 ASCE 43 ANSI/ASME B31.1 (Note 8)
SGM	Electric Motor Driven Pump and Driver	NS-AQ	D	NSC	No	USG	NFPA 20 NFPA 25 NFPA 804 (Note 8)
SA	Ventilation Equipment	NS-AQ	D	II-SSE	Yes	USG	NFPA 20 NFPA 90A ASME AG-1 ASME N-509 ASCE 43 (Note 8)
SGM	Jockey Pump and driver	NS-AQ	D	NSC	No	USG	NFPA 20 NFPA 25 NFPA 804 (Note 8)
SG	Fire Protection Makeup Piping and Valves From Raw (Desalinated) Water Supply System	NS-AQ	D	NSC	No	UZT	NFPA 22 NFPA 25 (Note 8)
Fire Suppression Systems							
	Fire Suppression Systems and Standpipes and Hose Stations for Site Specific Buildings other than UHS Makeup Water Intake Structure~~, UHS Electrical Building,~~ and Fire Protection Building	NS-AQ	D	NSC	No	UST UTG UYF UPQ	NFPA 13 NFPA 14 NFPA 25 NFPA 804 (Note 8)
	Fire Suppression Systems for UHS Makeup Water Intake Structure~~, UHS Electrical Building,~~ and Fire Protection Building	NS-AQ	D	II	No	UPF, USG	NFPA 13 NFPA 25 NFPA 804 ANSI/ASME B31.1 (Note 8)
	Standpipes and Hose Stations for UHS makeup Water Intake Structure~~ and UHS Electrical Building~~	NS-AQ	D	II-SSE	Yes	UPF	NFPA 14 NFPA 25 NFPA 804 ANSI/ASME B31.1 (Note 8)
Other Site-Specific Structures							
UBA	Switchgear Building	NS-AQ	N/A	II	No	UBA	IBC/AISC 341/AISC 360/ACI 318/ACI 349/ANSI/AISC N690
UMA	Turbine Building	NS-AQ	N/A	II	No	UMA	IBC/AISC 341/AISC 360/ACI 318/ACI 349/ANSI/AISC N690
UAC	Grid Systems Control Building	NS	N/A	CS	No	UAC	IBC

Table 3.2-1—{Classification Summary for Site-Specific SSCs}
(Page 6 of 9)

KKS System or Component Code	SSC Description	Safety Classification (Note 1)	Quality Group Classification	Seismic Category (Note 2)	10CFR50 Appendix B Program (Note 5)	Location (Note 3)	Comments/ Commercial Code (Note 10)
UQZ	Electrical Duct Banks traversing from the Safeguards Buildings to the Four Essential Service Water Buildings and Both Emergency Power Generating Buildings	S	N/A	I	Yes	UJK/ UZT/ UQB/ UBP	ACI-349
UQZ	Electrical Duct Banks traversing from the Safeguards Buildings to the Switchgear Building	NS	N/A	CS	No	UJK/ UZT/ UBA	IBC
	Electrical Duct Banks traversing from the Emergency Auxiliary Transformers to the Safeguard Buildings	NS	N/A	CS	No	UBE/ UZT/ UJK	IBC
UBZ	Electrical Duct Banks traversing from the Switchgear Building to the Desalination Plant, Circulating Water Pump Building, Cooling Tower, Switchyard Control House, Site Specific Auxiliary Transformer, Sewage Treatment Plant, and CW Makeup Water Intake Structure	NS	N/A	CS	No	UBA/ UZT/ UPQ/ UQA/ URA/ UAC/ UAA/ UGV/ UPE	IBC
	Electrical Duct Banks traversing between miscellaneous conventional seismic category buildings	NS	N/A	CS	No	UZT	IBC

Table 3.2-1—{Classification Summary for Site-Specific SSCs}

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KKS System or Component Code	SSC Description	Safety Classification (Note 1)	Quality Group Classification	Seismic Category (Note 2)	10CFR50 Appendix B Program (Note 5)	Location (Note 3)	Comments/ Commercial Code (Note 10)

Notes:

1. As defined in U.S. EPR FSAR Section 3.2.1, the US EPR safety classifications, as supplemented by the UniStar Quality Assurance Program Description (QAPD) classifications, are:
   S- Safety-related (UniStar QAPD classification - QA Level 1)
   NS- Non-safety-related
   NS-AQ- Supplemented Grade (UniStar QAPD classification - QA Level 2)
2. As defined in Section 3.2.1 and U.S. EPR FSAR Section 3.2.1, the Seismic Classifications are:
   I – Seismic Category I
   II – Seismic Category II
   II-SSE – Seismic Category II Fire Protection structures, systems, and components that are required to remain functional during and following a safe shutdown earthquake to support equipment required to achieve safe shutdown. The following Fire Protection structures, systems, and components are required to remain functional during and after a seismic event: 1) Fire Water Storage Tanks; 2) Fire Protection Building; 3) Diesel driven fire pumps and their associated subsystems and components, including the diesel fuel oil system; 4) Critical support systems for the Fire Protection Building, i.e., ventilation; and 5) The portions of the fire water piping system and components (including isolation valves) which supply water to the stand pipes in buildings that house the equipment required for safe shutdown of the plant following an SSE. Manual actions may be required to isolate the portion of the Fire Protection piping system that is not qualified as Seismic Category II-SSE.
   CS – Conventional Seismic
   NSC – Non-seismic
3. Locations are defined in the table that follows:

KKS Designator	Location
UAA	Switchyard
UAC	Grid System Control Building
UBA	Switchgear Building
UBE	Auxiliary Power Transformers
UBP	Emergency Power Generating Building
UGV	Sewage Treatment Plant Building
UJK	Safeguard Buildings Electrical
UMA	Turbine Building
UPF	UHS Makeup Water Intake Structure
UPE	Circulating Water Makeup Intake Structure
UQB	Essential Service Water Pump Building
UQA	Circulating Water Pump Building
URA	Cooling Tower Structure
USG	Fire Water Storage Tanks and Fire Protection Building
UST	Workshop & Warehouse Building
USU	Storage / Warehouse
UTG	Central Gas Supply Building
UYF	Security Access Building
UZT	Outdoor Area
UPQ	Water Treatment Building
UQZ	Buried piping and pipe ducts for service water systems and cables
UBZ	Buried conduit duct bank from Switchgear building to transformers
UGU	Wastewater discharge structure

Table 3.2-1—{Classification Summary for Site-Specific SSCs}

(Page 8 of 9)

KKS System or Component Code	SSC Description	Safety Classification (Note 1)	Quality Group Classification	Seismic Category (Note 2)	10CFR50 Appendix B Program (Note 5)	Location (Note 3)	Comments/ Commercial Code (Note 10)

4. Acronyms are defined below:

KKS	Code Description
GW	Raw water supply system
GK	Potable and sanitary water systems
GKB	Potable and sanitary water distribution system
GR	Sewage water treatment system
PA	Circulating water supply system
PAA	Circulating water screening plant
PAB	Circulating water piping system
PAC	Circulating water pump system
PED	Essential service water recirculation cooling system
QJ	Central gas distribution system
SG	Stationary fire protection systems
SGA	Fire water distribution system, conventional area
SGA0	Fire water distribution system outside of buildings
SGM	Fire protection equipment

5. Those SSC classified as "NS-AQ" (for Safety Class) and classified as "Yes" for 10 CFR 50 Appendix B will be subject only to those quality assurance requirements of Appendix B that are pertinent to that SSC based on the potential affect of the SSC on safety-related structures.
6. These components will be designed to the Manufacturer's Standard of Design
7. Quality Group classification is applicable for pressure retaining and radioactive containing SSC's. This does not apply to electrical equipment, or component structures. The quality group classification of those components will be N/A.
8. Applicable codes and standards for the electrical components in Table 3.2-1 are provided in U.S. EPR Section 8.1.4.3.
9. The UHS makeup dual flow traveling screens are designed to withstand design basis seismic loads without a loss of their mechanical function and are designed to permit manual operator rotation and cleaning of the screen panels.

Table 3.2-1—{Classification Summary for Site-Specific SSCs}

(Page 9 of 9)

KKS System or Component Code	SSC Description	Safety Classification (Note 1)	Quality Group Classification	Seismic Category (Note 2)	10CFR50 Appendix B Program (Note 5)	Location (Note 3)	Comments/ Commercial Code (Note 10)

10. Applicable Code Editions:

Commercial Code	Edition
ASME III	2004
ANSI/HI 2.3	2000
ANSI/HI 9.8	1998
ACI 349	ACI 349-01/349R-01, 2001
ANSI/AISC N690	1994 (R2004)s2
IBC	2006 (w/ 2007 supplements)
ASME B31.1	2004
ASME Section VIII	2004
DOT Standard	Latest editions endorsed by DOT regulations in 10 CFR Title 49
NFPA 13	2007
NFPA 14	2007
NFPA 20	2007
NFPA 22	2003
NFPA 24	2007
NFPA 25	2002
NFPA 90A	2002 (with 2003 & 2005 errata)
NFPA 214	2005
NFPA 804	2006
ASME/ANSI N509	2002 (w/ 2003, 2005 errata)
ASME AG-1a	2003 w/ 2004 addenda
ASCE 43	2005
ASCE 4	1998, reprinted in 2000
AWWA D100	2005
AWWA	Latest editions issued as of detailed design
ANSI/AISC 341	2005
AISC 360	2005
ACI 318-05/318R-05	2005

11. Applicable codes and standards for the electrical components in Table 3.2-1 are provided in the U.S. EPR FSAR Section 8.1.4.3.
12. These components will be designed to the Manufacturer's Standard of design.

3.3.2.3 Effect of Failure of Structures or Components Not Designed for Tornado Loads

{Non-safety-related structures located on the site and not included in U.S. EPR FSAR Section 3.3.2.3 include:

- Fire Protection Water Tanks
- Fire Protection Building
- Storage / Warehouse
- Central Gas Supply Building
- Security Access Facility
- Switchgear Building
- Grid Systems Control Building
- Circulating Water System Cooling Tower
- Circulating Water System Pump Building
- Circulating Water System Makeup Water Intake Structure
- Circulating Water System Retention Basin
- Desalinization/Water Treatment Plant
- Waste Water Treatment Plant
- ~~Forebay~~
- Demineralized Water Tanks

Except for the Switchgear Building~~, Forebay,~~ and concrete portions of the Circulating Water System (CWS) Makeup Water Intake Structure (MWIS), the non-safety-related buildings are miscellaneous steel and concrete structures, which are not designed for tornado loadings. These structures are distant enough from safety-related structures that their collapse due to tornado loadings would not result in adverse interaction with any safety-related structure. During detailed design of such structures, their heights and separation distances from safety-related structures will be maintained such that the failure of these structures due to tornado loadings will not affect the ability of safety-related structures to perform their intended safety functions. Missiles generated by the collapse of these structures during tornado loadings are enveloped by the design basis tornado missile loads described in U.S. EPR FSAR Section 3.5.1.4.

The Switchgear Building ~~and Forebay have~~has a potential for interaction with safety-related structures and ~~are~~is designed to withstand the effects of tornado loadings. The structural system of the Switchgear Building employs engineered pressure relief sliding panels to mitigate the effects of tornado loadings. Conservatively, the concrete portion of CWS MWIS is designed for tornado loadings.}

3.4.2 EXTERNAL FLOOD PROTECTION

{This section of the U.S. EPR FSAR is incorporated by reference with the supplements as described below:

The maximum groundwater elevation in the U.S. EPR FSAR generic design is 3.3 ft (1 m) below finished grade. The maximum groundwater level at the CCNPP Unit 3 Powerblock is approximately 30 ft (9.1 m) below finished grade as discussed in Section 2.4.12.5.The U.S. EPR FSAR requires the Probable Maximum Flood (PMF) elevation to be 1 ft (0.3 m) below finished yard grade. This requirement envelopes the CCNPP Unit 3 maximum flood level for all safety-related structures, except the Ultimate Heat Sink (UHS) Makeup Water Intake Structure ~~and the UHS Electrical Building~~. The UHS Makeup Water Intake Structure ~~and the UHS Electrical Building are~~is located at the shoreline. Since the UHS Makeup Water Intake Structure ~~and the UHS Electrical Building are~~is classified as a safety-related building~~s, they~~it will be designed to meet the requirements of Regulatory Guide 1.27 (NRC, 1976). The UHS Makeup Water Intake Structure ~~and the UHS Electrical Building are~~is designed to be watertight to prevent internal flooding of the buildings. The UHS Makeup Water Intake Structure ~~and the UHS Electrical Building are~~is discussed in Section 2.4.10, Section 3.4.3.10, Section 3.8.5 and Section 9.2.5.}

3.4.3 ANALYSIS OF FLOODING EVENTS

3.4.3.1 Internal Flooding Events

{No departures or supplements.}

3.4.3.2 External Flooding Events

The U.S. EPR FSAR includes the following COL Item in Section 3.4.3.2:

> A COL applicant that references the U.S. EPR design certification will confirm the potential site-specific external flooding events are bounded by the U.S. EPR design basis flood values or otherwise demonstrate that the design is acceptable.

This COL Item is addressed as follows:

{U.S. EPR FSAR Section 3.4.3.2 states: "The Seismic Category I structures are not designed for dynamic effects associated with external flooding (e.g., wind, waves, currents) because the design basis flood level is below the finished yard grade." The design of the CCNPP Unit 3 safety-related structures is consistent with this statement, except the UHS Makeup Water Intake Structure~~ and the UHS Electrical Building~~. Flooding of ~~these structures~~this structure is addressed in Section 3.4.3.10.}

3.4.3.10 Ultimate Heat Sink Makeup Water Intake Structure Flooding Analysis

The U.S. EPR FSAR includes the following COL Item in Section 3.4.3.10:

> A COL applicant that references the U.S. EPR design certification will perform a flooding analysis for the ultimate heat sink makeup water intake structure based on the site-specific design of the structure and the flood protection concepts provided herein.

This COL Item is addressed as follows:

{The maximum flood level at the UHS Makeup Water Intake Structure ~~and UHS Electrical Building location~~ is elevation 33.2 ft (10.11 m) as a result of the surge, wave heights, and wave run-up associated with the PMH as discussed in Section 2.4.5. The UHS Makeup Water Intake Structure ~~and the UHS Electrical Building~~ would experience flooding during a PMH. ~~These structures are~~This structure is designed to withstand the static and dynamic flooding forces, and the UHS Makeup Water pump room areas and electrical rooms are designed to be watertight. The flood protection measures for the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ are described in Section 2.4.10.

In the event of flooding due to equipment or piping failure within a UHS Makeup Water pump room, the affected division of the UHS Makeup Water System is assumed to be lost. The flood protection measures for the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ ensure that a flood in one division will not impact another division. Thus, there would be two divisions of the UHS Makeup Water System available for fulfillment of the safety function, if one division is assumed to be unavailable due to maintenance.}

3.5.1.4 Missiles Generated by Tornadoes and Extreme Winds

The U.S. EPR FSAR includes the following COL Item in Section 3.5.1.4:

> A COL applicant that references the U.S. EPR design certification will evaluate the potential for other missiles generated by natural phenomena, such as hurricanes and extreme winds, and their potential impact on the missile protection design features of the U.S. EPR.

This COL Item is addressed as follows:

All Seismic Category I structures that make up the U.S. EPR standard design meet the most stringent Region I tornado intensity requirements of Regulatory Guide 1.76 (NRC, 2007a). The associated tornado wind speeds (230 mph (103 m/s) maximum) represent an exceedance frequency of 1E-07 per year. Region I tornado missile parameters are reflected in U.S. EPR FSAR Table 3.5-1 and are used in the standard design of all Seismic Category I structures.

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Likewise, the U.S. EPR standard design of all Category I structures outside the NI base mat are constructed of reinforced concrete and all wall and roof slabs meet the Region I design-basis missile spectrum, including the automobile missile guidance of Regulatory Guide 1.76 (NRC, 2007a) for all structural elevations. {An exception to the previous statement is that for the Essential Service Water Cooling Tower, the automobile missile impact is considered on all wall elements at all elevations, but not the roof slab. The highest elevation within the 0.5 mile (0.8 km) radius at CCNPP Unit 3 is at an approximate elevation of 130 ft (39.6 m). Adding the 30 ft (9.1 m) requirement, all elements below elevation 160 ft (48.8 m) require evaluation of the automobile missile. Normal grade elevation at the Essential Service Water Cooling Tower and pump structures is approximately 82 ft (25 m). Therefore, structural elements less than 78 ft (23.8 m) high require automobile missile evaluation. The height of the Essential Service Water Cooling Tower is approximately 96 ft (29 m) and the adjoining pumphouse roof slab is at approximately 63 ft (19 m) elevation. Automobile missile impact is considered in pumphouse structure roof slab design but is not postulated for the Essential Service Water Cooling Tower roof slab design because the elevation of this roof slab is above the maximum height at which evaluation of the automobile missile must be evaluated.

The site-specific Seismic Category I Ultimate Heat Sink (UHS) Makeup Water Intake Structure ~~and UHS Electrical Building are~~is constructed of reinforced concrete, and the missile barrier walls and roof slabs meet Region 1 design-basis missile spectrum, including the automobile missile guidance of Regulatory Guide 1.76 (NRC, 2007a). On this basis, the site-specific conditions are conservatively enveloped for all required elevations.

Thus, by the standard U.S. EPR meeting the Region I tornado missile spectrum requirements for all Category I structures, the site-specific conditions at CCNPP Unit 3 are in compliance with all Regulatory Guide 1.76 (NRC, 2007a) tornado missile requirements.}

Table 3.9-1—{Site-Specific Inservice Valve Testing Program Requirements}

(Page 1 of 5)

Valve Identification Number [1]	Description /Valve Function	Valve Type [2]	Valve Actuator [3]	ASME Code Class [4]	ASME OM Code Category [5]	Active/ Passive[6]	Safety Position [7]	Test Required [8]	Test Frequency [9]	Comments
~~30PED10 AA001 A~~	~~UHS Makeup Water Pump 1 Discharge MOV~~	~~BF~~	~~MO~~	~~3~~	~~A~~	~~A~~	~~O~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	
~~30PED10 AA002 A~~	~~UHS Makeup Water Pump 1 Recirculation MOV~~	~~BF~~	~~MO~~	~~3~~	~~A~~	~~A~~	~~O~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	
~~30PED10 AA005 A~~	~~UHS Makeup Water Train 1 Test Bypass Isolation Valve~~	~~BF~~	~~MO~~	~~3~~	~~A~~	~~A~~	~~C~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	
~~30PED10 AA201 A~~	~~UHS Makeup Water Pump 1 Check Valve~~	~~CK~~	~~SA~~	~~3~~	~~C~~	~~P~~	~~O~~	~~ET~~	~~Q~~	
~~30PED20 AA001 A~~	~~UHS Makeup Water Pump 2 Discharge MOV~~	~~BF~~	~~MO~~	~~3~~	~~A~~	~~A~~	~~O~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	
~~30PED20 AA002 A~~	~~UHS Makeup Water Pump 2 Recirculation MOV~~	~~BF~~	~~MO~~	~~3~~	~~A~~	~~A~~	~~O~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	
~~30PED20 AA005 A~~	~~UHS Makeup Water Train 2 Test Bypass Isolation Valve~~	~~BF~~	~~MO~~	~~3~~	~~A~~	~~A~~	~~C~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	
~~30PED20 AA201 A~~	~~UHS Makeup Water Pump 2 Check Valve~~	~~CK~~	~~SA~~	~~3~~	~~C~~	~~P~~	~~O~~	~~ET~~	~~Q~~	
~~30PED30 AA001 A~~	~~UHS Makeup Water Pump 3 Discharge MOV~~	~~BF~~	~~MO~~	~~3~~	~~A~~	~~A~~	~~O~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	
~~30PED30 AA002 A~~	~~UHS Makeup Water Pump 3 Recirculation MOV~~	~~BF~~	~~MO~~	~~3~~	~~A~~	~~A~~	~~O~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	
~~30PED30 AA005 A~~	~~UHS Makeup Water Train 3 Test Bypass Isolation Valve~~	~~BF~~	~~MO~~	~~3~~	~~A~~	~~A~~	~~C~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	
~~30PED30 AA201 A~~	~~UHS Makeup Water Pump 3 Check Valve~~	~~CK~~	~~SA~~	~~3~~	~~C~~	~~P~~	~~O~~	~~ET~~	~~Q~~	
~~30PED40 AA001 A~~	~~UHS Makeup Water Pump 4 Discharge MOV~~	~~BF~~	~~MO~~	~~3~~	~~A~~	~~A~~	~~O~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	
~~30PED40 AA002 A~~	~~UHS Makeup Water Pump 4 Recirculation MOV~~	~~BF~~	~~MO~~	~~3~~	~~A~~	~~A~~	~~O~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	
~~30PED40 AA005 A~~	~~UHS Makeup Water Train 4 Test Bypass Isolation Valve~~	~~BF~~	~~MO~~	~~3~~	~~A~~	~~A~~	~~C~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	
~~30PED40 AA201 A~~	~~UHS Makeup Water Pump 4 Check Valve~~	~~CK~~	~~SA~~	~~3~~	~~C~~	~~P~~	~~O~~	~~ET~~	~~Q~~	
~~LATER~~	~~UHS Makeup Water System Manual Valves~~	~~Various~~	~~MA~~	~~3~~	~~B~~	~~P~~	~~O/C~~	~~ET~~ ~~PI~~	~~5Y~~ ~~2Y~~	~~See Note 10~~
Ultimate Heat Sink (UHS) Makeup Water System - Train 1										
30PED10AA002A	UHS Makeup Water Pump Minimum Flow Valve Train 1	BF	MO	3	B	A	C	ET PI	Q 2Y	

Table 3.9-1—{Site-Specific Inservice Valve Testing Program Requirements}

(Page 2 of 5)

Valve Identification Number [1]	Description /Valve Function	Valve Type [2]	Valve Actuator [3]	ASME Code Class [4]	ASME OM Code Category [5]	Active/ Passive [6]	Safety Position [7]	Test Required [8]	Test Frequency [9]	Comments
30PED10AA190A	UHS Makeup Water Pump Air Release/Vacuum Breaker Valve Train 1	RV	SA	3	C	A	O/C	ET LT PI	2Y 10Y 2Y	
30PED10AA201A	UHS Makeup Water Pump Discharge Check Valve Train 1	CK	SA	3	C	A	O	ET	Q	
30PED10AA001A	UHS Makeup Water Pump Discharge Isolation Valve Train 1	BF	MO	3	B	A	O	ET PI	Q 2Y	
-	UHS Makeup Water Pump Initial Fill Check Valve Train 1	CK	SA	3	C	A	C	ET	Q	
-	UHS Makeup Water Pump Initial Fill Isolation Valve Train 1	GT	MO	3	B	A	C	ET PI	Q 2Y	
30PED10AA005A	UHS Makeup Water Train 1 Test Bypass Isolation Valve	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED10AA006A	UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Train 1	GT	MO	3	B	A	C	ET PI	Q 2Y	
-	UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 1	BF	MA	3	B	P	O	ET PI	2Y 2Y	
Ultimate Heat Sink (UHS) Makeup Water System - Train 2										
30PED20AA002A	UHS Makeup Water Pump Minimum Flow Valve Train 2	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED20AA190A	UHS Makeup Water Pump Air Release/Vacuum Breaker Valve Train 2	RV	SA	3	C	A	O/C	ET LT PI	2Y 10Y 2Y	
30PED20AA201A	UHS Makeup Water Pump Discharge Check Valve Train 2	CK	SA	3	C	A	O	ET	Q	
30PED20AA001A	UHS Makeup Water Pump Discharge Isolation Valve Train 2	BF	MO	3	B	A	O	ET PI	Q 2Y	
-	UHS Makeup Water Pump Initial Fill Check Valve Train 2	CK	SA	3	C	A	C	ET	Q	
-	UHS Makeup Water Pump Initial Fill Isolation Valve Train 2	GT	MO	3	B	A	C	ET PI	Q 2Y	
30PED20AA005A	UHS Makeup Water Train 1 Test Bypass Isolation Valve	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED20AA006A	UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Train 2	GT	MO	3	B	A	C	ET PI	Q 2Y	

Table 3.9-1—{Site-Specific Inservice Valve Testing Program Requirements}

(Page 3 of 5)

Valve Identification Number [1]	Description /Valve Function	Valve Type [2]	Valve Actuator [3]	ASME Code Class [4]	ASME OM Code Category [5]	Active/ Passive [6]	Safety Position [7]	Test Required [8]	Test Frequency [9]	Comments
-	UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 2	BF	MA	3	B	P	O	ET PI	2Y 2Y	
Ultimate Heat Sink (UHS) Makeup Water System - Train 3										
30PED30AA002A	UHS Makeup Water Pump Minimum Flow Valve Train 3	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED30AA190A	UHS Makeup Water Pump Air Release/Vacuum Breaker Valve Train 3	RV	SA	3	C	A	O/C	ET LT PI	2Y 10Y 2Y	
30PED30AA201A	UHS Makeup Water Pump Discharge Check Valve Train 3	CK	SA	3	C	A	O	ET	Q	
30PED30AA001A	UHS Makeup Water Pump Discharge Isolation Valve Train 3	BF	MO	3	B	A	O	ET PI	Q 2Y	
-	UHS Makeup Water Pump Initial Fill Check Valve Train 3	CK	SA	3	C	A	C	ET	Q	
-	UHS Makeup Water Pump Initial Fill Isolation Valve Train 3	GT	MO	3	B	A	C	ET PI	Q 2Y	
30PED30AA005A	UHS Makeup Water Train 1 Test Bypass Isolation Valve	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED30AA006A	UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Train 3	GT	MO	3	B	A	C	ET PI	Q 2Y	
-	UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 3	BF	MA	3	B	P	O	ET PI	2Y 2Y	
Ultimate Heat Sink (UHS) Makeup Water System - Train 4										
30PED40AA002A	UHS Makeup Water Pump Minimum Flow Valve Train 4	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED40AA190A	UHS Makeup Water Pump Air Release/Vacuum Breaker Valve Train 4	RV	SA	3	C	A	O/C	ET LT PI	2Y 10Y 2Y	
30PED40AA201A	UHS Makeup Water Pump Discharge Check Valve Train 4	CK	SA	3	C	A	O	ET	Q	
30PED40AA001A	UHS Makeup Water Pump Discharge Isolation Valve Train 4	BF	MO	3	B	A	O	ET PI	Q 2Y	
-	UHS Makeup Water Pump Initial Fill Check Valve Train 4	CK	SA	3	C	A	C	ET	Q	

Table 3.9-1—{Site-Specific Inservice Valve Testing Program Requirements}

(Page 4 of 5)

Valve Identification Number [1]	Description /Valve Function	Valve Type [2]	Valve Actuator [3]	ASME Code Class [4]	ASME OM Code Category [5]	Active/ Passive[6]	Safety Position [7]	Test Required [8]	Test Frequency [9]	Comments
-	UHS Makeup Water Pump Initial Fill Isolation Valve Train 4	GT	MO	3	B	A	C	ET PI	Q 2Y	
30PED40AA005A	UHS Makeup Water Train 1 Test Bypass Isolation Valve	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PED40AA006A	UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Train 4	GT	MO	3	B	A	C	ET PI	Q 2Y	
-	UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 4	BF	MA	3	B	P	O	ET PI	2Y 2Y	
Miscllaneous Manual Valves										
Later	UHS Makeup Water System Manual Valves	Various	MA	3	B	P	O/C	ET PI	2Y 2 Y	See Note 10

Table 3.9-1—{Site-Specific Inservice Valve Testing Program Requirements}

(Page 5 of 5)

Valve Identification Number [1]	Description /Valve Function	Valve Type [2]	Valve Actuator [3]	ASME Code Class [4]	ASME OM Code Category [5]	Active/ Passive [6]	Safety Position [7]	Test Required [8]	Test Frequency [9]	Comments

Notes:

1. The U. S. EPR subscribes to the Kraftworks Kennzeichen System (KKS) for coding and nomenclature of SSCs.
2. Valve Type
   GB – Globe
   GT – Gate
   CK – Check
   RV – Relief
   RD – Rupture Disk
   DI – Diaphragm
   BF – Butterfly
   PL – Plug
3. Valve Actuator
   MO – Motor-operated
   SO – Solenoid-operated
   AO – Air-operated
   HO – Hydraulic-operated
   SA – Self-actuated
   MA – Manual
   PA – Pilot-actuated
4. ASME Code Class as determined by quality groups from Regulatory 1.26.
5. ASME Code Category A, B, C, D as defined in ASME OM Code 2004, Subsection ISTC-1300
6. ASME functional category as defined in ASME OM Code 2004, Subsection ~~ISTC-1300~~ISTA-2000.
7. Valve safety function positions(s), specify both positions for valves that perform a safety function in both the open and closed positions. Valves are exercised to the position (s) required to fulfill their safety function(s). Check valve tests include both open and closed tests.
8. Required tests per ASME OM Code 2004, Subsection ISTC-3000
   LT – Leakage test per Table ISTC-3500-1 and ISTC-3000
   ET – Exercise test per Table ISTC-3500-1 and ISTC-3510-1, nominally every 3 months
   PI – Position indication verification per Table ISTC-3500-1 and ISTC-3700
   ST – Stroke time per test per ISTC-5000 (in conjunction with exercise test).
9. Test frequencies abbreviations per NUREG-1482, Revision 1:
   Q test performed once every 92 days
   CS – test performed during cold shutdown, but no more frequently than once every 92 days
   RF – test performed each refueling outage
   2Y – test performed once every 2 years
   5Y – test performed once every 5 years (per ASME OM, ISTC-3540)
   10Y– test performed once every 10 years
   RV – test relief valve at OM schedule.
10. Table entries for manual valves will be developed during detailed design engineering.

3.10 SEISMIC AND DYNAMIC QUALIFICATION OF MECHANICAL AND ELECTRICAL EQUIPMENT

{This section of the U.S. EPR FSAR is incorporated by reference with the supplements and departure as described in the following sections.

For CCNPP Unit 3, seismic qualification of equipment located in the EPGB and ESWB is performed using the In-Structure Response Spectra (ISRS) provided in Section 3.7.2.5 instead of the U.S. EPR FSAR ISRS.

For CCNPP Unit 3, seismic and dynamic qualification of mechanical and electrical equipment (identified in Table 3.10-1) includes equipment associated with the:

- UHS Makeup Water System, including the UHS Makeup Water Intake Structure ~~and the UHS Electrical Building~~; and
- Fire Protection System components that are required to protect equipment required to achieve safe shutdown following an earthquake, including the Fire Protection Building and Fire Water Storage Tanks.

Results of seismic and dynamic qualification of equipment by testing and/or analysis were not available at the time of submittal of the original COL application. Thus, in conformance with NRC Regulatory Guide 1.206 (NRC, 2007), a seismic qualification implementation program is provided. As depicted in Table 3.10-2, the qualification program will be implemented in five major phases.

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Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 1 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
Ultimate Heat Sink (UHS) Makeup System									
Train 1									
UHS Makeup Water Pump Train 1	30PED10AP001	30UPF01001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Motor Train 1	30PED10AP001	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Root Valve Train 1	30PED10AA303	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Train 1	30PED10CP001	30UPF02001	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 1 Train 1	-	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Flow Element/Instrument Train 1	30PED10CF003	30UPF02001	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 2 Train 1	-	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Valve Train 1	30PED10AA002	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Valve Motor Actuator Train 1	30PED10AA002	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Line Orifice Plate Train 1	-	30UPF02001	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve, Vent Valve Train 1	-	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve, Isolation Valve Train 1	-	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve Train 1	30PED10AA190	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Check Valve Train 1	30PED10AA201	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Isolation Valve Train 1	30PED10AA001	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Isolation Valve Motor Actuator Train 1	30PED10AA001	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Initial Fill Check Valve Train 1	-	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Initial Fill Isolation Valve Train 1	-	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Initial Fill Isolation Valve Motor Actuator Train 1	-	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 2 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
Low Side Isolation Valve for ΔP Measurement Across Pump Discharge Strainer Train 1	30PED10AA304	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer ΔP Measurement Instrument Train 1	30PED10CP002	30UPF02001	M	M	ES	SI	S		Y(5)
High Side Isolation Valve for ΔP Measurement Across Pump Discharge Strainer Train 1	30PED10AA305	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Train 1	30PED10AT001	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Motor Actuator Train 1	30PED10AT001	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Filter Drain Valve 1 Train 1	30PED10AA405	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Filter Drain Valve 2 Train 1	30PED10AA406	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Train 1	30PED10AA006	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Motor Actuator Train 1	30PED10AA006	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 1	-	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Sample Connection Valve Train 1	-	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Pump Room Air Handling Unit (AHU) Train 1	-	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Pump Room AHU Fan Motor Train 1	-	30UPF02001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Air Cooled Condenser (ACC) Train 1	-	30UPF03001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building ACC Fan Motor Train 1	-	30UPF03001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building ACC Compressor Motor Train 1	-	30UPF03001	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Safety Related Dampers Train 1	-	-	M	M	ES	SI	S	C/NM	Y(5)
Pump Room AHU ΔP Measurement Across Filter Instrument Train 1	-	-	M	M	ES	SI	S		Y(5)
Low Side Root Valve for ΔP Measurement Across AHU Filter Train 1	-	-	M	M	ES	SI	S	C/NM	Y(5)

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 3 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
High Side Root Valve for ΔP Measurement Across AHU Filter Train 1	-	-	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building AHU Supply Side Flow Measurement Instrument Train 1	-	-	M	M	ES	SI	S		Y(5)
UHS Makeup Water Building Temperature Measurement Instruments (All) Train 1	-	-	M	M	ES	SI	S		Y(5)
UHS Makeup Water Building Safety Related Tornado Dampers (All) Train 1	-	-	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Train 1	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Actuator Train 1	-	M	M	-	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Alternate Supply Valve Train 1	-	M	M	-	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Train 1	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Intake Structure Level Measurement (All) Train 1	-	-	M	M	ES	SI	S		Y(5)
Train 2									
UHS Makeup Water Pump Train 2	30PED20AP001	30UPF01002	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Motor Train 2	30PED20AP001	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Root Valve Train 2	30PED20AA303	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Train 2	30PED20CP001	30UPF02004	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 1 Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Flow Element/Instrument Train 2	30PED20CF003	30UPF02004	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 2 Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Valve Train 2	30PED20AA002	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Valve Motor Actuator Train 2	30PED20AA002	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 4 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
UHS Makeup Water Pump Minimum Flow Line Orifice Plate Train 2	-	30UPF02004	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve, Vent Valve Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve, Isolation Valve Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve Train 2	30PED20AA190	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Check Valve Train 2	30PED20AA201	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Isolation Valve Train 2	30PED20AA001	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Isolation Valve Motor Actuator Train 2	30PED20AA001	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Initial Fill Check Valve Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Initial Fill Isolation Valve Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Initial Fill Isolation Valve Motor Actuator Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
Low Side Isolation Valve for ΔP Measurement Across Pump Discharge Strainer Train 2	30PED20AA304	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer ΔP Measurement Instrument Train 2	30PED20CP002	30UPF02004	M	M	ES	SI	S		Y(5)
High Side Isolation Valve for ΔP Measurement Across Pump Discharge Strainer Train 2	30PED20AA305	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Train 2	30PED20AT001	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Motor Actuator Train 2	30PED20AT001	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Filter Drain Valve 1 Train 2	30PED20AA405	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Filter Drain Valve 2 Train 2	30PED20AA406	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Train 2	30PED20AA006	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Motor Actuator Train 2	30PED20AA006	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 5 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Sample Connection Valve Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Pump Room Air Handling Unit (AHU) Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Pump Room AHU Fan Motor Train 2	-	30UPF02004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Air Cooled Condenser (ACC) Train 2	-	30UPF03004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building ACC Fan Motor Train 2	-	30UPF03004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building ACC Compressor Motor Train 2	-	30UPF03004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Safety Related Dampers Train 2	-	-	M	M	ES	SI	S	C/NM	Y(5)
Pump Room AHU ΔP Measurement Across Filter Instrument Train 2	-	-	M	M	ES	SI	S		Y(5)
Low Side Root Valve for ΔP Measurement Across AHU Filter Train 2	-	-	M	M	ES	SI	S	C/NM	Y(5)
High Side Root Valve for ΔP Measurement Across AHU Filter Train 2	-	-	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building AHU Supply Side Flow Measurement Instrument Train 2	-	-	M	M	ES	SI	S		Y(5)
UHS Makeup Water Building Temperature Measurement Instruments (All) Train 2	-	-	M	M	ES	SI	S		Y(5)
UHS Makeup Water Building Safety Related Tornado Dampers (All) Train 2	-	-	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Train 2	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Actuator Train 2	-	M	M	-	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Alternate Supply Valve Train 2	-	M	M	-	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Train 2	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Intake Structure Level Measurement (All) Train 2	-	-	M	M	ES	SI	S		Y(5)

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 6 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
Train 3									
UHS Makeup Water Pump Train 3	30PED30AP001	30UPF01003	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Motor Train 3	30PED30AP001	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Root Valve Train 3	30PED30AA303	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Train 3	30PED30CP001	30UPF02006	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 1 Train 3	-	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Flow Element/Instrument Train 3	30PED30CF003	30UPF02006	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 2 Train 3	-	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Valve Train 3	30PED30AA002	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Valve Motor Actuator Train 3	30PED30AA002	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Line Orifice Plate Train 3	-	30UPF02006	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve, Vent Valve Train 3	-	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve, Isolation Valve Train 3	-	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve Train 3	30PED30AA190	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Check Valve Train 3	30PED30AA201	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Isolation Valve Train 3	30PED30AA001	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Isolation Valve Motor Actuator Train 3	30PED30AA001	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Initial Fill Check Valve Train 3	-	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Initial Fill Isolation Valve Train 3	-	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Initial Fill Isolation Valve Motor Actuator Train 3	-	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 7 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
Low Side Isolation Valve for ΔP Measurement Across Pump Discharge Strainer Train 3	30PED30AA304	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer ΔP Measurement Instrument Train 3	30PED30CP002	30UPF02006	M	M	ES	SI	S		Y(5)
High Side Isolation Valve for ΔP Measurement Across Pump Discharge Strainer Train 3	30PED30AA305	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Train 3	30PED30AT001	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Motor Actuator Train 3	30PED30AT001	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Filter Drain Valve 1 Train 3	30PED30AA405	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Filter Drain Valve 2 Train 3	30PED30AA406	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Train 3	30PED30AA006	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Motor Actuator Train 3	30PED30AA006	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 3	-	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Sample Connection Valve Train 3	-	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Pump Room Air Handling Unit (AHU) Train 3	-	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Pump Room AHU Fan Motor Train 3	-	30UPF02006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Air Cooled Condenser (ACC) Train 3	-	30UPF03006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building ACC Fan Motor Train 3	-	30UPF03006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building ACC Compressor Motor Train 3	-	30UPF03006	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Safety Related Dampers (All) Train 3	-	-	M	M	ES	SI	S	C/NM	Y(5)
Pump Room AHU ΔP Measurement Across Filter Instrument Train 3	-	-	M	M	ES	SI	S		Y(5)
Low Side Root Valve for ΔP Measurement Across AHU Filter Train 3	-	-	M	M	ES	SI	S	C/NM	Y(5)

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 8 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
High Side Root Valve for ΔP Measurement Across AHU Filter Train 3	-	-	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building AHU Supply Side Flow Measurement Instrument Train 3	-	-	M	M	ES	SI	S		Y(5)
UHS Makeup Water Building Temperature Measurement Instruments (All) Train 3	-	-	M	M	ES	SI	S		Y(5)
UHS Makeup Water Building Safety Related Tornado Dampers Train 3	-	-	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Train 3	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Actuator Train 3	-	M	M	?	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Alternate Supply Valve Train 3	-	M	M	?	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Train 3	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Intake Structure Level Measurement (All) Train 3	-	-	M	M	ES	SI	S		Y(5)
Train 4									
UHS Makeup Water Pump Train 4	30PED40AP001	30UPF01004	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Motor Train 4	30PED40AP001	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Root Valve Train 4	30PED40AA303	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Pressure Instrument Train 4	30PED40CP001	30UPF02008	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 1 Train 4	-	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Flow Element/Instrument Train 4	30PED40CF003	30UPF02008	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Discharge Flow Element Instrument Root Valve 2 Train 4	-	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Valve Train 4	30PED40AA002	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Minimum Flow Valve Motor Actuator Train 4	30PED40AA002	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 9 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
UHS Makeup Water Pump Minimum Flow Line Orifice Plate Train 4	-	30UPF02008	M	M	ES	SI	S		Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve, Vent Valve Train 4	-	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve, Isolation Valve Train 4	-	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Air Release/Vacuum Breaker Valve Train 4	30PED40AA190	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Check Valve Train 4	30PED40AA201	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Isolation Valve Train 4	30PED40AA001	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Isolation Valve Motor Actuator Train 4	30PED40AA001	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Initial Fill Check Valve Train 4	-	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Initial Fill Isolation Valve Train 4	-	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Initial Fill Isolation Valve Motor Actuator Train 4	-	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
Low Side Isolation Valve for ΔP Measurement Across Pump Discharge Strainer Train 4	30PED40AA304	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer ΔP Measurement Instrument Train 4	30PED40CP002	30UPF02008	M	M	ES	SI	S		Y(5)
High Side Isolation Valve for ΔP Measurement Across Pump Discharge Strainer Train 4	30PED40AA305	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Train 4	30PED40AT001	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Motor Actuator Train 4	30PED40AT001	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Filter Drain Valve 1 Train 4	30PED40AA405	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Filter Drain Valve 2 Train 4	30PED40AA406	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Train 4	30PED40AA006	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Motor Actuator Train 4	30PED40AA006	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 10 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 4	-	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Sample Connection Valve Train 4	-	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Pump Room Air Handling Unit (AHU) Train 4	-	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Pump Room AHU Fan Motor Train 4	-	30UPF02008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Air Cooled Condenser (ACC) Train 4	-	30UPF03008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building ACC Fan Motor Train 4	-	30UPF03008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building ACC Compressor Motor Train 4	-	30UPF03008	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building Safety Related Dampers Train 4	-	-	M	M	ES	SI	S	C/NM	Y(5)
Pump Room AHU ΔP Measurement Across Filter Instrument Train 4	-	-	M	M	ES	SI	S		Y(5)
Low Side Root Valve for ΔP Measurement Across AHU Filter Train 4	-	-	M	M	ES	SI	S	C/NM	Y(5)
High Side Root Valve for ΔP Measurement Across AHU Filter Train 4	-	-	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Building AHU Supply Side Flow Measurement Instrument Train 4	-	-	M	M	ES	SI	S		Y(5)
UHS Makeup Water Building Temperature Measurement Instruments (All) Train 4	-	-	M	M	ES	SI	S		Y(5)
UHS Makeup Water Building Safety Related Tornado Dampers Train 4	-	-	M	M	ES	SI	S	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Train 4	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Isolation Valve Actuator Train 4	-	M	M	?	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Wash Pump Screen Wash Alternate Supply Valve Train 4	-	M	M	?	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Traveling Screen Train 4	-	-	M	M	-	(See Note 6)	NS-AQ	C/NM	Y(5)
UHS Makeup Water Intake Structure Level Measurement (All) Train 4	-	-	M	M	ES	SI	S		Y(5)

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)	EQ Program Designation (Note 5)
~~Ultimate Heat Sink (UHS) Makeup (m/u) System~~								
~~UHS m/u pp disch isol train 1~~	~~30PED10AA001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS pp min flow vlv train 1~~	~~30PED10AA002~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS pp test isol train 1~~	~~30PED10AA005~~	~~30UZT~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS pp air rel vlv train 1~~	~~30PED10AA190~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch chk vlv train 1~~	~~30PED10AA201~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch press train 1~~	~~30PED10AA303~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED10CP002 low side isol~~	~~30PED10AA304~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED10CP002 hi side isol~~	~~30PED10AA305~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u low pt drain vlv train 1~~	~~30PED10AA404~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED10CP003 hi side test vlv~~	~~30PED10AA443~~	~~30UZT~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED10CP003 low side test vlv~~	~~30PED10AA444~~	~~30UZT~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u high pt vent vlv train 1~~	~~30PED10AA511~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp train 1~~	~~30PED10AP001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch strnr train 1~~	~~30PED10AT001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u supp isol, train 1~~	~~30PED11AA001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u ret isol, train 1~~	~~30PED11AA002~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u side vac bkr train 1~~	~~30PED11AA191~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ diff press hi side isol, train 1~~	~~30PED11AA301~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ diff press lo side isol train 1~~	~~30PED11AA302~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u side lo pt drn vlv, train 1~~	~~30PED11AA400~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u disch Flow rate Instrument~~	~~30PED10CF003~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u Test Flow rate Instrument~~	~~30PED10CF004~~	~~30UZT~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u Intake Structure Level Inst.~~	~~30PED10CL001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u strainer debris removal Valve~~	~~30PED10AA006~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30 PED11 AC001 Fan~~	~~30PED11AN001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED11AH002A~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED11AH002B~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED11AH002C~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED11AH002D~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Debris Filter Drain Valve 1~~	~~30PED10 AA405~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 12 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)	EQ Program Designation (Note 5)
~~Debris Filter Drain Valve 2~~	~~30PED10 AA406~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Debris Filter Air Release Valve~~	~~30PED10AA190~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch isol train 2~~	~~30PED20AA001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp min flow vlv train 2~~	~~30PED20AA002~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp test isol train 2~~	~~30PED20AA005~~	~~30UZT~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp air rel vlv train 2~~	~~30PED20AA190~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch chk vlv train 2~~	~~30PED20AA201~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch press train 2~~	~~30PED20AA303~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED20CP002 low side isol~~	~~30PED20AA304~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED20CP002 hi side isol~~	~~30PED20AA305~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u low pt drain vlv train 2~~	~~30PED20AA404~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED20CP003 hi side test vlv~~	~~30PED20AA443~~	~~30UZT~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED20CP003 low side test vlv~~	~~30PED20AA444~~	~~30UZT~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u high pt vent vlv train 2~~	~~30PED20AA511~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp train 2~~	~~30PED20AP001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch strnr train 2~~	~~30PED20AT001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u supp isol, train 2~~	~~30PED21AA001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u ret isol, train 2~~	~~30PED21AA002~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u side vac bkr train 2~~	~~30PED21AA191~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ diff press hi side isol, train 2~~	~~30PED21AA301~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ diff press lo side isol train 2~~	~~30PED21AA302~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u side lo pt drn vlv, train 2~~	~~30PED21AA400~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u disch Flow rate Instrument~~	~~30PED20CF003~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u Test Flow rate Instrument~~	~~30PED20CF004~~	~~30UZT~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u Intake Structure Level Inst.~~	~~30PED20CL001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u strainer debris removal Valve~~	~~30PED20AA006~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30 PED21 AC001 Fan~~	~~30PED21AN001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED21AH002A~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED21AH002B~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED21AH002C~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED21AH002D~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 13 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)	Safety Class (Note 4)	EQ Program Designation (Note 5)
~~Debris Filter Drain Valve 1~~	~~30PED20 AA405~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~Debris Filter Drain Valve 2~~	~~30PED20 AA406~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~Debris Filter Air Release Valve~~	~~30PED20AA190~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch isol train 3~~	~~30PED30AA001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp min flow vlv train 3~~	~~30PED30AA002~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp test isol train 3~~	~~30PED30AA005~~	~~30UZT~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp air rel vlv train 3~~	~~30PED30AA190~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch chk vlv train 3~~	~~30PED30AA201~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch press train 3~~	~~30PED30AA303~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~30PED30CP002 low side isol~~	~~30PED30AA304~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~30PED30CP002 hi side isol~~	~~30PED30AA305~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u low pt drain vlv train 3~~	~~30PED30AA404~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~30PED30CP003 hi side test vlv~~	~~30PED30AA443~~	~~30UZT~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~30PED30CP003 low side test vlv~~	~~30PED30AA444~~	~~30UZT~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u high pt vent vlv train 3~~	~~30PED30AA511~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp train 3~~	~~30PED30AP001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch strnr train 3~~	~~30PED30AT001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u supp isol, train 3~~	~~30PED31AA001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u ret isol, train 3~~	~~30PED31AA002~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u side vac bkr train 3~~	~~30PED31AA191~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~SAQ diff press hi side isol, train 3~~	~~30PED31AA301~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~SAQ diff press lo side isol train 3~~	~~30PED31AA302~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u side lo pt drn vlv, train 3~~	~~30PED31AA400~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u disch Flow rate Instrument~~	~~30PED30CF003~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u Test Flow rate Instrument~~	~~30PED30CF004~~	~~30UZT~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u Intake Structure Level Inst.~~	~~30PED30CL001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~UHS m/u strainer debris removal Valve~~	~~30PED30AA006~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~30 PED31 AC001 Fan~~	~~30PED31AN001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED31AH002A~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED31AH002B~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED31AH002C~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES SI~~	~~S~~	~~Y (5)~~

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 14 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)	EQ Program Designation (Note 5)
~~Electric Heater~~	~~30PED31AH002D~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Debris Filter Drain Valve 1~~	~~30PED30 AA405~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Debris Filter Drain Valve 2~~	~~30PED30 AA406~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Debris Filter Air Release Valve~~	~~30PED30AA190~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch isol train 4~~	~~30PED40AA001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp min flow vlv train 4~~	~~30PED40AA002~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp test isol train 4~~	~~30PED40AA005~~	~~30UZT~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp air rel vlv train 4~~	~~30PED40AA190~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch chk vlv train 4~~	~~30PED40AA201~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch press train 4~~	~~30PED40AA303~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED40CP002 low side isol~~	~~30PED40AA304~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED40CP002 hi side isol~~	~~30PED40AA305~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u low pt drain vlv train 4~~	~~30PED40AA404~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED40CP003 hi side test vlv~~	~~30PED40AA443~~	~~30UZT~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED40CP003 low side test vlv~~	~~30PED40AA444~~	~~30UZT~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u high pt vent vlv train 4~~	~~30PED40AA511~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp train 4~~	~~30PED40AP001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch strnr train 4~~	~~30PED40AT001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u supp isol, train 4~~	~~30PED41AA001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u ret isol, train 4~~	~~30PED41AA002~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u side vac bkr train 4~~	~~30PED41AA191~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ diff press hi side isol, train 4~~	~~30PED41AA301~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ diff press lo side isol train 4~~	~~30PED41AA302~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u side lo pt drn vlv, train 4~~	~~30PED41AA400~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u disch Flow rate Instrument~~	~~30PED40CF003~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u Test Flow rate Instrument~~	~~30PED40CF004~~	~~30UZT~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u Intake Structure Level Inst.~~	~~30PED40CL001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u strainer debris removal Valve~~	~~30PED40AA006~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30 PED41 AC001 Fan~~	~~30PED41AN001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED41AH002A~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED41AH002B~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 15 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)	EQ Program Designation (Note 5)
~~Electric Heater~~	~~30PED41AH002C~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Electric Heater~~	~~30PED41AH002D~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Debris Filter Drain Valve 1~~	~~30PED40 AA405~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Debris Filter Drain Valve 2~~	~~30PED40 AA406~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~Debris Filter Air Release Valve~~	~~30PED40AA190~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED10AA001 valve motor actuator~~	~~30PED10AA001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED10AA002 valve motor actuator~~	~~30PED10AA002~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED10AA005 valve motor actuator~~	~~30PED10AA005~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED10AA006 valve motor actuator~~	~~30PED10AA006~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp motor heater, train 1~~	~~30PED10AH001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp motor, train 1~~	~~30PED10AP001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch strnr actuator, train1~~	~~30PED10AT001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp test flow, train 1~~	~~30PED10CF002~~	~~30UZT~~	~~M~~	~~M~~		~~SII~~	~~NS-AQ~~	~~Y (5)~~
~~UHS m/u pp disch press, train 1~~	~~30PED10CP001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u strnr diff press, train 1~~	~~30PED10CP002~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch temp, train 1~~	~~30PED10CT001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u diff press inst, train 1~~	~~30PED11CP501~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED11 AC001 Fan motor~~	~~30PED11AN001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED20AA001 valve motor actuator~~	~~30PED20AA001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED20AA002 valve motor actuator~~	~~30PED20AA002~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED20AA005 valve motor actuator~~	~~30PED20AA005~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp motor heater, train 2~~	~~30PED20AH001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp motor, train 2~~	~~30PED20AP001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch strnr actuator, train2~~	~~30PED20AT001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED20AA006 valve motor actuator~~	~~30PED20AA006~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp test flow, train 2~~	~~30PED20CF002~~	~~30UZT~~	~~M~~	~~M~~		~~SII~~	~~NS-AQ~~	~~Y (5)~~
~~UHS m/u pp disch press, train 2~~	~~30PED20CP001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u strnr diff press, train 2~~	~~30PED20CP002~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch temp, train 2~~	~~30PED20CT001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED21 AC001 Fan motor~~	~~30PED21AN001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u diff press inst, train 2~~	~~30PED21CP501~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 16 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)	EQ Program Designation (Note 5)
~~30PED30AA001 valve motor actuator~~	~~30PED30AA001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED30AA002 valve motor actuator~~	~~30PED30AA002~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED30AA005 valve motor actuator~~	~~30PED30AA005~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED30AA006 valve motor actuator~~	~~30PED30AA006~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp motor heater, train 3~~	~~30PED30AH001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp motor, train 3~~	~~30PED30AP001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch strnr actuator, train3~~	~~30PED30AT001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp test flow, train 3~~	~~30PED30CF002~~	~~30UZT~~	~~M~~	~~M~~		~~SII~~	~~NS-AQ~~	~~Y (5)~~
~~UHS m/u pp disch press, train 3~~	~~30PED30CP001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u strnr diff press, train 3~~	~~30PED30CP002~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch temp, train 3~~	~~30PED30CT001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED31 AC001 Fan motor~~	~~30PED31AN001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u diff press inst, train 3~~	~~30PED31CP501~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED40AA001 valve motor actuator~~	~~30PED40AA001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED40AA002 valve motor actuator~~	~~30PED40AA002~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED40AA005 valve motor actuator~~	~~30PED40AA005~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED40AA006 valve motor actuator~~	~~30PED40AA006~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp motor heater, train 4~~	~~30PED40AH001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp motor, train 4~~	~~30PED40AP001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch strnr actuator, train4~~	~~30PED40AT001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp test flow, train 4~~	~~30PED40CF002~~	~~30UZT~~	~~M~~	~~M~~		~~SII~~	~~NS-AQ~~	~~Y (5)~~
~~UHS m/u pp disch press, train 4~~	~~30PED40CP001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u strnr diff press, train 4~~	~~30PED40CP002~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~UHS m/u pp disch temp, train 4~~	~~30PED40CT001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~30PED41 AC001 Fan motor~~	~~30PED41AN001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
~~SAQ UHS m/u diff press inst, train 4~~	~~30PED41CP501~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~Y (5)~~
Fire Protection System								
Fire Protection Diesel Engine(s)/Diesel Engine Pump(s)		30USG	M	M		SII-SSE	NS-AQ	Y (5)
Fire Protection Diesel Engine(s)/Pump(s) Instrument(s)		30USG	M	M		SII-SSE	NS-AQ	Y (5)
Fire Protection Diesel Engine(s)/Pump(s) Valve(s)		30USG	M	M		SII-SSE	NS-AQ	Y (5)
Fire Protection System Isolation Valve(s)		30USG	M	M		SII-SSE	NS-AQ	Y (5)

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 17 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)
Fire Protection System Check Valve(s)		30USG	M	M		SII-SSE	NS-AQ		Y (5)
Fire Protection System Pressure Relief Valve(s)		30USG	M	M		SII-SSE	NS-AQ		Y (5)
Fire Protection Water Storage Tanks Isolation Valve(s)			M	M		SII-SSE	NS-AQ		Y (5)
Fire Protection System Post Indicator Valve(s)		30UZT	M	M		SII-SSE	NS-AQ		Y (5)
Fire Protection System Hydrant Isolation Valve(s)		30UZT	M	M		SII-SSE	NS-AQ		Y (5)
Hydrants Supplying Protection to SSE Buildings		30UZT	M	M		SII-SSE	NS-AQ		Y (5)
UHS Makeup Water Intake Structure Hose Station(s)		30UPF	M	M		SII-SSE	NS-AQ		Y (5)
Fans/Motors		30USG	M	M		SII-SSE	NS-AQ		Y (5)
Electric Heaters		30USG	M	M		SII-SSE	NS-AQ		Y (5)
Ductwork		30USG	M	M		SII-SSE	NS-AQ		Y (5)
Damper Motors		30USG	M	M		SII-SSE	NS-AQ		Y (5)
Class 1E Emergency Power Supply (EPSS)									
31BMT05 6.9 kV to 480 V (XFMR)	31BMT05GT0		M	M	ES	SI	S		Y (5)
32BMT05 6.9 kV to 480 V (XFMR)	32BMT05GT0		M	M	ES	SI	S		Y (5)
33BMT05 6.9 kV to 480 V (XFMR)	33BMT05GT0		M	M	ES	SI	S		Y (5)
34BMT05 6.9 kV to 480 V (XFMR)	34BMT05GT0		M	M	ES	SI	S		Y (5)
31BNG 1E 480 V Bus (MCC)	31BNG01GW0		M	M	ES	SI	S		Y (5)
32BNG 1E 480 V Bus (MCC)	32BNG01GW0		M	M	ES	SI	S		Y (5)
33BNG 1E 480 V Bus (MCC)	33BNG01GW0		M	M	ES	SI	S		Y (5)
34BNG 1E 480 V Bus (MCC)	34BNG01GW0		M	M	ES	SI	S		Y (5)
Essential Service Water System (ESWS)									
UHS Tower Basin Level Indicator	30PEB10CL001	31URB01003	M	M	ES PAM	SI	S 1E	EMC	Y (5) Y (6)
UHS Tower Basin Level Indicator	30PEB20CL001	32URB01003	M	M	ES PAM	SI	S 1E	EMC	Y (5) Y (6)
UHS Tower Basin Level Indicator	30PEB30CL001	33URB01003	M	M	ES PAM	SI	S 1E	EMC	Y (5) Y (6)
UHS Tower Basin Level Indicator	30PEB40CL001	34URB01003	M	M	ES PAM	SI	S 1E	EMC	Y (5) Y (6)

Table 3.10-1—{Seismic and Dynamic Qualifications of Mechanical and Electrical Equipment}

(Page 18 of 18)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)	Safety Class (Note 4)	EQ Program Designation (Note 5)

Notes:

1. EQ Environment (M= Mild, H= Harsh)
2. Radiation Environment Zone (M= Mild, H= Harsh)
3. RT (Reactor Trip), ES (Engineered Safeguards), PAM (Postaccident Monitoring), SI (Seismic I), SII (Seismic II), SII-SSE (Seismic II- Fire Protection System piping, valves, and equipment supplying fire suppression water to systems required for safe shutdown are required to operate following a Safe Shutdown Earthquake (SSE))
4. Safety Class: S (Safety-Related (i.e., QA Level I)), NS-AQ (Supplemental Grade Non-Safety (i.e., QA Level II)), 1E (Class 1E), EMC (Electromagnetic Compatibility), C/NM (Consumables/ Non Metalics)
5. Yes (1) = Full EQ Electrical, Yes (2) = EQ Radiation Harsh-Electrical, Yes (3) = EQ Radiation Harsh-Consumables, Yes (4) = EQ for Consumables, Yes (5) = EQ Seismic, Yes (6) = EQ EMC.
6. The UHS Makeup dual flow traveling screens are designed to withstand design basis seismic loads without a loss of their mechanical function and are designed to permit manual operator rotation and cleaning of the screen panels.

Table 3.11-1—{Site-Specific Environmentally Qualified Electrical/I&C Equipment}

(Page 1 of 11)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)			EQ Program Designation (Note 5)	
UHS Makeup Water System											
UHS Makeup Water Pump Motor Train 1	30PED10AP001	30UPF02001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Pressure Instrument Train 1	30PED10CP001	30UPF02001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Flow Element/Instrument Train 1	30PED10CF003	30UPF02001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Minimum Flow Valve Motor Actuator Train 1	30PED10AA002	30UPF02001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Pump Discharge Isolation Valve Motor Actuator Train 1	30PED10AA001	30UPF02001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Initial Fill Isolation Valve Motor Actuator Train 1		30UPF02001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Strainer ΔP Measurement Instrument Train 1	30PED10CP002	30UPF02001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Strainer Motor Actuator Train 1	30PED10AT001	30UPF02001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Motor Actuator Train 1	30PED10AA006	30UPF02001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building Pump Room Air Handling Unit (AHU) Train 1		30UPF02001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building Pump Room AHU Fan Motor Train 1		30UPF02001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)

Table 3.11-1—{Site-Specific Environmentally Qualified Electrical/I&C Equipment}

(Page 2 of 11)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)			EQ Program Designation (Note 5)	
UHS Makeup Water Building ACC Fan Motor Train 1		30UPF03001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building ACC Compressor Motor Train 1		30UPF03001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
Pump Room AHU ΔP Measurement Across Filter Instrument Train 1			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building AHU Supply Side Flow Measurement Instrument Train 1			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building Temperature Measurement Instruments (All) Train 1			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Intake Structure Level Measurement (All) Train 1			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Motor Train 2	30PED20AP001	30UPF02004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Pressure Instrument Train 2	30PED20CP001	30UPF02004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Flow Element/Instrument Train 2	30PED20CF003	30UPF02004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Minimum Flow Valve Motor Actuator Train 2	30PED20AA002	30UPF02004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Pump Discharge Isolation Valve Motor Actuator Train 2	30PED20AA001	30UPF02004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Initial Fill Isolation Valve Motor Actuator Train 2		30UPF02004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)

Table 3.11-1—{Site-Specific Environmentally Qualified Electrical/I&C Equipment}

(Page 3 of 11)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)			EQ Program Designation (Note 5)	
UHS Makeup Water Pump Discharge Strainer ΔP Measurement Instrument Train 2	30PED20CP002	30UPF02004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Strainer Motor Actuator Train 2	30PED20AT001	30UPF02004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Motor Actuator Train 2	30PED20AA006	30UPF02004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building Pump Room Air Handling Unit (AHU) Train 2		30UPF02004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building Pump Room AHU Fan Motor Train 2		30UPF02004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building ACC Fan Motor Train 2		30UPF03004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building ACC Compressor Motor Train 2		30UPF03004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
Pump Room AHU ΔP Measurement Across Filter Instrument Train 2			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building AHU Supply Side Flow Measurement Instrument Train 2			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building Temperature Measurement Instruments (All) Train 2			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Intake Structure Level Measurement (All) Train 2			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Motor Train 3	30PED30AP001	30UPF02006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)

Table 3.11-1—{Site-Specific Environmentally Qualified Electrical/I&C Equipment}

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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)			EQ Program Designation (Note 5)	
UHS Makeup Water Pump Discharge Pressure Instrument Train 3	30PED30CP001	30UPF02006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Flow Element/Instrument Train 3	30PED30CF003	30UPF02006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Minimum Flow Valve Motor Actuator Train 3	30PED30AA002	30UPF02006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Pump Discharge Isolation Valve Motor Actuator Train 3	30PED30AA001	30UPF02006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Initial Fill Isolation Valve Motor Actuator Train 3		30UPF02006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Strainer ΔP Measurement Instrument Train 3	30PED30CP002	30UPF02006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Strainer Motor Actuator Train 3	30PED30AT001	30UPF02006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Motor Actuator Train 3	30PED30AA006	30UPF02006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building Pump Room Air Handling Unit (AHU) Train 3		30UPF02006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building Pump Room AHU Fan Motor Train 3		30UPF02006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building ACC Fan Motor Train 3		30UPF03006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building ACC Compressor Motor Train 3		30UPF03006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)

Table 3.11-1—{Site-Specific Environmentally Qualified Electrical/I&C Equipment}

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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)			EQ Program Designation (Note 5)	
Pump Room AHU ΔP Measurement Across Filter Instrument Train 3			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building AHU Supply Side Flow Measurement Instrument Train 3			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building Temperature Measurement Instruments (All) Train 3			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Intake Structure Level Measurement (All) Train 3			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Motor Train 4	30PED40AP001	30UPF02008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Pressure Instrument Train 4	30PED40CP001	30UPF02008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Flow Element/Instrument Train 4	30PED40CF003	30UPF02008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Minimum Flow Valve Motor Actuator Train 4	30PED40AA002	30UPF02008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Pump Discharge Isolation Valve Motor Actuator Train 4	30PED40AA001	30UPF02008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Initial Fill Isolation Valve Motor Actuator Train 4		30UPF02008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Strainer ΔP Measurement Instrument Train 4	30PED40CP002	30UPF02008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)

Table 3.11-1—{Site-Specific Environmentally Qualified Electrical/I&C Equipment}

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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)			EQ Program Designation (Note 5)	
UHS Makeup Water Pump Discharge Strainer Motor Actuator Train 4	30PED40AT001	30UPF02008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Motor Actuator Train 4	30PED40AA006	30UPF02008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building Pump Room Air Handling Unit (AHU) Train 4		30UPF02008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building Pump Room AHU Fan Motor Train 4		30UPF02008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building ACC Fan Motor Train 4		30UPF03008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building ACC Compressor Motor Train 4		30UPF03008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building Pump Room AHU ΔP Across Filter Measurement Instrument Train 4			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building AHU Supply Side Flow Measurement Instrument Train 4			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Building Temperature Measurement Instruments (All) Train 4			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
UHS Makeup Water Intake Structure Level Measurement (All) Train 4			M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
~~**UHS Makeup Water System**~~											
~~30PED10AA001 valve motor actuator~~	~~30PED10AA001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED10AA002 valve motor actuator~~	~~30PED10AA002~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED10AA005 valve motor actuator~~	~~30PED10AA005~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~

Table 3.11-1—{Site-Specific Environmentally Qualified Electrical/I&C Equipment}

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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)			EQ Program Designation (Note 5)	
~~30PED10AA006 valve motor actuator~~	~~30PED10AA006~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp motor heater, train 1~~	~~30PED10AH001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~		~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp motor, train 1~~	~~30PED10AP001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp disch strnr actuator, train1~~	~~30PED10AT001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp test flow, train 1~~	~~30PED10CF002~~	~~30UZT~~	~~M~~	~~M~~		~~SII~~	~~NS-AQ~~	-	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp disch press, train 1~~	~~30PED10CP001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup strnr diff press, train 1~~	~~30PED10CP002~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup m/u pp disch temp, train 1~~	~~30PED10CT001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~SAQ UHS makeup diff press inst, train 1~~	~~30PED11CP501~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED11 AC001 Fan motor~~	~~30PED11AN001~~	~~30UPF01001~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED20AA001 valve motor actuator~~	~~30PED20AA001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED20AA002 valve motor actuator~~	~~30PED20AA002~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED20AA005 valve motor actuator~~	~~30PED20AA005~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp motor heater, train 2~~	~~30PED20AH001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~		~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp motor, train 2~~	~~30PED20AP001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp disch strnr actuator, train2~~	~~30PED20AT001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED20AA006 valve motor actuator~~	~~30PED20AA006~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp test flow, train 2~~	~~30PED20CF002~~	~~30UZT~~	~~M~~	~~M~~		~~SII~~	~~NS-AQ~~	-	~~EMC~~	~~Y(5)~~	~~Y(6)~~

Table 3.11-1—{Site-Specific Environmentally Qualified Electrical/I&C Equipment}

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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)			EQ Program Designation (Note 5)	
~~UHS makeup /u pp disch press, train 2~~	~~30PED20CP001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup strnr diff press, train 2~~	~~30PED20CP002~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp disch temp, train 2~~	~~30PED20CT001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED21 AC001 Fan motor~~	~~30PED21AN001~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~SAQ UHS makeup diff press inst, train 2~~	~~30PED21CP501~~	~~30UPF01002~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED30AA001 valve motor actuator~~	~~30PED30AA001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED30AA002 valve motor actuator~~	~~30PED30AA002~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED30AA005 valve motor actuator~~	~~30PED30AA005~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED30AA006 valve motor actuator~~	~~30PED30AA006~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp motor heater, train 3~~	~~30PED30AH001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~		~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp motor, train 3~~	~~30PED30AP001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp disch strnr actuator, train3~~	~~30PED30AT001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp test flow, train 3~~	~~30PED30CF002~~	~~30UZT~~	~~M~~	~~M~~		~~SII~~	~~NS-AQ~~	-	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp disch press, train 3~~	~~30PED30CP001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup strnr diff press, train 3~~	~~30PED30CP002~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup/u pp disch temp, train 3~~	~~30PED30CT001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED31 AC001 Fan motor~~	~~30PED31AN001~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~SAQ UHS makeup diff press inst, train 3~~	~~30PED31CP501~~	~~30UPF01003~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~

Table 3.11-1—{Site-Specific Environmentally Qualified Electrical/I&C Equipment}

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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)			EQ Program Designation (Note 5)	
~~30PED40AA001 valve motor actuator~~	~~30PED40AA001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED40AA002 valve motor actuator~~	~~30PED40AA002~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED40AA005 valve motor actuator~~	~~30PED40AA005~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED40AA006 valve motor actuator~~	~~30PED40AA006~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp motor heater, train 4~~	~~30PED40AH001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~		~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp motor, train 4~~	~~30PED40AP001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp disch strnr actuator, train4~~	~~30PED40AT001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp test flow, train 4~~	~~30PED40CF002~~	~~30UZT~~	~~M~~	~~M~~	~~-~~	~~SII~~	~~NS-AQ~~	~~-~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp disch press, train 4~~	~~30PED40CP001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup strnr diff press, train 4~~	~~30PED40CP002~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~UHS makeup /u pp disch temp, train 4~~	~~30PED40CT001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~30PED41 AC001 Fan motor~~	~~30PED41AN001~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
~~SAQ UHS makeup diff press inst, train 4~~	~~30PED41CP501~~	~~30UPF01004~~	~~M~~	~~M~~	~~ES~~	~~SI~~	~~S~~	~~1E~~	~~EMC~~	~~Y(5)~~	~~Y(6)~~
Fire Protection System											
Fire Protection Diesel Engine(s)/Diesel Engine Pump(s)		30USG	M	M		SII-SSE	NS-AQ		EMC	Y(5)	Y(6)
Fire Protection Diesel Engine Batteries		30USG	M	M		SII-SSE	NS-AQ		EMC	Y(5)	Y(6)
Fire Protection Diesel Engine(s)/Pump(s) Instrument(s) (local)		30USG	M	M		SII-SSE	NS-AQ		EMC	Y(5)	Y(6)

Table 3.11-1—{Site-Specific Environmentally Qualified Electrical/I&C Equipment}

(Page 10 of 11)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)			EQ Program Designation (Note 5)	
Fire Protection Diesel Engine(s)/Pump(s) Valve(s)		30USG	M	M		SII-SSE	NS-AQ		EMC	Y(5)	Y(6)
Fire Protection System Isolation Valve(s)		30USG	M	M		SII-SSE	NS-AQ		EMC**	Y(5)	Y(6)
Fire Protection Water Storage Tanks Isolation Valve(s)			M	M		SII-SSE	NS-AQ		EMC**	Y(5)	Y(6)
Fire Protection System Post Indicator Valve(s)		30UZT	M	M		SII-SSE	NS-AQ		EMC**	Y(5)	Y(6)
Fire Protection System Hydrant Isolation Valve(s)		30UZT	M	M		SII-SSE	NS-AQ		EMC**	Y(5)	Y(6)
Fans/Motors		30USG	M	M		SII-SSE	NS-AQ			Y (5)	Y (6)
Class 1E Emergency Power Supply (EPSS)											
31BMT05 6.9 kV to 480 V (XFMR)	31BMT05GT0	~~30UPF~~30UPF03002	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
32BMT05 6.9 kV to 480 V (XFMR)	32BMT05GT0	~~30UPF~~30UPF03005	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
33BMT05 6.9 kV to 480 V (XFMR)	33BMT05GT0	~~30UPF~~30UPF03007	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
34BMT05 6.9 kV to 480 V (XFMR)	34BMT05GT0	~~30UPF~~30UPF03009	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
31BNG 1E 480 V Bus (MCC)	31BNG01GW0	~~30UPF~~30UPF2001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
32BNG 1E 480 V Bus (MCC)	32BNG01GW0	~~30UPF~~30UPF2004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
33BNG 1E 480 V Bus (MCC)	33BNG01GW0	~~30UPF~~30UPF2006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
34BNG 1E 480 V Bus (MCC)	34BNG01GW0	~~30UPF~~30UPF2008	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
Site Specific Safety Related Electrical Power Cable Types											
Medium Voltage Power Cable	various	multiple	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
Low Voltage Power Cable	various	multiple	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
Low Voltage Control Cable (600V)	various	multiple	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
Shielded Instrumentation Cable (600V)	various	multiple	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
Thermocouple Extension Cable	various	multiple	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
Fiber Optic Communication Cable	various	multiple	M	M	ES	SI	S	1E	EMC	Y(5)	
Essential Service Water System (ESWS)											
UHS Tower Basin Level Indicator	30PEB10CL001	31URB01003	M	M	ES	PAM SI	S	1E	EMC	Y(5)	Y(6)
UHS Tower Basin Level Indicator	30PEB20CL001	32URB01003	M	M	ES	PAM SI	S	1E	EMC	Y(5)	Y(6)

Table 3.11-1—{Site-Specific Environmentally Qualified Electrical/I&C Equipment}

(Page 11 of 11)

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)			EQ Program Designation (Note 5)	
UHS Tower Basin Level Indicator	30PEB30CL001	33URB01003	M	M	ES	PAM SI	S	1E	EMC	Y(5)	Y(6)
UHS Tower Basin Level Indicator	30PEB40CL001	34URB01003	M	M	ES	PAM SI	S	1E	EMC	Y(5)	Y(6)

Notes:

1. EQ Environment: M (Mild), H (Harsh)

2. Radiation Environment Zone: M (Mild), H (Harsh)

3. EQ Designated Function: RT (Reactor Trip), ES (Engineered Safeguards), PAM (Postaccident Monitoring), SI (Seismic I), SII (Seismic II), SII-SSE (Seismic II - Fire Protection System piping, valves, and equipment supplying fire suppression water to systems required for safe shutdown are required to operate following a Safe Shutdown Earthquake (SSE).

4. Safety Class: S (Safety-Related (i.e., QA Level I)), NS-AQ (Supplemental Grade Non-Safety (i.e., QA Level II)), 1E (Class 1E), EMC (Electromagnetic Compatibility), C/NM (Consumables/Non Metallics).

5. Yes(1)=Full EQ Electrical, Yes(2)=EQ Radiation Harsh-Electrical, Yes(3)=EQ Radiation Harsh-Consumables, Yes(4)=EQ for Consumables, Yes(5)=EQ Seismic, Yes(6)=EQ EMC.

** Fire Protection System isolation valves are equipped with tamper switches, hence identified for EMC.

3.12.5 PIPING STRESS ANALYSIS CRITERIA

3.12.5.1 Seismic Input Envelope versus Site-Specific Spectra

{The site-specific seismic response is within the parameters of U.S. EPR FSAR Section 3.7.2 as discussed in Section 3.7.2. The In-Structure Response Spectra (ISRS) is generated from the soil cases defined in the U.S. EPR FSAR Section 3.7.1 and is used for pipe stress and support analysis on systems within the scope of the U.S. EPR FSAR certified design for Category I structures. Site-specific ISRS defined in FSAR Section 3.7.2.5 for the UHS MWIS~~ and UHS EB~~ is used for the pipe stress and support analysis of site-specific systems within ~~these structures~~the structure. These site-specific ISRS are based on foundation input response spectra for site-specific structures discussed in Section 3.7.1.1.1.}

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Enclosure 6

Markup pages of FSAR Chapter 8.0

Calvert Cliffs Nuclear Power Plant, Unit 3

Table 8.1-1— {Division 1 Emergency Diesel Generator Nominal Loads}

Time Sequence (sec)	Load Description	Volts	Rating (hp/kW)	Operating Load LOOP (kW)	Operating Load DBA/LOOP (kW)
Load Step Group 1 (Note 1)					
15 (Note 2)	~~Cooling Fans for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 5 hp each)~~Air Handling Unit Fan for UHS Makeup Water Intake Structure	480	~~10~~5 hp	~~8.3~~4.1	~~8.3~~ 4.1
15 (Note 2)	~~Heating Fans for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 5 hp each)~~Air-cooled Condenser for UHS Makeup Water Intake Structure	480	10 ~~hp~~kW	0	0
15 (Note 3)	~~Sump Pumps for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 10 hp each)~~	~~480~~	~~20 hp~~	~~0~~	~~0~~
15 (Note 2)	~~Unit Heaters for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 5 kW each)~~Air Handling Unit Electrical Coils for UHS Makeup Water Intake Structure	480	~~10~~39 kW	0	0
15 (Note 3)	UHS Makeup Water Isolation MOV	480	2 hp	0	0
15 (Note 3)	UHS Makeup Water Mini Flow Bypass MOV	480	2 hp	0	0
15 (Note 3)	UHS Makeup Water Strainer MOVs (2 MOVs, 2 hp each)	480	4 hp	0	0
15 (Note 4)	Estimated Cable Losses		2 kW	2	2
15 (Note 4)	UHS Makeup Water System Transformer Losses and MCC equipment losses		7 kW	7	7
15	Allowance for future small loads		5 kW	5	5
Subtotal of Additional Loads for Load Step Group 1				~~22.3~~18.1	~~22.3~~18.1
Additional Manually Connected Loads					
N/A (Note 5)	UHS Makeup Water Pumps 30PED10AP001	480	50 hp	0	0
N/A	UHS Makeup Water Traveling Screen Motor	480	10 hp	0	0
N/A	UHS Makeup Water Traveling Screen Wash Pump Motor	480	10 hp	0	0
Total of Additional Manually Connected Loads				**0**	**0**

Notes:

1. Power to the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ is available from the 31BDD buses during the EDG Loading Sequence Step 1.

2. Cooling systems are assumed to be operating and heating systems are off.

3. Loads seldom function and are not credited towards EDG loading.

4. Estimated Losses.

5. UHS Makeup Water Pumps are not required to run during the first 72 hours of a DBE.

Table 8.1-2— {Division 2 Emergency Diesel Generator Nominal Loads}

Time Sequence (sec)	Load Description	Volts	Rating (hp/kW)	Operating Load LOOP (kW))	Operating Load DBA/LOOP (kW)
Load Step Group 1 (Note 1)					
15 (Note 2)	~~Cooling Fans for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 5 hp each)~~Air Handling Unit Fan for UHS Makeup Water Intake Structure	480	~~10~~5 hp	~~8.3~~4.1	~~8.3~~ 4.1
15 (Note 2)	~~Heating Fans for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 5 hp each)~~Air-cooled Condenser for UHS Makeup Water Intake Structure	480	10 ~~hp~~kW	0	0
15 (Note 3)	~~Sump Pumps for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 10 hp each)~~	~~480~~	~~20 hp~~	~~0~~	~~0~~
15 (Note 2)	~~Unit Heaters for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 5 kW each)~~Air Handling Unit Electrical Coils for UHS Makeup Water Intake Structure	480	~~10~~39 kW	0	0
15 (Note 3)	UHS Makeup Water Isolation MOV	480	2 hp	0	0
15 (Note 3)	UHS Makeup Water Mini Flow Bypass MOV	480	2 hp	0	0
15 (Note 3)	UHS Makeup Water Strainer MOVs (2 MOVs, 2 hp each)	480	4 hp	0	0
15 (Note 4)	Estimated Cable Losses		2 kW	2	2
15 (Note 4)	UHS Makeup Water System Transformer Losses and MCC equipment losses		7 kW	7	7
15	Allowance for future small loads		5 kW	5	5
Subtotal of Additional Loads for Load Step Group 1				~~22.3~~18.1	~~22.3~~18.1
Additional Manually Connected Loads					
N/A (Note 5)	UHS Makeup Water Pumps 30PED20AP001	480	50 hp	0	0
N/A	UHS Makeup Water Traveling Screen Motor	480	10 hp	0	0
N/A	UHS Makeup Water Traveling Screen Wash Pump Motor	480	10 hp	0	0
Total of Additional Manually Connected Loads				**0**	**0**

Notes:

1. Power to the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ is available from the 32BDD buses during the EDG Loading Sequence Step 1.

2. Cooling systems are assumed to be operating and heating systems are off.

3. Loads seldom function and are not credited towards EDG loading.

4. Estimated Losses.

5. UHS Makeup Water Pumps are not required to run during the first 72 hours of a DBE.

Table 8.1-3— {Division 3 Emergency Diesel Generator Nominal Loads}

Time Sequence (sec)	Load Description	Volts	Rating (hp/kW)	Operating Load LOOP (kW)	Operating Load DBA/LOOP (kW)
Load Step Group 1 (Note 1)					
15 (Note 2)	~~Cooling Fans for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 5 hp each)~~Air Handling Unit Fan for UHS Makeup Water Intake Structure	480	~~10~~5 hp	~~8.3~~4.1	~~8.3~~ 4.1
15 (Note 2)	~~Heating Fans for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 5 hp each)~~Air-cooled Condenser for UHS Makeup Water Intake Structure	480	10 ~~hp~~kW	0	0
15 (Note 3)	~~Sump Pumps for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 10 hp each)~~	~~480~~	~~20 hp~~	~~0~~	~~0~~
15 (Note 2)	~~Unit Heaters for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 5 kW each)~~Air Handling Unit Electrical Coils for UHS Makeup Water Intake Structure	480	~~10~~39 kW	0	0
15 (Note 3)	UHS Makeup Water Isolation MOV	480	2 hp	0	0
15 (Note 3)	UHS Makeup Water Mini Flow Bypass MOV	480	2 hp	0	0
15 (Note 3)	UHS Makeup Water Strainer MOVs (2 MOVs, 2 hp each)	480	4 hp	0	0
15 (Note 4)	Estimated Cable Losses		2 kW	2	2
15 (Note 4)	UHS Makeup Water System Transformer Losses and MCC equipment losses		7 kW	7	7
15	Allowance for future small loads		5 kW	5	5
Subtotal of Additional Loads for Load Step Group 1				~~22.3~~18.1	~~22.3~~18.1
Additional Manually Connected Loads					
N/A (Note 5)	UHS Makeup Water Pumps 30PED30AP001	480	50 hp	0	0
N/A	UHS Makeup Water Traveling Screen Motor	480	10 hp	0	0
N/A	UHS Makeup Water Traveling Screen Wash Pump Motor	480	10 hp	0	0
Total of Additional Manually Connected Loads				**0**	**0**

Notes:

1. Power to the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ is available from the 33BDD buses during the EDG Loading Sequence Step 1.

2. Cooling systems are assumed to be operating and heating systems are off.

3. Loads seldom function and are not credited towards EDG loading.

4. Estimated Losses.

5. UHS Makeup Water Pumps are not required to run during the first 72 hours of a DBE.

Table 8.1-4— {Division 4 Emergency Diesel Generator Nominal Loads}

Time Sequence (sec)	Load Description	Volts	Rating (hp/kW)	Operating Load LOOP (kW)	Operating Load DBA/LOOP (kW)
Load Step Group 1 (Note 1)					
15 (Note 2)	~~Cooling Fans for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 5 hp each)~~Air Handling Unit Fan for UHS Makeup Water Intake Structure	480	~~10~~5 hp	~~8.3~~4.1	~~8.3~~ 4.1
15 (Note 2)	~~Heating Fans for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 5 hp each)~~Air-cooled Condenser for UHS Makeup Water Intake Structure	480	10 ~~hp~~kW	0	0
15 (Note 3)	~~Sump Pumps for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 10 hp each)~~	~~480~~	~~20 hp~~	~~0~~	~~0~~
15 (Note 2)	~~Unit Heaters for UHS Makeup Water Intake Structure and UHS Electrical Building (1 for mechanical division and 1 for electrical division, 5 kW each)~~Air Handling Unit Electrical Coils for UHS Makeup Water Intake Structure	480	~~10~~39 kW	0	0
15 (Note 3)	UHS Makeup Water Isolation MOV	480	2 hp	0	0
15 (Note 3)	UHS Makeup Water Mini Flow Bypass MOV	480	2 hp	0	0
15 (Note 3)	UHS Makeup Water Strainer MOVs (2 MOVs, 2 hp each)	480	4 hp	0	0
15 (Note 4)	Estimated Cable Losses		2 kW	2	2
15 (Note 4)	UHS Makeup Water System Transformer Losses and MCC equipment losses		7 kW	7	7
15	Allowance for future small loads		5 kW	5	5
Subtotal of Additional Loads for Load Step Group 1				~~22.3~~18.1	~~22.3~~18.1
Additional Manually Connected Loads					
N/A (Note 5)	UHS Makeup Water Pumps 30PED40AP001	480	50 hp		0
N/A	UHS Makeup Water Traveling Screen Motor	480	10 hp	0	0
N/A	UHS Makeup Water Traveling Screen Wash Pump Motor	480	10 hp	0	0
Total of Additional Manually Connected Loads				**0**	**0**

Notes:

1. Power to the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ is available from the 34BDD buses during the EDG Loading Sequence Step 1.

2. Cooling systems are assumed to be operating and heating systems are off.

3. Loads seldom function and are not credited towards EDG loading.

4. Estimated Losses.

5. UHS Makeup Water Pumps are not required to run during the first 72 hours of a DBE.

8.3.1.1.1 Emergency Power Supply System

{There are four divisions of Emergency Power Supply System (EPSS) distribution equipment for the UHS Makeup Water System. The EPSS distribution equipment for the UHS Makeup Water System is located in the Seismic Category I UHS ~~Electrical Building~~Makeup Water Intake Structure. Each division is functionally independent and physically separated from the other divisions.}

The site-specific EPSS distribution switchgear and nominal bus voltages are shown in Table 8.3-2. This information supplements U.S. EPR FSAR Table 8.3-2.

8.3.1.1.2 Normal Power Supply System

{The Normal Power Supply System (NPSS) is shown on Figure 8.3-2 and Figure 8.3-3. Figure 8.3-2 illustrates the NPSS single line drawing as shown in the U.S. EPR FSAR, with the site-specific equipment added or removed as appropriate. Site-specific features identified on Figure 8.3-2 include:

- Power is supplied to switchyard control house MCC from 31BBH and 32BBH.
- Circulating Water Intake Structure loads are supplied from 34BBH.
- Backup power for Desalinization plant and demineralization plant loads.
- Cooling tower wet fans are supplied by site-specific 6.9 kV switchgear 35BBE and 35BBF for Train 5, and 6.9 kV switchgear 36BBE and 36BBF for Train 6. These switchgear replace 480 VAC load centers 35BFB, 35BFC, and 35BFD for Train 5, and 480 VAC load centers 36BFB, 36BFC, and 36BFD for Train 6 listed in U.S. EPR FSAR Table 8.3-3. The changes resulted from increasing the size of the cooling tower wet fans from 300 hp (each) to 350 hp (each).

Figure 8.3-3 shows site-specific transformer 30BBT04 and distribution system, which supplies the normal power from the station switchyard to the desalinization plant, demineralization plant, waste water treatment facility, and Circulating Water System Cooling Tower dry fans (plume abatement). There is also a backup power source for the desalinization plant and demineralization plant loads from NPSS bus 36BBD to site-specific 6.9 kV switchgear 30BBM. A loss of power from 30BBT04 results in the automatic transfer (via dead bus transfer) of 30BBM from the normal power source to the backup power from 36BBD.

The site-specific NPSS equipment shown on Figure 8.3-2 and Figure 8.3-3 is listed in Table 8.3-3.

U.S. EPR Table 8.3-3 lists 480 V AC Load Centers 35BFB, 35BFC, and 35BFD for Train 5 and 480 V AC Load Centers 36BFB, 36BFC, and 36BFD for Train 6. These 480 V AC load centers are also shown on U.S. EPR FSAR 8.3-3. These 480 V AC Load Centers are replaced in the site-specific design with 6.9 kV Switchgear 35BBE and 35BBF for Train 5 and 6.9 kV Switchgear 36BBE and 36BBF for Train 6. This represents a departure from the U.S. EPR FSAR.

<u>The traveling screen motor and the screen wash pump motor are normally powered from the non-Class 1E Normal Power Supply System, with capability to be manually connected to Class 1E emergency diesel generator backed power source.</u>}

8.3.1.1.7 Electrical Equipment Layout

{The electrical distribution system components distribute power to safety-related and non-safety-related site-specific loads located throughout the site.

The EPSS 480 V AC, MCC and distributions transformers for the UHS Makeup Water System are located in the applicable division of the UHS ~~Electrical Building~~Makeup Water Intake Structure pump rooms and transformer rooms. }

8.3.1.1.8 Raceway and Cable Routing

{The EPSS distribution equipment for the UHS Makeup Water System is located in the applicable division of the Seismic Category I UHS ~~Electrical Building~~Makeup Water Intake Structure pump rooms and transformer rooms. The raceway and cable routing design described in the U.S. EPR FSAR, Section 8.3.1.1.8 is incorporated by reference.}

The U.S. EPR FSAR includes the following COL Item in Section 8.3.1.18:

> A COL applicant that references the U.S. EPR design certification will describe inspection, testing, and monitoring programs to detect the degradation of inaccessible or underground power cables that support EDGs, offiste power, ESW, and other systems that are within the scope of 10 CFR 50.65.

This COL Item is addressed as follows:

{Calvert Cliffs 3 Nuclear Project, LLC and Unistar Nuclear Operating Services, LLC shall put in place a cable management program prior to fuel load that will:

- Identify the inaccessible or underground cables that are within the scope of 10 CFR 50.65,
- Describe the inspection, testing, and monitoring programs that will be implemented to detect degradation of these cables.}

8.3.1.1.9 Independence of Redundant Systems

{The EPSS distribution equipment for the UHS Makeup Water System is located in the applicable division of the Seismic Category I UHS ~~Electrical Building~~Makeup Water Intake Structure pump rooms and transformer rooms. Redundant equipment independence, including cabling independence and separation, described in the U.S. EPR FSAR, Section 8.3.1.1.9 is incorporated by reference.}

8.3.1.2.4 Compliance with GDC 17

{The EPSS distribution equipment for the UHS Makeup Water System is located in the applicable division of the Seismic Category I UHS ~~Electrical Building~~Makeup Water Intake Structure pump rooms and transformer rooms. Each division is functionally independent and physically separated from the other divisions.}

8.3.1.3 Electrical Power System Calculations and Distribution System Studies for AC Systems

The U.S. EPR FSAR includes the following conceptual design information in Section 8.3.1.3: Figure 8.3-4 [[Typical Station Grounding Grid]]

The conceptual design information is addressed as follows:

{The above U.S. EPR FSAR conceptual design information, including U.S. EPR FSAR Figure 8.3-4, is applicable to CCNPP Unit 3. Additionally, the site-specific UHS Intake Structure, ~~UHS Electrical Building,~~ circulating water system cooling tower area, desalination plant and 500 kV Switchyard are designed with lightning protection and grounding consistent with US. EPR FSAR Tier 2, Section8.3.1.3.5 and 8.3.1.3.8.

The switchyard grounding grid is interconnected with the Nuclear Island and power block ground grid. The switchyard ground grid, including conductor sizing, matrix pattern spacing, and connection with the power block ground grid is determined using the regulatory guidance and industry standards described in U.S. EPR FSAR Section 8.3.1.3.8.}

Table 8.3-2—{CCNPP Unit 3 EPSS Switchgear, Load Center, and Motor Control Center Numbering and Nominal Voltage}

Nominal Voltage Level	Division	Switchgear / Load Center / Motor Control Center
480 V MCC	1	31BNG01[1]
480 V MCC	2	32BNG01[1]
480 V MCC	3	33BNG01[1]
480 V MCC	4	34BNG01[1]

(1) Equipment located in the respective division in the UHS ~~Electrical Building~~Makeup Water Intake Structure pump rooms.

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Enclosure 7

Markup pages of FSAR Chapter 9.0

Calvert Cliffs Nuclear Power Plant, Unit 3

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 the Chesapeake Bay. The common forebay is shared between the CWS makeup water system and UHS makeup water system. Two buried 60" safety-related pipes provide a flow path for Chesapeake Bay water to enter the common forebay. Both pipes are designed to account for head losses in the pipe and provide sufficient flow for the CWS makeup and UHS makeup. Both pipes are normally in operation, however, either pipe can be isolated for maintenance as the other pipe is capable of providing 100% flow for CWS makeup and UHS makeup. Due to the head loss through the pipes, the design low water level at the common forebay for the UHS makeup intake is at EL. -8 ft NGVD29, which is 2 feet lower than the design low water level in the Chesapeake Bay of -6 ft NGVD29. The common forebay invert elevation is at -22.5 ft NGVD29, which provides ample additional margin in pump submergence during UHS operation with one or two intake pipes. The UHS Makeup Water Intake Structure houses four bar screens and four dual-flow traveling screens that remove large debris and trash that may be entrained in the flow. Each traveling screen is located in a separate enclosure and provides the required flow to the associated UHS Makeup Water Pump. Each traveling screen is equipped with a screen wash system which provides a high pressure spray to remove debris from the traveling screens.

There are four independent UHS Makeup Water System trains, one for each ESWS division. 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 four separate rooms at the UHS Makeup Water Intake Structure ~~pumphouse~~), 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 upstream of the blowdown flow meter. The latter safety-related MOV is normally closed, and will go closed if open on receipt of an accident signal, providing assurance of UHS Makeup Water System integrity.

Instrumentation and controls are provided for monitoring and controlling individual components and system functions. Switchgear and electrical equipment supplying power to each train's pump and MOVs are located in its associated pump room.

~~The pump, check valve, pump isolation MOV and strainer for each train are located in one of four separate watertight rooms in the UHS Makeup Water Intake Structure pumphouse. The associated electrical switchgear and equipment for each train's pump and MOV is similarly housed in a separate watertight room in the nearby UHS Electrical Building.~~

A general area drawing of the site-specific CCNPP Unit 3 UHS Makeup Water Intake and Circulating Water Makeup Water Intake Structures is shown in Figure 9.2-4. ~~A plan view~~Plan views of the UHS Makeup Water Intake Structure ~~is shown in Figure 9.2-5 and a section view is shown in Figure 9.2-6.~~are shown in Figure 9.2-5 and Figure 9.2-6. A section view is shown in Figure 9.2.7. The UHS Makeup Water System is shown in Figure 9.2-8.

9.2.5.3 Component Description

Normal ESW Makeup Isolation Valves

The normal ESWS Makeup Water System isolation valves are safety-related MOVs designed to ASME Section III, Class 3 requirements, and made of materials compatible with the brackish UHS makeup water.

UHS Makeup Water Intake Structure Bar Screens and Traveling Screens

The UHS Makeup Water Intake Structure has four bar screens and four dual-flow traveling screens. The screens prevent debris from passing into the UHS Makeup Water System. The traveling screens are equipped with a Seismic Category II screen wash system that includes four screen wash pumps. The screen wash pumps provide a high pressure spray to remove debris from the traveling screens. These traveling screens are classified as NS-AQ and are designed to remain mechanically functional following an SSE. The ability to manually rotate and clean the travelling screens to ensure adequate flow to the UHS makeup water pumps following a SSE is also provided. The structure housing the traveling screens will protect them from other natural phenomena, e.g. hurricane, tornado. The structure also provides separation between the screens for each of the four divisions. During normal operation, the traveling screens are powered from the Normal Power Supply System. Backup (Class 1E) power supply is provided to operate the traveling screens post-DBA through the Emergency Power Supply System, for convenience, if the electrical components of the traveling screens are functional post DBA.

UHS Makeup Water System Pumps

There are four vertical turbine pumps, each rated at 750 gpm (approximately 2835 lpm). Each pump is driven by an electric motor, and is equipped with a discharge check valve and motor operated isolation valve. They are designed to ASME Section III, Class 3 requirements, and constructed of materials compatible with the brackish UHS makeup water.

UHS Makeup Water System Isolation Valves

The UHS Makeup Water System isolation valves are safety-related MOVs designed to ASME Section III, Class 3 requirements, and are made of materials compatible with the brackish UHS makeup water. For each train, there are ~~the pump isolation MOV~~UHS Makeup Water System Pump isolation, minimum flow, and initial fill isolation MOVs, the UHS Makeup Water System isolation MOV at the ESWS cooling tower basin, and the UHS Makeup Water System bypass isolation MOV.

UHS Makeup Water System Self Cleaning Strainers

There are four UHS Makeup Water System self-cleaning strainers, one on the discharge side of each UHS Makeup Water pump. They are designed to ASME Section III, Class 3 requirements, and constructed of materials compatible with the brackish UHS makeup water.

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

UHS Makeup Water System Piping

The UHS Makeup Water System piping and fittings that perform safety functions are designed to ASME Section III, Class 3 requirements, including normal operation and anticipated transient conditions. They are constructed of materials compatible with the brackish UHS makeup water.

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, both cooling tower blowdown and 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 basins, starting no later than 72 hours after receipt of an accident signal, to ensure that sufficient makeup flow is provided so 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 1 requirements, including the tie-in piping and isolation valves for normal makeup, and chemical addition and sampling.

- Has four equivalent and completely independent trains, any two of which are capable of providing the required worst case makeup flow.

- Has ~~each~~components, including the UHS Makeup Water System pump and its associated valves, strainer, electrical switchgear, and local controls and instrumentation ~~housed in watertight enclosures in the UHS Makeup Water Intake Structure for protection against worst case flooding at the Chesapeake Bay shoreline.~~that are protected against the effects of external and internal flooding as described in Section 3.4.3.10.

- Has an UHS Makeup Water Intake Structure which is designed and built for protection against seismic and missile hazards.

- 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 UHS Makeup Water Intake Structure to the individual ESWS cooling tower basins.

- Is treated to meet specified 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 a set of traveling screens that remain mechanically functional following an SSE. The ability to manually rotate and clean the travelling screens to ensure adequate flow to the UHS makeup water pumps following a SSE is also provided.

In addition, reconciliation of the site-specific climatology data has demonstrated that the ESWS cooling tower performance maintains the ESWS temperature below the required 95° F (35° C).

Figure Replaced

Figure 9.2-4—{General Area - UHS Makeup Water and CW Intake Structures}

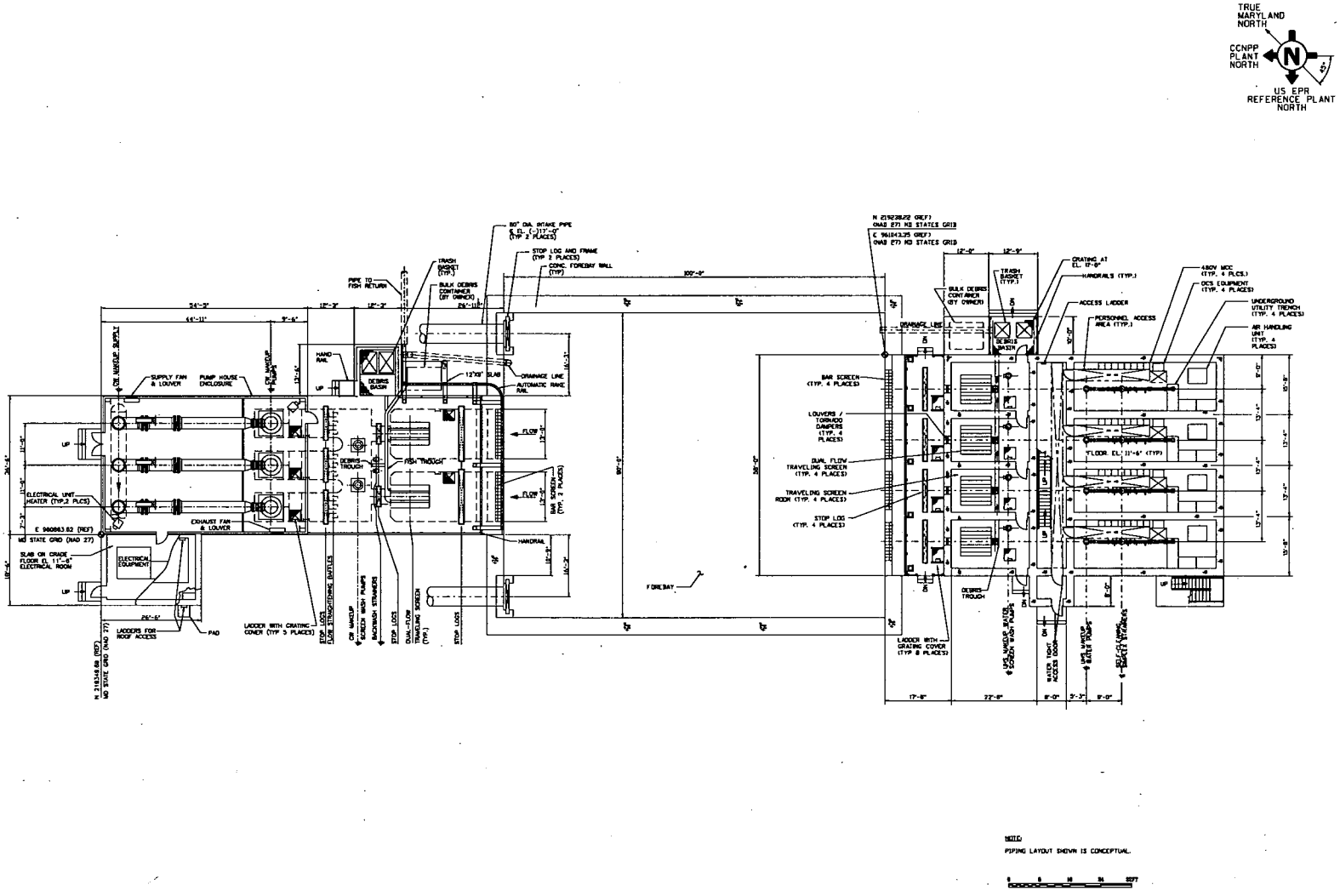


Figure Replaced

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

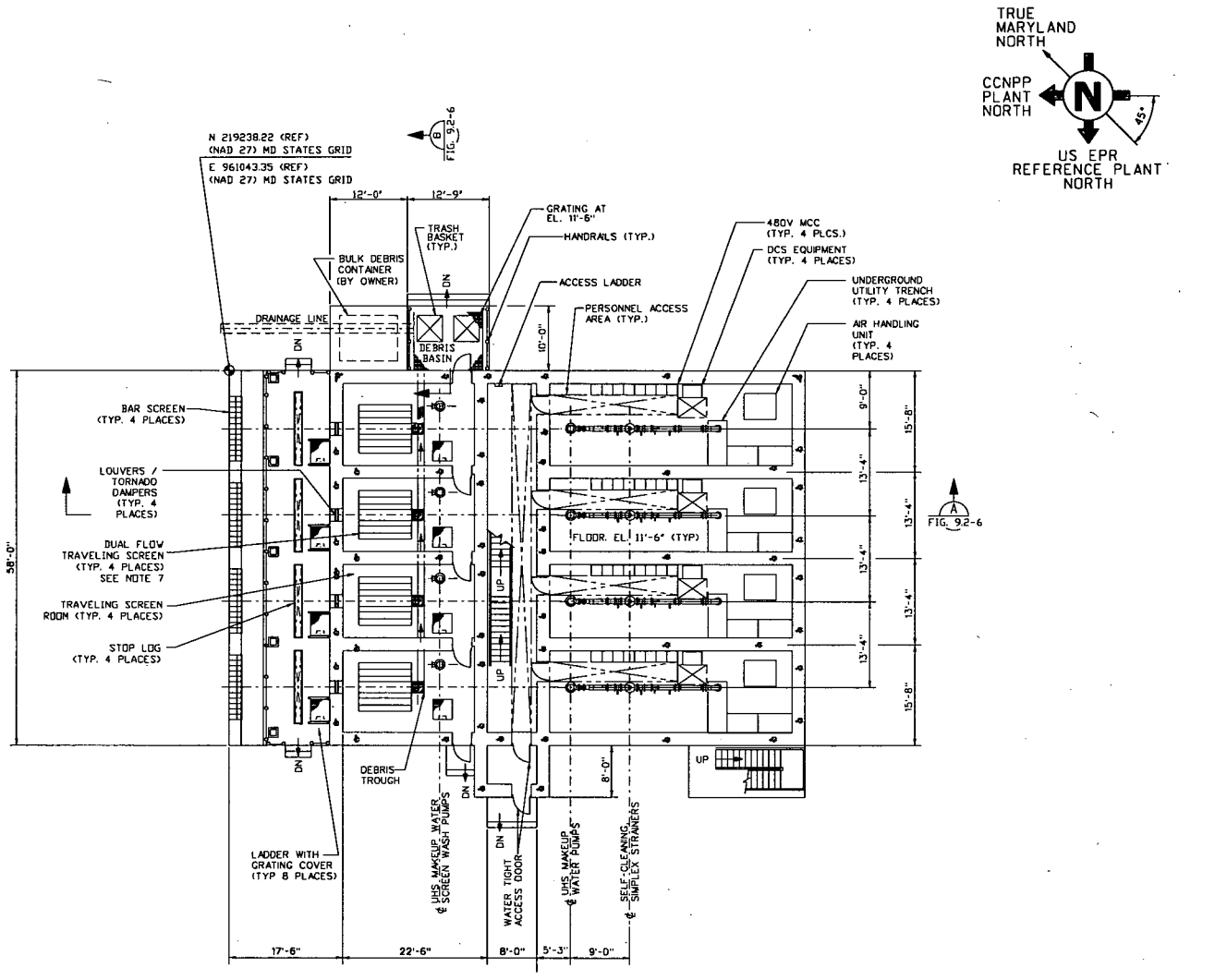
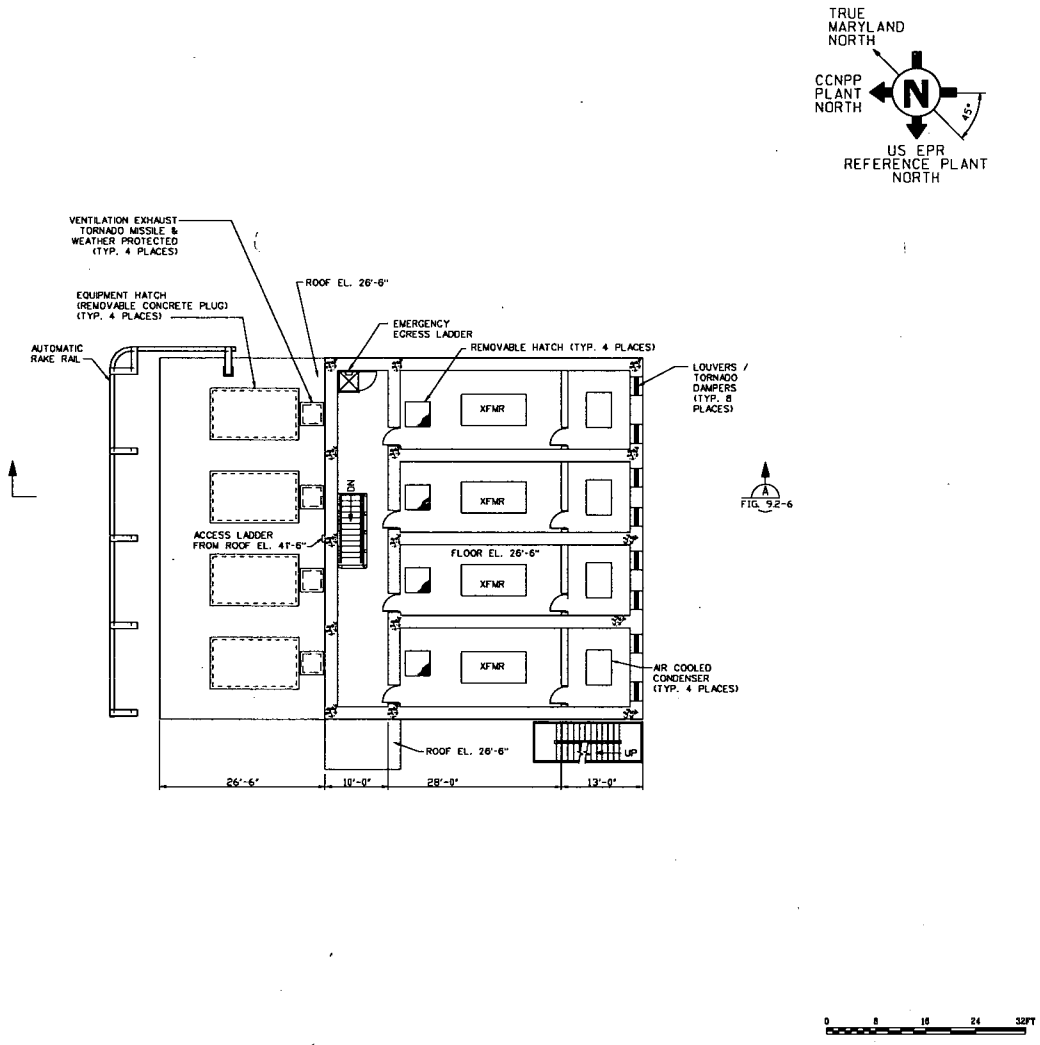


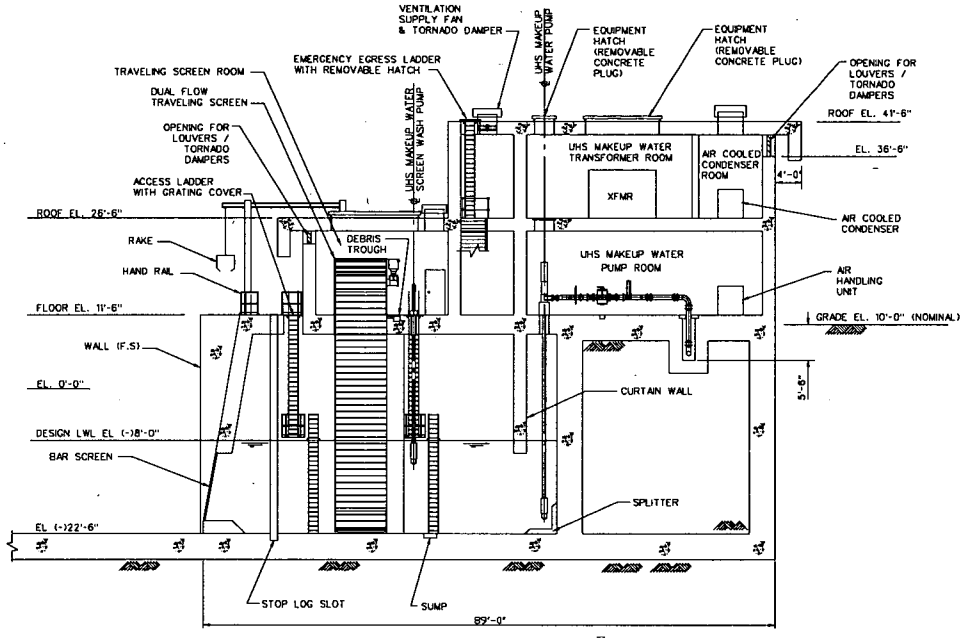
Figure Replaced

Figure 9.2-6—{UHS Makeup Water Intake Structure - Section View}

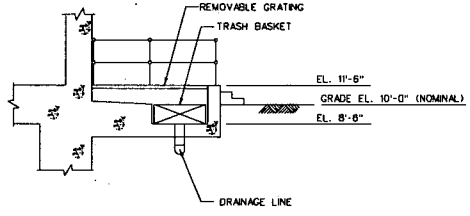


New Figure

Figure 9.2-7—{UHS Makeup Water Intake Structure - Section View}



SECTION A
FIG. 9.2-5

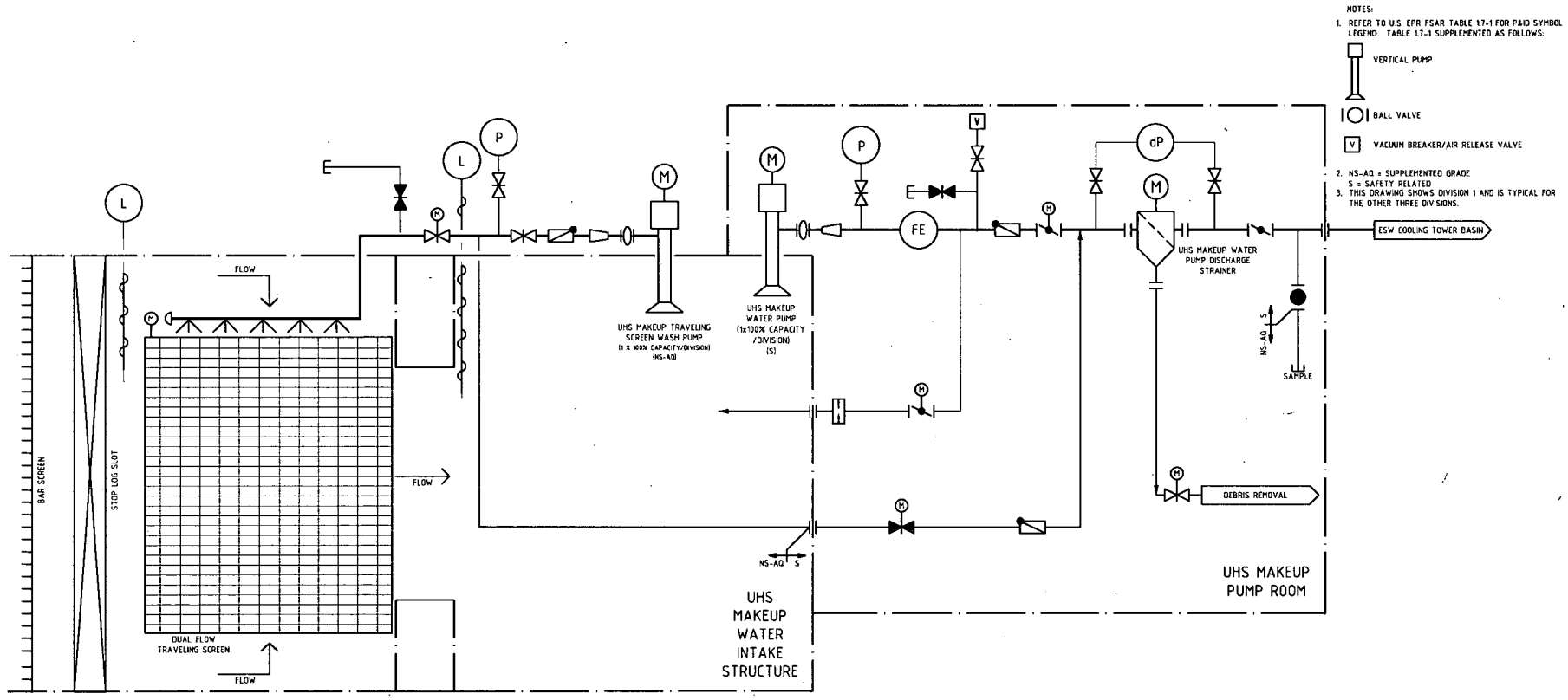


SECTION B
FIG. 9.2-5

NOTE:
PIPING LAYOUT SHOWN IS CONCEPTUAL.

0 8 16 24 32FT

New Figure
Figure 9.2-8—{UHS Makeup Water System}



9.4.15 {UHS MAKEUP WATER INTAKE STRUCTURE VENTILATION SYSTEM

The section was added as a supplement to the U.S. EPR FSAR.

9.4.15.1 Design Bases

The UHS Makeup Water Intake Structure Ventilation System ~~and the UHS Electrical Building Ventilation System maintain acceptable temperature limits~~maintains acceptable temperatures to support operation of the UHS Makeup Water Intake System pumps and associated electrical distribution equipment, which are required to operate under design basis accident conditions. The UHS Makeup Water Intake Structure Ventilation System also maintains acceptable room temperatures within the intake structure corridors and the traveling screen rooms. The UHS Makeup Water Intake Structure Ventilation System ~~and the UHS Electrical Building Ventilation System maintain~~maintains a minimum temperature of 41° F (5° C) and a maximum temperature of 104° F (40° C) in the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~, based on the 0% exceedence winter design basis ambient air temperature of 0° F DB and the 0% exceedence summer design-basis outdoor ambient air temperatures of 102° F DB/80° F WB, respectively. ~~These systems~~The system will support operation of the UHS Makeup Water Intake System pumps, dual flow traveling screens, screen wash pumps, and associated electrical distribution equipment, as well as to support personnel access to these spaces. This temperature range maintains a mild environment in ~~these buildings~~the building, as defined in US EPR FSAR Section 3.11.

Components of the UHS Makeup Water Intake Structure Ventilation System ~~and the UHS Electrical Building Ventilation System~~ are located inside the applicable divisions' UHS Makeup Water Pump rooms ~~and electrical rooms~~, transformer rooms, air-cooled condenser rooms, the intake structure corridors and traveling screen rooms. The UHS Makeup Water ~~Intake Structure and the UHS Electrical Building~~pump, transformer and air-cooled condenser rooms are designed to withstand the effects of natural phenomena, such as earthquakes, tornadoes, hurricanes, floods, and external missiles (GDC-2). The Traveling Screen rooms are designed to withstand the effects of earthquakes, tornadoes, hurricanes and external missiles; however, their ventilation systems are NS-AQ, and are not required to operate following accidents.

9.4.15.2 System Description

9.4.15.2.1 General Description

A drawing of the UHS Makeup Water Intake Structure Ventilation System~~and the UHS Electrical Building Ventilation System~~ is shown in Figure 9.4-2. The UHS Makeup Water Intake Structure Ventilation System consists of three (3) sub-systems: the makeup pump room ventilation system, the Intake Structure corridor ventilation system, and the traveling screen room ventilation system.

The UHS Makeup Water Intake Structure Ventilation System ~~recirculates~~supplies conditioned air for ~~cooling or heating of the four~~cooling, heating, and ventilating each divisional UHS Makeup Water System pump ~~rooms~~and transformer room in the UHS Makeup Water Intake Structure. ~~The UHS Electrical Building Ventilation System recirculates air for cooling or heating for the four electrical rooms in the UHS Electrical Building. The four UHS Makeup Water Electrical Building Rooms are considered confined space, since the structure is below grade and the roof access openings are all watertight to endure any potential floods. The four UHS Makeup Water System pump rooms are also designed watertight to endure potential floods. NEMA 12 (NEMA, 2003) enclosures protect low voltage electrical equipment from dust, dirt, and grit. Medium voltage transformers are specified to operate in this environment. This aspect of the design protects equipment against airborne particulate material, which could cause~~

~~electrical equipment failure. Each pump and electrical room has its own ventilation system train. The ventilation coolers for a particular pump room and associated electrical room are provided with cooling water by the UHS Makeup Water Intake System pump in the associated train.~~A safety-related split-system air conditioner is provided to cool and ventilate each UHS Makeup Water System pump and transformer room. Each air conditioning system recirculates room air and draws outside air to ventilate the rooms. The supply air flow path includes a missile-protected outside air intake, tornado damper, and an outside air makeup connection to the safety-related air handling unit, ducted from the air-cooled condenser room. The air-cooled condenser room forms the supply air plenum for the air-cooled condenser and the makeup air supply. Distribution ductwork supplies air from the air handling unit to the pump room and the transformer room above. Air is returned to the air handling unit via recirculation ductwork from the pump and transformer rooms. A nonsafety-related exhaust fan is provided to exhaust a portion of the room air. The exhaust air flow path consists of exhaust ductwork from each room drawn via an exhaust fan, which discharges into an exhaust plenum shared with the exhaust from the air-cooled condenser. The exhaust plenum discharges through the roof of the building through a check damper, tornado damper and missile shield.

Nonsafety-related supply and exhaust fans are provided to heat and ventilate the intake structure corridors. The supply air ductwork is provided with a duct heater to heat the supply air in the winter. Both supply and exhaust openings are protected from missiles and provided with tornado dampers.

Each traveling screen room is ventilated by a nonsafety-related exhaust fan which draws outside air through a supply air louver and filter. A unit heater is provided in each traveling screen room to maintain the minimum required temperature in the winter. Both supply and exhaust openings are protected from missiles and provided with tornado dampers.

9.4.15.2.2 Component Description

~~**Air Handling Units**~~

~~Air handling unit capacities in the UHS Makeup Water Intake Ventilation System and UHS Electrical Building Ventilation System are based on the environmental conditions and the required room temperature range. Each unit consists of a filter, blower, electric motor, and cooling coil.~~

Air Conditioning (AC) Units

The air conditioning systems utilize safety-related split-system units. Each systems' air-cooled condenser section (i.e., condenser fan, coil and compressor) is located in its own room, which forms a supply air plenum to provide cooling air from outdoors via missile protected openings located above the EL. 36 ft. flood level. Each evaporator section (i.e., filter, evaporator coil, electric heating coil and supply air fan) is located in its divisional pump room. AC unit capacities are based on the design ambient conditions and the required room temperature range. The air conditioning equipment shall be designed in accordance with ASME AG-1 2003 (ASME, 2003).

Ductwork and Accessories

~~The supply air duct~~Ductwork is constructed of galvanized steel and is structurally designed for the fan shutoff pressure. The ductwork meets the design, construction and testing requirements of ASME AG-1-2003 (ASME, 2003).

~~Cooling Coils~~

~~The cooling coils, which are integral to the air handling units, are designed in accordance with ASME AG-1-2003. The cooling coils are designed to meet ASME Boiler and Pressure Vessel Code, Section III, Class 3, 2004 Edition no Addenda (ASME, 2004).~~

~~Cooling Coil Isolation Valves~~

~~The cooling coil isolation valves are designed to meet ASME Boiler and Pressure Vessel Code, Section III, Class 3, 2004 Edition, no Addenda.~~

Air ~~Handling~~Conditioning Unit Condensate Drip Pans

Each air ~~handling~~conditioning unit has a drip pan installed to collect the condensate that forms in the ~~air handling unit and direct~~evaporator section and directs the condensate to the local sump.

Air Supply Fans

~~The fans, which are integral to the air handling units,~~Fans are centrifugal or axial type with ~~an~~ electric~~al~~ motor drive~~r~~. 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).

Unit Heaters

Unit heaters, consisting of fans, thermostats and electric heating coils are provided in each traveling screen room to maintain a minimum room temperature above the lower design temperature limit of 41°F, based on a minimum outside ambient temperature of 0°F. Unit heaters meet the design, construction and testing requirements of ASME AG-1-2003 (ASME, 2003).

Dampers

Dampers meet the design, construction and testing requirements of the applicable portions of ASME AG-1-2003 (ASME, 2003).

Electrical Duct Heater

An electric duct heater is provided to temper the air supplied to the UHS Makeup Water Intake Structure common corridors.

~~Electric Heating Coils~~

~~Electric heating coils are provided to maintain minimum room temperatures in the Essential Service Water Pump Building within the design temperature range.~~

9.4.15.2.3 System Operation

Normal Plant Operation

During normal plant operation, the UHS Makeup Water System pumps are not in operation, except for the performance of periodic surveillance tests. The UHS Makeup Water Intake Structure Ventilation System ~~and the UHS Electrical Building Ventilation System function~~functions to maintain acceptable room temperatures for starting and operating the UHS Makeup Water System pumps, traveling screens and screen wash pumps, as well as supporting the operation of the electrical distribution equipment for the UHS Makeup Water System and for personnel comfort. The room temperature is monitored ~~by~~and controlled using the temperature sensors ~~for~~located in each pump room, transformer room, the intake structure corridors and each traveling screen room ~~and electrical room~~. In the event cooling is required in any UHS Makeup pump or electrical room(s), the associated divisions' UHS Makeup Water

System pump is to started on high room temperature to supply cooling water to the associated division's cooling coils.

Abnormal Operating Conditions

~~If one or more components of a UHS Makeup Water Intake Structure Ventilation System train or UHS Electrical Building Ventilation System train fail, the UHS Makeup Water Intake Structure Ventilation System train or UHS Electrical Building Ventilation System train is not able to maintain the required ambient conditions in the UHS Makeup Water System pump room or UHS electrical room, respectively. There are four independent pairs of pump and electrical rooms (each pair is associated with a particular UHS Makeup Water System train). Failure of one train of the UHS Makeup Water Intake Structure Ventilation System or the UHS Electrical Building Ventilation System results in the inoperability of one train of the UHS Makeup Water System. However, this failure does not affect the other three trains of the UHS Makeup Water System.~~The UHS Makeup Water System (UHSMWS) is comprised of four (4) independent trains, each supported by its dedicated, safety-related UHSMWS Ventilation System. Two out of the four trains are required for the UHSMWS to perform its safety function. If one or more components of a UHS Makeup Pump Room Ventilation System fail, that ventilation system may not be able to maintain the required ambient conditions in the associated UHS Makeup Water pump or transformer room. Failure of one UHS Makeup Pump Room Ventilation System may result in inoperability of that train of the UHS Makeup Water System. However, this failure does not affect the other three (3) redundant trains of the UHS Makeup Water Ventilation System. The heating and ventilating systems serving the UHS Makeup Water Intake Structure corridors and traveling screen rooms are NS-AQ, and not required to operate in order for any UHS Makeup Water System to perform its safety function.

Plant Accident Conditions

The UHS Makeup Water Intake Structure Ventilation System ~~and the UHS Electrical Building Ventilation System also maintain conditions in the UHS Makeup Water Intake Structure and UHS Electrical Building~~also maintains the required ambient conditions in each trains' UHS Makeup Water pump and transformer room, in case the UHS Makeup Water pumps are required to operate.

9.4.15.3 Safety Evaluation

The UHS Makeup Water Intake Structure Ventilation System ~~and UHS Electrical Building Ventilation System have~~has sufficient heating and cooling capacity to maintain each ~~pump room and electrical room~~trains' pump and transformer room at temperatures between 41° F (5° C) and 104° F (40° C), when the UHS Makeup Water ~~Intake~~ System ~~pump motors are operated at rated load~~equipment operates at rated load (cooling mode), and, is on standby (heating mode).

The safety-related portions of the UHS Makeup Water Intake Structure Ventilation System ~~and the UHS Electrical Building Ventilation System~~ are designed to withstand the effects of earthquakes, tornadoes, hurricanes, floods, external missiles, and other similar natural phenomena. Sections 3.3, 3.4, 3.5, 3.7, and 3.8 provide the bases for the adequacy of the structural design of ~~these buildings~~the building.

No single failure compromises the safety functions of the UHS Makeup Water System; however, active failure of an air conditioning ~~train~~system will render the associated UHS Makeup Water System ~~train~~ inoperable. Power supplies to safety-related electrical components and controls for the UHS Makeup Water Intake Structure Ventilation System are provided from their respective divisional Class 1E Emergency Power Supply system.

9.4.15.4 Inspection and Testing Requirements

Sections 14.2.14.8 ~~and 14.2.14.9 provide~~provides the initial plant startup testing for the UHS Makeup Water Intake Structure Ventilation System ~~and UHS Electrical Building Ventilation System, respectively~~.

After the plant is brought into operation, periodic inspections and tests of the UHS Makeup Water Intake Structure Ventilation System ~~and UHS Electrical Building Ventilation System~~ are performed to verify proper operation. Scheduled inspections and tests are necessary to verify system operability.

Testing to verify the UHS Makeup Water Intake Structure Ventilation System~~and UHS Electrical Building Ventilation Systems~~ continued capability to remove design heat loads will be coordinated with full flow performance testing of each division's respective UHS Makeup Water System to establish equipment room design basis heat loads to the maximum extent practical. Testing to verify the systems maintain the minimum room design temperature will be performed with all equipment secured.

9.4.15.5 Instrumentation Requirements

Initial in-place testing of safety-related components of the UHS Makeup Water Intake Structure Ventilation System ~~and the UHS Electrical Building Ventilation System~~ is performed in accordance with ASME AG-1-2003 (ASME, 2003) and ASME N510-1989 (ASME, 1989).

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.

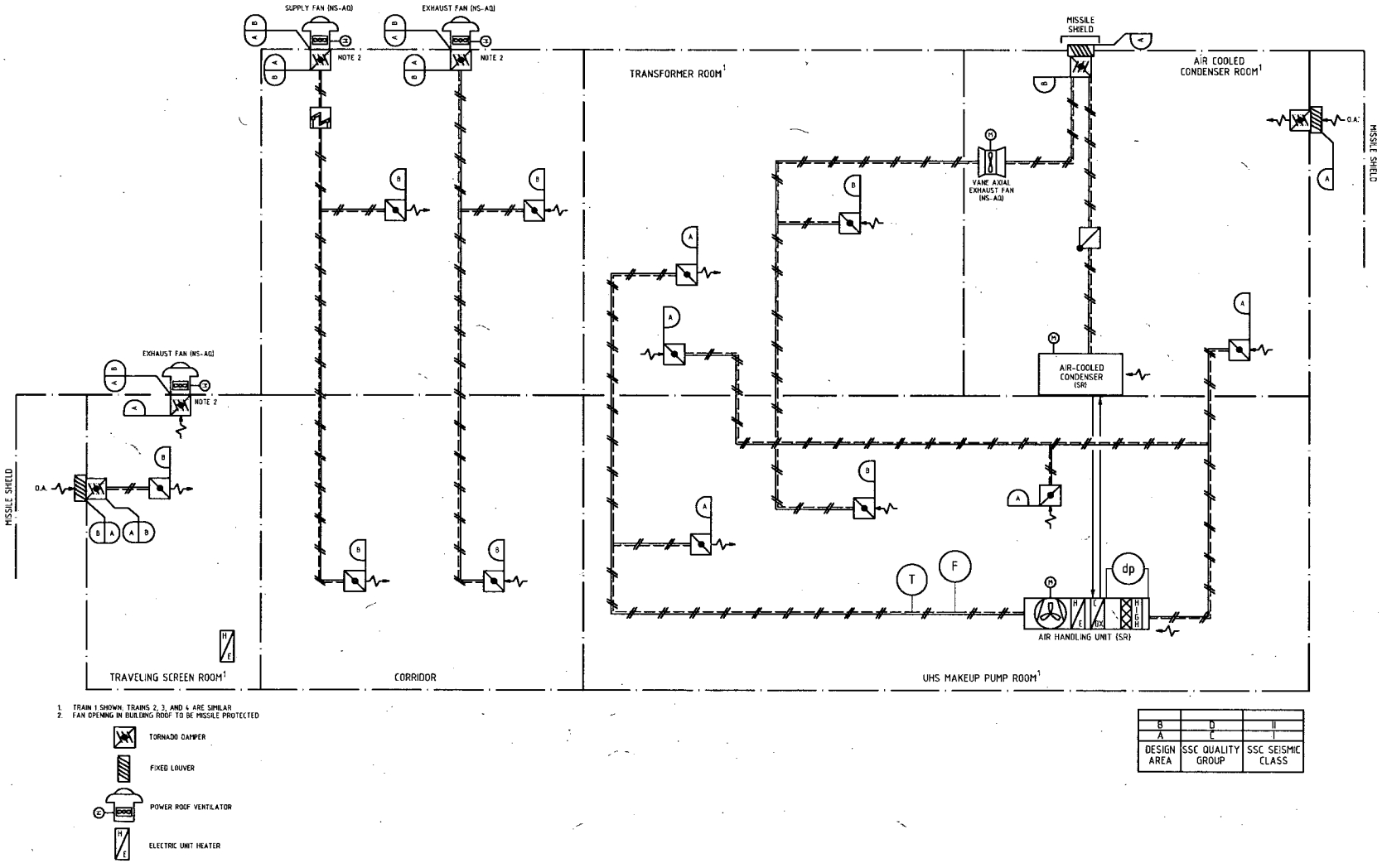
ASME, 2003. Code on Nuclear Air and Gas Treatment, ASME AG-1, American Society of Mechanical Engineers, 2003.

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

~~**NEMA, 2003.** NEMA Standards Publication 250-2003, Enclosures for Electrical Equipment (1000 Volts Maximum).~~

Figure Replaced

Figure 9.4-2—{UHS Makeup Water Intake Structure Ventilation System ~~and UHS Electrical Building 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 {"CCNPP Unit 3 Supplement"} and addresses {CCNPP Unit 3} conformance to the identified requirement of Regulatory Guide 1.189 (NRC, 2007).

The U.S. EPR includes the following COL item in Section 9.5.1.2.1:

> A COL applicant that references the U.S. EPR design certification will provide a description and simplified Fire Protection System piping and instrumentation diagrams for site-specific systems.

This COL item is addressed as follows:

> Figures 9.5.2 and 9.5-3 each provide a schematic piping and instrument diagram of the fire water distribution system specific to CCNPP Unit 3. These figures supplement the generic piping and instrumentation provided in Figure 9.5.1-1 of the U.S. EPR FSAR.
>
> Figure 9.5-2 illustrates the site-specific fire main yard loop supplying the Cooling Tower area. This non-seismic loop supplies the sprinkler system protecting the Water Treatment Building as well as the yard fire hydrants.
>
> Figure 9.5-3 illustrates the site-specific fire main yard loop supplying the Intake Structure area. The Seismic Category II-SSE loop supplies fire water to the above ground manual and automatic suppression systems identified in Figure 9.5-4~~ and 9.5-5. These figures~~. This figure illustrate the Seismic Category II-SSE standpipe and hose stations and the Seismic Category II sprinkler systems specified for the UHS Makeup Water Intake Structure~~ and the associated Electrical Building~~.}

9.5.1.2.2 General Description (continued)

Plant Fire Prevention and Control Features

< Text suppressed for clarity >

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) 13 (NFPA, 2007b), 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~~
- Desalinization / Water Treatment Building}

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.

9.5.2.3 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.

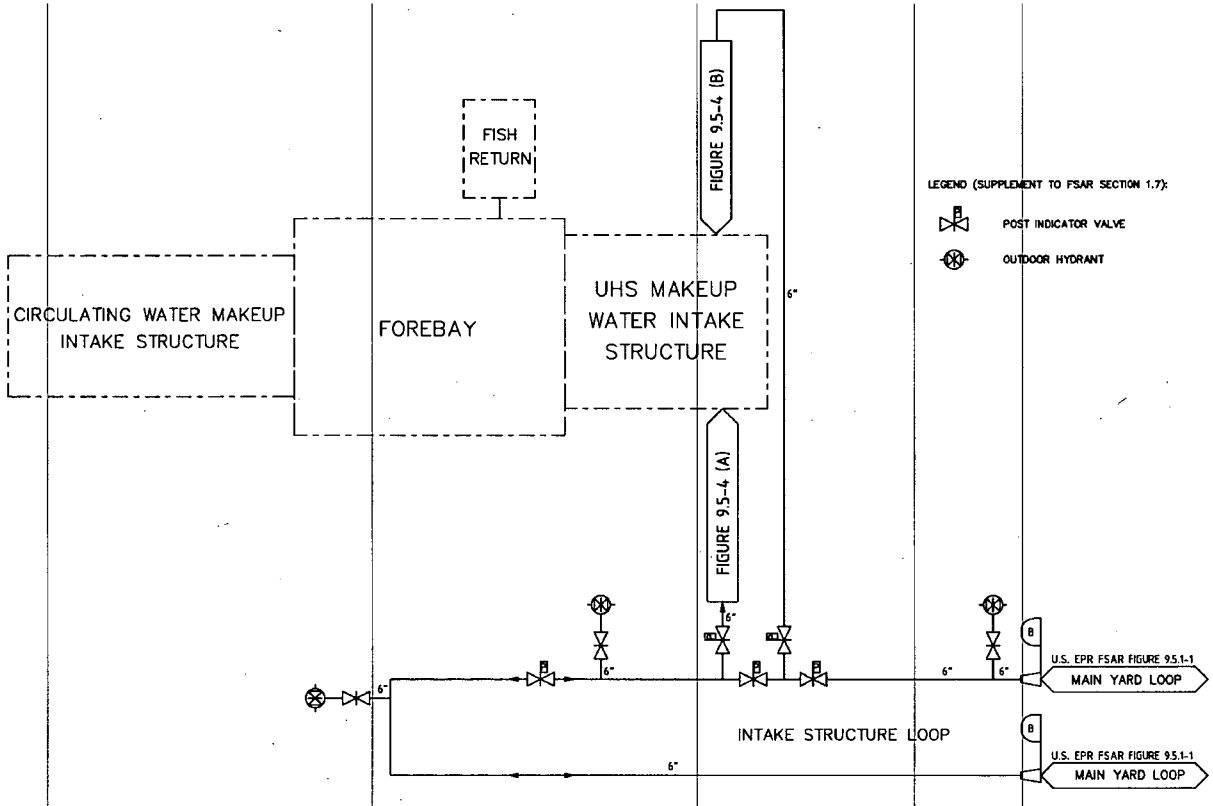
This COL Item is addressed as follows:

{The UHS Makeup Water Intake Structure ~~and the UHS Electrical Building~~ 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 Uninterruptible Power Supply System (EUPS) or the Class 1E Emergency Power Supply System (EPSS), which are supported by the emergency and station blackout 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.}

Figure Replaced

Figure 9.5-3—{CCNPP Unit 3 Fire Water Distribution System – Intake Structure Loop}

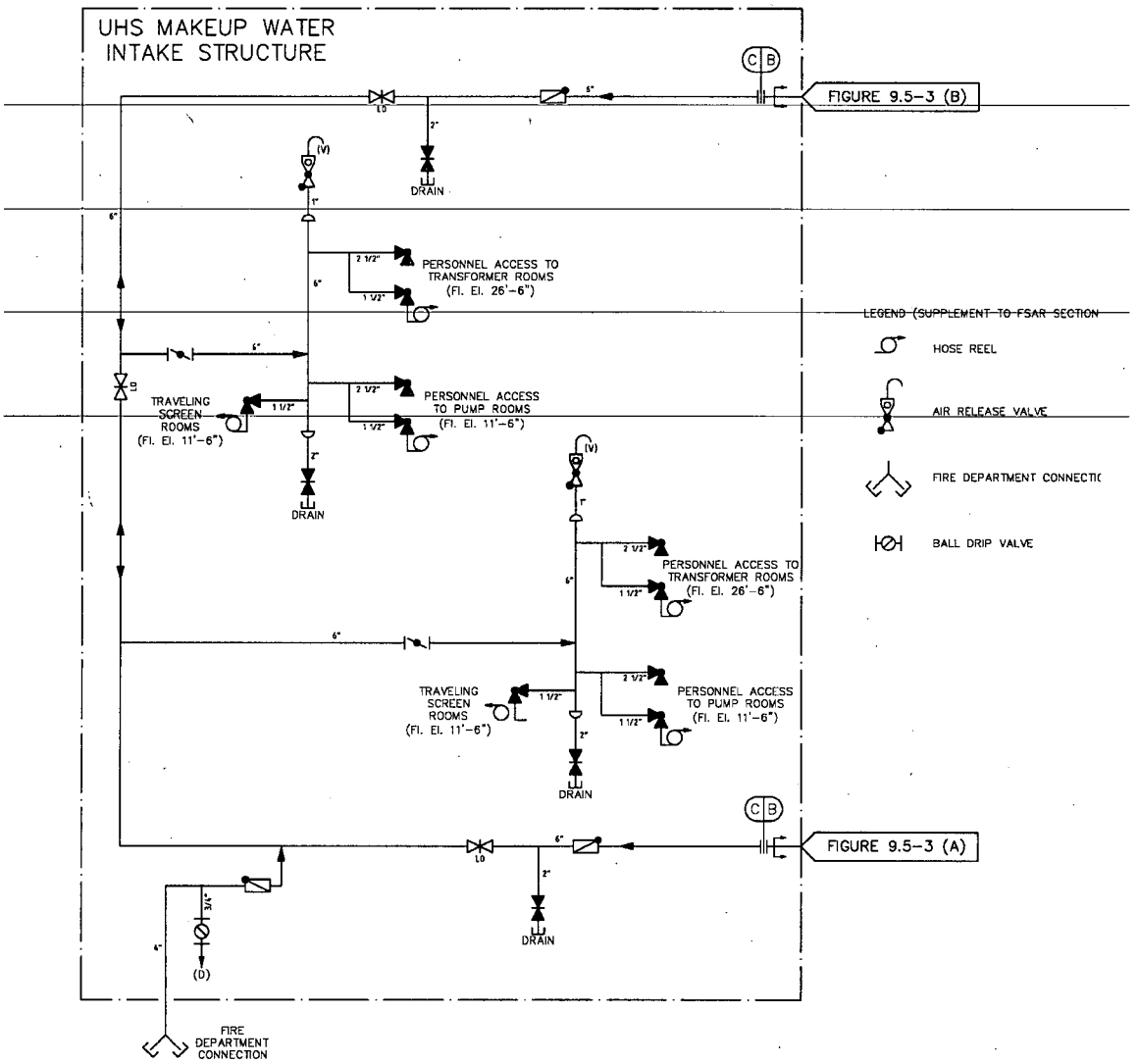


B	NS–AQ	D	250	100	II–SSE	Yes	NFPA 24, 2007 ed. NFPA 25. 2002 ed. NFPA 804, 2006 ed. ANSI/ASME B31.1, 2004 ed.
DESIGN AREA	SSC SAFETY CLASS	SSC QUALITY GROUP	DESIGN PRESSURE PSIG	DESIGN TEMPERATURE °F	SSC SEISMIC CLASS	10 CFR APPENDIX B PROGRAM (NOTE 1)	COMMERCIAL CODE

NOTE 1: THOSE SSCs CLASSIFIED AS NS-AQ (FOR SAFETY CLASS) AND CLASSIFIED AS "YES" FOR 10 CFR 50 APPENDIX B WILL BE SUBJECT ONLY TO THOSE QUALITY ASSURANCE REQUIREMENTS OF APPENDIX B THAT ARE PERTINENT TO THAT SSC BASED ON POTENTIAL AFFECT OF THE SSC ON SAFETY-RELATED FUNCTIONS.

Figure Replaced

Figure 9.5-4—{CCNPP Unit 3 UHS Makeup Water Intake Structure}



C	NS-AQ	D	250	120	II - SSE	YES	NFPA 13, 2007 ed. NFPA 14, 2007 ed. NFPA 25, 2002 ed. NFPA 804, 2006 ed. ANSI/ASME B31.1, 2004 ed.
B	NS-AQ	D	250	100	II - SSE	YES	NFPA 24, 2007 ed. NFPA 25, 2002 ed. NFPA 804, 2006 ed. ANSI/ASME B31.1, 2004 ed.
DESIGN AREA	SSC SAFETY CLASS	SSC QUALITY GROUP	DESIGN PRESSURE PSIG	DESIGN TEMPERATURE °F	SSC SEISMIC CLASS	10 CFR APPENDIX B PROGRAM (NOTE 1)	COMMERCIAL CODE

NOTE 1: THOSE SSCs CLASSIFIED AS NS-AQ (FOR SAFETY CLASS) AND CLASSIFIED AS "YES" FOR 10 CFR 50 APPENDIX B WILL BE SUBJECT ONLY TO THOSE QUALITY ASSURANCE REQUIREMENTS OF APPENDIX B THAT ARE PERTINENT TO THAT SSC BASED ON POTENTIAL AFFECT OF THE SSC ON SAFETY-RELATED FUNCTIONS.

Figure 9.5-5—~~{CCNPP Unit 3 UHS Electrical Building~~Not Used~~}~~

9B.1.3 SCOPE

The scope of the FPA consists of the comprehensive assessment of the fire or explosion hazards for the plant structures in the following list, including a description of the fire protection defense-in-depth features provided to minimize the consequences of such an event.

- Turbine Building (UMA)
- Switchgear Building (UBA)
- Auxiliary Power Transformer Area (UBE)
- Generator Transformer Area (UBF)
- {Warehouse Building (UST)}
- Security Access Building (UYF)
- Central Gas Supply Building (UTG)
- {Grid Systems Control Building (UAC)}
- Fire Protection Building (USG)
- {Circulating Water System Cooling Tower Structure (URA)}
- {Circulating Water System Pump Building (UQA)}
- {Ultimate Heat Sink Makeup Water Intake Structure (UPF)~~, including associated UHS Electrical Building~~}
- {Circulating Water System Makeup Intake Structure (UPE)}
- {Desalinization/Water Treatment Building (UPQ)}

9B.3 FIRE AREA-BY-FIRE AREA EVALUATION

The FPA is performed on a fire area by fire area basis for the following plant structures:

- Turbine Building (UMA)
- Switchgear Building (UBA)
- Auxiliary Power Transformer Area (UBE)
- Generator Transformer Area (UBF)
- {Warehouse Building (UST)}
- Security Access Building (UYF)
- Central Gas Supply Building (UTG)
- {Grid Systems Control Building (UAC)}
- Fire Protection Building (USG)
- {Cooling Tower Structure (URA)}
- {Circulating Water Pump Building (UQA)}
- {Ultimate Heat Sink Makeup Water Intake Structure (UPF)~~, including associated UHS Electrical Building~~}
- {Circulating Water System Makeup Intake Structure (UPE)}
- {Desalinization/Water Treatment Building (UPQ)}

9B.3.12 ULTIMATE HEAT SINK MAKEUP WATER INTAKE STRUCTURE ~~INCLUDING ASSOCIATED UHS ELECTRICAL BUILDING~~

~~9B.3.12.1 Fire Area FA-UPF-01 (Table 9B-2, Column 35)~~

~~Fire area FA-UPF-01 is one of four electrical rooms, which serve the Ultimate Heat Sink Makeup Water System pumps, and is designated as UHS Makeup Water Intake Structure Electrical Room 1.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-01 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single exit through the building corridor.~~

~~9B.3.12.2 Fire Area FA-UPF-02 (Table 9B-2, Column 36)~~

~~Fire area FA-UPF-02 is the corridor which serves the Ultimate Heat Sink Makeup Water System pump electrical rooms.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-02 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via redundant means of egress to the exterior.~~

~~9B.3.12.3 Fire Area FA-UPF-03 (Table 9B-2, Column 37)~~

~~Fire area FA-UPF-03 is one of the four Ultimate Heat Sink Makeup Water System pump rooms and is designated as UHS Makeup Water Intake Structure Pump Room 1.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-03 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single grade level exit through the building corridor.~~

~~9B.3.12.4 Fire Area FA-UPF-04 (Table 9B-2, Column 38)~~

~~Fire area FA-UPF-04 is the corridor which serves the Ultimate Heat Sink Makeup Water System pump rooms.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-04 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via redundant means of egress to the exterior.~~

~~9B.3.12.5 Fire Area FA-UPF-05 (Table 9B-2, Column 39)~~

~~Fire area FA-UPF-05 is one of four electrical rooms which serve the Ultimate Heat Sink Makeup Water System pumps and is designated as UHS Makeup Water Intake Structure Electrical Room 2.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-05 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single exit to the exterior.~~

~~9B.3.12.6 Fire Area FA-UPF-06 (Table 9B-2, Column 40)~~

~~Fire area FA-UPF-06 is one of the four Ultimate Heat Sink Makeup Water System pump rooms and is designated as UHS Makeup Water Intake Structure Pump Room 2.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-06 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single grade level exit through the building corridor.~~

~~9B.3.12.7 Fire Area FA-UPF-07 (Table 9B-2, Column 41)~~

~~Fire area FA-UPF-07 is one of four electrical rooms which serve the Ultimate Heat Sink Makeup Water System pumps and is designated as UHS Makeup Water Intake Structure Electrical Room 3.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-07 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single exit through the building corridor.~~

~~9B.3.12.8 Fire Area FA-UPF-08 (Table 9B-2, Column 42)~~

~~Fire area FA-UPF-08 is one of the four Ultimate Heat Sink Makeup Water System pump rooms and is designated as UHS Makeup Water Intake Structure Pump Room 3.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-08 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single grade level exit through the building corridor.~~

~~9B.3.12.9 Fire Area FA-UPF-09 (Table 9B-2, Column 43)~~

~~Fire area FA-UPF-09 is one of four electrical rooms which serve the Ultimate Heat Sink Makeup Water System pumps and is designated as UHS Makeup Water Intake Structure Electrical Room 4.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-09 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single exit through the building corridor.~~

~~9B.3.12.10 Fire Area FA-UPF-10 (Table 9B-2, Column 44)~~

~~Fire area FA-UPF-10 is one of the four Ultimate Heat Sink Makeup Water System pump rooms and is designated as UHS Makeup Water Intake Structure Pump Room 4.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-10 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single grade level exit through the building corridor.~~

~~9B.3.12.11 Fire Area FA-UPF-11 (Table 9B-2, Column 45)~~

~~Fire area FA-UPF-11 is one of four traveling screen rooms which serve the Ultimate Heat Sink Makeup Water System pumps and is designated as UHS Makeup Water Intake Structure Traveling Screen Room 1.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-11 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single grade level exit through the building corridor.~~

~~9B.3.12.12 Fire Area FA-UPF-12 (Table 9B-2, Column 46)~~

~~Fire area FA-UPF-12 is one of four traveling screen rooms which serve the Ultimate Heat Sink Makeup Water System pumps and is designated as UHS Makeup Water Intake Structure Traveling Screen Room 2.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-12 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single grade level exit through the building corridor.~~

~~9B.3.12.13 Fire Area FA-UPF-13 (Table 9B-2, Column 47)~~

~~Fire area FA-UPF-13 is one of four traveling screen rooms which serve the Ultimate Heat Sink Makeup Water System pumps and is designated as UHS Makeup Water Intake Structure Traveling Screen Room 3.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-13 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single grade level exit through the building corridor.~~

~~9B.3.12.14 Fire Area FA-UPF-14 (Table 9B-2, Column 48)~~

~~Fire area FA-UPF-14 is one of four traveling screen rooms which serve the Ultimate Heat Sink Makeup Water System pumps and is designated as UHS Makeup Water Intake Structure Traveling Screen Room 4.~~

~~The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-14 from affecting adjacent fire areas.~~

~~This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single grade level exit through the building corridor.~~

9B.3.12.1 Fire Area FA-UPF-01 (Table 9B-2, Column 35)

Fire area FA-UPF-01 is one of the four UHS makeup water pump, electrical, traveling screen and forebay divisions. Fire area FA-UPF-01 consists of the following rooms:

Room Number	Room Name
UPF03-001	Air Cooled Condenser Room 1
UPF03-002	Transformer Room 1
UPF02-001	UHS Makeup Water Pump Room 1
UPF02-003	Traveling Screen Room 1
UPF01-001	UHS Makeup Water Intake Forebay Area 1

The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-01 from affecting adjacent fire areas.

This fire area is occasionally occupied during normal plant operations. The egress route from the Air Cooled Condenser Room, Transformer Room and UHS Makeup Water Pump Room in the event of a fire is via the building corridors two exits: a single escape ladder to the roof, or a single grade level exit to the exterior. The egress route from the Traveling Screen Room in the event of fire is through two grade level exits to the exterior.

9B.3.12.2 Fire Area FA-UPF-02 (Table 9B-2, Column 36)

Fire area FA-UPF-02 is the corridor/stairwell enclosure serving the UHS Makeup Water Intake Structure. Fire area FA-UPF-02 consists of the following rooms:

Room Number	Room Name
UPF03-003	Personnel Access to Electrical Rooms
UPF02-002	Personnel Access to Pump Rooms
UPF02-010	Vestibule

The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-02 from affecting adjacent fire areas.

This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single grade level exit to the exterior or a single escape ladder to the roof.

9B.3.12.3 Fire Area FA-UPF-03 (Table 9B-2, Column 37)

Fire area FA-UPF-03 is one of the four UHS makeup water pump, electrical, traveling screen and forebay divisions. Fire area FA-UPF-03 consists of the following rooms:

Room Number	Room Name
UPF03-004	Air Cooled Condenser Room 2
UPF03-005	Transformer Room 2
UPF02-004	UHS Makeup Water Pump Room 2
UPF02-005	Traveling Screen Room 2
UPF01-002	UHS Makeup Water Intake Forebay Area 2

The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-03 from affecting adjacent fire areas.

This fire area is occasionally occupied during normal plant operations. The egress route from the Air Cooled Condenser Room, Transformer Room and UHS Makeup Water Pump Room in the event of a fire is via the building corridors two exits: a single escape ladder to the roof, or a single grade level exit to the exterior. The egress route from the Traveling Screen Room in the event of fire is through two grade level exits to the exterior.

9B.3.12.4 Fire Area FA-UPF-04 (Table 9B-2, Column 38)

Fire area FA-UPF-04 is one of the four UHS makeup water pump, electrical, traveling screen and forebay divisions. Fire area FA-UPF-04 consists of the following rooms:

Room Number	Room Name
UPF03-006	Air Cooled Condenser Room 3
UPF03-007	Transformer Room 3
UPF02-006	UHS Makeup Water Pump Room 3
UPF02-007	Traveling Screen Room 3
UPF01-003	UHS Makeup Water Intake Forebay Area 3

The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-04 from affecting adjacent fire areas.

This fire area is occasionally occupied during normal plant operations. The egress route from the Air Cooled Condenser Room, Transformer Room and UHS Makeup Water Pump Room in the event of a fire is via the building corridors two exits: a single escape ladder to the roof, or a single grade level exit to the exterior. The egress route from the Traveling Screen Room in the event of fire is through two grade level exits to the exterior.

9B.3.12.5 Fire Area FA-UPF-05 (Table 9B-2, Column 39)

Fire area FA-UPF-05 is one of the four UHS makeup water pump, electrical, traveling screen and forebay divisions. Fire area FA-UPF-05 consists of the following rooms:

Room Number	Room Name
UPF03-008	Air Cooled Condenser Room 4
UPF03-009	Transformer Room 4
UPF02-008	UHS Makeup Water Pump Room 4
UPF02-009	Traveling Screen Room 4
UPF01-004	UHS Makeup Water Intake Forebay Area 4

The adequacy of the fire protection features provided is sufficient to prevent a fire originating within fire area FA-UPF-05 from affecting adjacent fire areas.

This fire area is occasionally occupied during normal plant operations. The egress route from the Air Cooled Condenser Room, Transformer Room and UHS Makeup Water Pump Room in the event of a fire is via the building corridors two exits: a single escape ladder to the roof, or a single grade level exit to the exterior. The egress route from the Traveling Screen Room in the event of fire is through two grade level exits to the exterior.

9B.3.13 CIRCULATING WATER SYSTEM MAKEUP INTAKE STRUCTURE

9B.3.13.1 Fire Area FA-UPE-01 (Table 9B-2, Column ~~49~~40)

Fire area FA-UPE-01 is the electrical equipment room providing power and control for the circulating water system makeup pumps.

The adequacy of the fire protection features provided are sufficient to prevent a fire originating within fire area FA-UPE-01 from affecting adjacent fire areas.

This fire area is not normally occupied during normal plant operations. The egress route from this area is via single exit to the exterior.

9B.3.13.2 Fire Area FA-UPE-02 (Table 9B-2, Column ~~50~~41)

Fire area FA-UPE-02 is the grade and below grade portion of the circulating water system makeup intake structure which houses the three circulating water makeup pumps.

The adequacy of the fire protection features provided are sufficient to prevent a fire originating within fire area FA-UPE-02 from affecting adjacent fire areas.

This fire area is not normally occupied during normal plant operations. The egress route from this area in the event of a fire is via a single grade level exit to the exterior and via multiple ladders from below grade.

9B.3.14 DESALINIZATION/WATER TREATMENT BUILDING

9B.3.14.1 Fire Area FA-UPQ-01 (Table 9B-2, Column ~~51~~42)

Fire area FA-UQP-01 is the Desalinization and Water Treatment Building.

The adequacy of the fire protection features provided are sufficient to prevent a fire originating within fire area FA-UPQ-01 from affecting adjacent fire areas.

This fire area is occasionally occupied during normal plant operations. The egress route from this area in the event of a fire is via multiple exits located at grade elevation.}

Table 9B-2—{Fire Area Parameters}

(Page 9 of 17)

Column	31	32	33	34	~~35~~
Fire Area	FA-USG-03	FA-URA-01	FA-UQA-01	FA-UQA-02	~~FA-UPF-01~~
Building or Area	USG	URA	UQA	UQA	~~UPF~~
Figures	Figure 9B-20	Figure 9B-21	Figure 9B-22	Figure 9B-22	~~Figure 9B-23~~
Fire Barriers (Notes 3,4,5,6)	See Figures	See Figures	See Figures	See Figures	~~See Figures~~
SSC: important to safety	None	None	None	None	~~Yes~~
SCC: post-fire safe shutdown	None	None	None	None	~~None~~
In situ Loading (Note 1)	a, c, d, g, j	a, b, d, e, g, w	a, b, c, e, g	a, c, d, g	~~a, c, d, e, g, k~~
Transient Fire Loading	THL-2	THL-1	THL-2	THL-2	~~THL-2~~
Common Ignition Source (Note 2a)	a, b, c, d, m	a, c	a, b, m	a, b, c, d	~~a, b~~
Atypical Ignition Sources (Note 2b)	None	ee	None	None	~~None~~
Hazard Classification (Note 13)	OH Group-1	OH Group-2	OH Group-1	OH Group-1	~~OH Group-1~~
Automatic Fire Detection	Yes	Yes	Yes	Yes	~~Yes~~
Manual Fire Alarms	Yes	Yes	Yes	Yes	~~Yes~~
Automatic Fixed Fire Suppression	No	No	No	No	~~Yes~~
Manual Fixed Fire Suppression	No	No	No	No	~~No~~
Standpipe and Hose System (Note 7)	No	No	No	No	~~Yes~~
Portable Fire Extinguishers (Note 8)	Yes	Yes	Yes	Yes	~~Yes~~
Suppression Affects	Note 14	Note 14	Note 14	Note 14	~~Note 14~~
Plant Drains	Note 9	Note 9	Note 9	Note 9	~~Note 9~~
Radiological Affects	None	None	None	None	~~None~~
HVAC	Note 10	Note 10	Note 10	Note 10	~~Note 10~~
Emergency Lighting (Note 11)	aa	None	aa	aa	~~aa~~
Communication (Note 12)	Yes	Yes	Yes	Yes	~~Yes~~
Engineering Evaluations	None	None	None	None	~~None~~

Table 9B-2—{Fire Area Parameters}

(Page 10 of 17)

Column	~~36~~	~~37~~	~~38~~	~~39~~	~~40~~
Fire Area	~~FA-UPF-02~~	~~FA-UPF-03~~	~~FA-UPF-04~~	~~FA-UPF-05~~	~~FA-UPF-06~~
Building or Area	~~UPF~~	~~UPF~~	~~UPF~~	~~UPF~~	~~UPF~~
Figures	~~Figure 9B-23~~	~~Figure 9B-23~~	~~Figure 9B-23~~	~~Figure 9B-23~~	~~Figure 9B-23~~
Fire Barriers (Notes 3,4,5,6)	~~See Figures~~	~~See Figures~~	~~See Figures~~	~~See Figures~~	~~See Figures~~
SSC: important to safety	~~None~~	~~OH Group-Yes~~	~~None~~	~~Yes~~	~~Yes~~
SCC: post-fire safe shutdown	~~None~~	~~None~~	~~None~~	~~None~~	~~None~~
In situ Loading (Note 1)	~~a, c, g~~	~~a, c, d, g~~	~~a, c, g~~	~~a, c, d, e, g, k~~	~~a, c, d, g~~
Transient Fire Loading	~~THL-2~~	~~THL-2~~	~~THL-2~~	~~THL-2~~	~~THL-2~~
Common Ignition Source (Note 2a)	~~a~~	~~a, b, c, d~~	~~a~~	~~a, b~~	~~a, b, c, d~~
Atypical Ignition Sources (Note 2b)	~~None~~	~~ee~~	~~None~~	~~None~~	~~ee~~
Hazard Classification (Note 13)	~~OH Group-1~~	~~OH Group-1~~	~~OH Group-1~~	~~OH Group-1~~	~~OH Group-1~~
Automatic Fire Detection	~~Yes~~	~~Yes~~	~~No~~	~~Yes~~	~~Yes~~
Manual Fire Alarms	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~
Automatic Fixed Fire Suppression	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~
Manual Fixed Fire Suppression	~~No~~	~~No~~	~~No~~	~~No~~	~~No~~
Standpipe and Hose System (Note 7)	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~
Portable Fire Extinguishers (Note 8)	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~
Suppression Affects	~~Note 14~~	~~Note 14~~	~~Note 14~~	~~Note 14~~	~~Note 14~~
Plant Drains	~~Note 9~~	~~Note 9~~	~~Note 9~~	~~Note 9~~	~~Note 9~~
Radiological Affects	~~None~~	~~None~~	~~None~~	~~None~~	~~None~~
HVAC	~~Note 10~~	~~Note 10~~	~~Note 10~~	~~Note 10~~	~~Note 10~~
Emergency Lighting (Note 11)	~~aa~~	~~aa~~	~~aa~~	~~aa~~	~~aa~~
Communication (Note 12)	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~
Engineering Evaluations	~~None~~	~~None~~	~~None~~	~~None~~	~~None~~

Table 9B-2—{Fire Area Parameters}

(Page 11 of 17)

Column	35	36	37	38	39
Fire Area	FA-UPF-01	FA-UPF-02	FA-UPF-03	FA-UPF-04	FA-UPF-05
Building or Area	UPF	UPF	UPF	UPF	UPF
Figures	Figure 9B-23	Figure 9B-23	Figure 9B-23	Figure 9B-23	Figure 9B-23
Fire Barriers (Notes 3,4,5,6)	See Figures	See Figures	See Figures	See Figures	See Figures
SSC: important to safety	Yes	None	Yes	Yes	Yes
SCC: post-fire safe shutdown	Yes	None	Yes	Yes	Yes
In situ Loading (Note 1)	a, b, c, d, e, g, j, k, t	a, b, c, j	a, b, c, d, e, g, j, k, t	a, b, c, d, e, g, j, k, t	a, b, c, d, e, g, j, k, t
Transient Fire Loading	THL-2	THL-2	THL-2	THL-2	THL-2
Common Ignition Source (Note 2a)	a, b, c, d, g, m, o, p	a, m	a, b, c, d, g, m, o, p	a, b, c, d, g, m, o, p	a, b, c, d, g, m, o, p
Atypical Ignition Sources (Note 2b)	aa, ee	aa	aa, ee	aa, ee	aa, ee
Hazard Classification (Note 13)	OH Group-2	OH Group-1	OH Group-2	OH Group-2	OH Group-2
Automatic Fire Detection	Yes (Hazard Specific) UPF03-001 Air Cooled Condenser Room 1 UPF03-002 Transformer Room 1 UPF02-001 UHS Makeup Water Pump Room 1 UPF02-003 Traveling Screen Room 1	Yes (Hazard Specific) UPF03-003 Personnel Access to Electrical Rooms UPF02-002 Personnel Access to Pump Rooms	Yes (Hazard Specific) UPF03-004 Air Cooled Condenser Room 2 UPF03-005 Transformer Room 2 UPF02-004 UHS Makeup Water Pump Room 2 UPF02-005 Traveling Screen Room 2	Yes (Hazard Specific) UPF03-006 Air Cooled Condenser Room 3 UPF03-007 Transformer Room 3 UPF02-006 UHS Makeup Water Pump Room 3 UPF02-007 Traveling Screen Room 3	Yes (Hazard Specific) UPF03-008 Air Cooled Condenser Room 4 UPF03-009 Transformer Room 4 UPF02-008 UHS Makeup Water Pump Room 4 UPF02-009 Traveling Screen Room 4
Manual Fire Alarms	Yes	Yes	Yes	Yes	Yes
Automatic Fixed Fire Suppression	No	No	No	No	No
Manual Fixed Fire Suppression	No	No	No	No	No
Standpipe and Hose System (Note 7)	Yes	Yes	Yes	Yes	Yes
Portable Fire Extinguishers (Note 8)	Yes	Yes	Yes	Yes	Yes
Suppression Affects	Note 14	Note 14	Note 14	Note 14	Note 14
Plant Drains	Note 9	Note 9	Note 9	Note 9	Note 9
Radiological Affects	None	None	None	None	None
HVAC	Note 10	Note 10	Note 10	Note 10	Note 10
Emergency Lighting (Note 11)	aa	aa	aa	aa	aa
Communication (Note 12)	Yes	Yes	Yes	Yes	v
Engineering Evaluations	Yes (Notes 6a & 17)	Yes (Notes 6a & 17)	Yes (Notes 6a & 17)	Yes (Notes 6a & 17)	Yes (Notes 6a & 17)

Table 9B-2—{Fire Area Parameters}

(Page 12 of 17)

Column	~~41~~	~~42~~	~~43~~	44	~~49~~40
Fire Area	~~FA-UPF-07~~	~~FA-UPF-08~~	~~FA-UPF-09~~	~~FA-UPF-10~~	FA-UPE-01
Building or Area	~~UPF~~	~~UPF~~	~~UPF~~	~~UPF~~	UPE
Figures	~~Figure 9B-23~~	~~Figure 9B-23~~	~~Figure 9B-23~~	~~Figure 9B-23~~	Figure 9B-24
Fire Barriers (Notes 3,4,5,6)	~~See Figures~~	~~See Figures~~	~~See Figures~~	~~See Figures~~	See Figures
SSC: important to safety	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	None
SCC: post-fire safe shutdown	~~None~~	~~None~~	~~None~~	~~None~~	None
In situ Loading (Note 1)	~~a, c, d, e, g, k~~	~~a, c, d, g~~	~~a, c, d, e, g, k~~	~~a, c, d, g~~	a, c, e, g
Transient Fire Loading	~~THL-2~~	~~THL-2~~	~~THL-2~~	~~THL-2~~	THL-2
Common Ignition Source (Note 2a)	~~a, b, m~~	~~a, b, c, d~~	~~a, b, m~~	~~a, b, c, d~~	a, b, m
Atypical Ignition Sources (Note 2b)	~~None~~	~~ee~~	~~None~~	~~ee~~	None
Hazard Classification (Note 13)	~~OH Group-1~~	~~OH Group-1~~	~~OH Group-1~~	~~OH Group-1~~	OH Group-1
Automatic Fire Detection	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	Yes
Manual Fire Alarms	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	Yes
Automatic Fixed Fire Suppression	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	No
Manual Fixed Fire Suppression	~~No~~	~~No~~	~~No~~	~~No~~	No
Standpipe and Hose System (Note 7)	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	No
Portable Fire Extinguishers (Note 8)	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	Yes
Suppression Affects	~~Note 14~~	~~Note 14~~	~~Note 14~~	~~Note 14~~	Note 14
Plant Drains	~~Note 9~~	~~Note 9~~	~~Note 9~~	~~Note 9~~	Note 9
Radiological Affects	~~None~~	~~None~~	~~None~~	~~None~~	None
HVAC	~~Note 10~~	~~Note 10~~	~~Note 10~~	~~Note 10~~	Note 10
Emergency Lighting (Note 11)	~~aa~~	~~aa~~	~~aa~~	~~aa~~	aa
Communication (Note 12)	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	Yes
Engineering Evaluations	~~None~~	~~None~~	~~None~~	~~None~~	None

Table 9B-2—{Fire Area Parameters}

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Column	~~46~~41	~~47~~42
Fire Area	FA-UPE-02	FA-UPQ-01
Building or Area	UPE	UPQ
Figures	Figure 9B-24	Figure 9B-25
Fire Barriers (Notes 3,4,5,6)	See Figures	See Figures
SSC: important to safety	None	None
SCC: post-fire safe shutdown	None	None
In situ Loading (Note 1)	a, c, d, g	a, c, d, e, g, k
Transient Fire Loading	THL-2	THL-2
Common Ignition Source (Note 2a)	a, b, c, d	a, b, c, d
Atypical Ignition Sources (Note 2b)	ee	None
Hazard Classification (Note 13)	OH Group-1	OH Group-1
Automatic Fire Detection	Yes	Yes (Note 15)
Manual Fire Alarms	Yes	Yes
Automatic Fixed Fire Suppression	No	Yes (Note 15)
Manual Fixed Fire Suppression	No	No
Standpipe and Hose System (Note 7)	No	No
Portable Fire Extinguishers (Note 8)	Yes	Yes
Suppression Affects	Note 14	Note 14
Plant Drains	Note 9	Note 9
Radiological Affects	None	None
HVAC	Note 10	Note 10
Emergency Lighting (Note 11)	aa	aa
Communication (Note 12)	Yes	Yes
Engineering Evaluations	None	None

Table 9B-2—{Fire Area Parameters}
(Page 14 of 17)

Notes

1. In-situ Loading:
   a. Miscellaneous Cable Insulation
   b. Miscellaneous Plastic and Rubber
   c. Miscellaneous Wire and Plastic Components (Panels)
   d. Lubricants and Hydraulic Fluids
   e. Electrical Cabinets
   f. Flammable Gases (Hydrogen)
   g. Electrical Cable Insulation (Cable Trays)
   h. Charcoal (Filters)
   i. Air Compressors
   j. HVAC Subsystem Components
   k. Transformers (Dry)
   l. Transformers (Oil-filled)
   m. Battery Cases
   n. Diesel Fuel Oil
   o. Paints, Solvents and Cleaning Fluids
   p. Clothing (Cotton and Synthetic Blends)
   q. Clothing (Rubber and Plastic)
   r. Paper Records, Procedures and Files
   s. Furniture and/or Appliances
   t. Air Handling Units
   u. Flammable Gases (Methane)
   v. Battery Chargers

Table 9B-2—{Fire Area Parameters}
(Page 15 of 17)

2a. Common Ignition Sources:
- a. Low to Medium Voltage Electrical Circuits
- b. General Electrical and Control Cabinets
- c. Electric Motors
- d. Pumps
- e. Air Compressors
- f. Indoor Oil-filled Transformers
- g. Electrical Switchgear Cabinets
- h. Reactor Protection System MG sets
- i. Diesel Generators
- j. Battery Banks
- k. Boiler Heating Units
- l. Electric Dryers
- m. HVAC subsystem components
- n. Low Voltage Electrical Circuits
- o. Air Handling Units
- p. Transformers (Dry)

2b. Atypical Ignition Sources:
- aa. Arcing Electrical Faults
- bb. Hydrogen Storage Tanks
- cc. Hydrogen Piping
- dd. T/G Exciter / Hydrogen
- ee. Liquid Fuels (spills)
- ff. Outdoor Oil-filled Transformers

3. Barrier Ratings: See "Fire Barrier Location" located on the Fire Area Layout Drawings

4. Doors:
- ♦ For 1 hour fire rated barriers, minimum 1 hour fire rated door assemblies are provided.
- ♦ For 2 hour fire rated barriers, minimum 1.5 hour fire rated door assemblies are provided.
- ♦ For 3 hour fire rated barriers, minimum 3 hour fire rated door assemblies are provided.

Table 9B-2—{Fire Area Parameters}
(Page 16 of 17)

5. Dampers:
   - For 1 hour fire rated barriers, minimum 1 hour fire rated dampers are provided, except where through duct configuration is suitable to satisfy NFPA 90A (NFPA, 2002) requirements to allow for dampers to be omitted.
   - For 2-hour fire rated barriers, minimum 1.5-hour fire rated dampers are provided.
   - For 3-hour fire rated barriers, minimum 3-hour fire rated dampers are provided.

6. Penetrations:
   Penetrations through fire rated walls, floors, and ceilings of each fire area are sealed or otherwise closed with rated penetration seal assemblies except where seal omission is permitted by NFPA code/standard. Any non-rated penetrations through rated barriers in this fire area will be justified by engineering evaluations.

6a. ~~During detailed design, engineering evaluations associated with the non-rated traveling screen penetrations through the rated floors of fire areas FA-UPF-11, FA-UPF-12, FA-UPF-13 and FA-UPF-14 shall be performed.~~During detailed design, an engineering evaluation shall be performed to justify the open floor trench penetrations through the 3 hour rated fire barriers separating fire areas FA-UPF-01, FA-UPF-03, FA-UPF-04 and FA-UPF-05 (rooms UPF02-003, UPF02-005, UPF02-007, and UPF02-009) and the debris basin.

7. Unless noted otherwise, a "Yes" indicates that Class III standpipes and hose stations are available for fire fighting use, but may not be located within the fire area.

7a. One and a half inch hose connections shall be provided in lieu of the Class III standpipes and hose connections.

8. Portable Fire Extinguishers:
   Portable fire extinguishers may not necessarily be located in each individual fire area; however, they are available throughout each building to support manual fire fighting activities in accordance with NFPA requirements.

9. Plant Drains:
   Drainage to be determined during detailed design. Drains will be provided except where storage of hazardous materials and/or radiological contamination imposes requirements for confinement and/or secondary containment.

Table 9B-2—{Fire Area Parameters}
(Page 17 of 17)

10. HVAC:
Duct smoke detection and fan interlock will be provided when required by NFPA 90A.

11. Emergency Lighting:
aa. self-contained, battery backed fixtures installed throughout the fire area which provide minimum illumination for a 90 minute period to ensure a safe access/egress path in the event of a loss of the normal lighting system.

12. Communication:
One or more of the following methods of communication are available: plant-wide public address/paging system, in-plant telephone system, external communication links to the outside world, and/or portable radio communications.

13. Hazard Classification:
See Section 9B.2.2 for definition of hazard classifications.
- Light Hazard
- Ordinary Hazard (OH Group-1)
- Ordinary Hazard (OH Group-2)
- Extra Hazard (EH Group-1)
- Extra Hazard (EH Group-2)

14. Suppression Affects:

No adverse affects from automatic suppression systems are anticipated based on selected suppression agents and systems, on the absence of important to safety SSCs in the area or room of concern, and/or on the absence of important to safety SSCs susceptible to damage in the area or room of concern. This will require confirmation after final room/area, suppression system and important to safety SSC configuration/layout.

15. Water Reactive Chemicals:

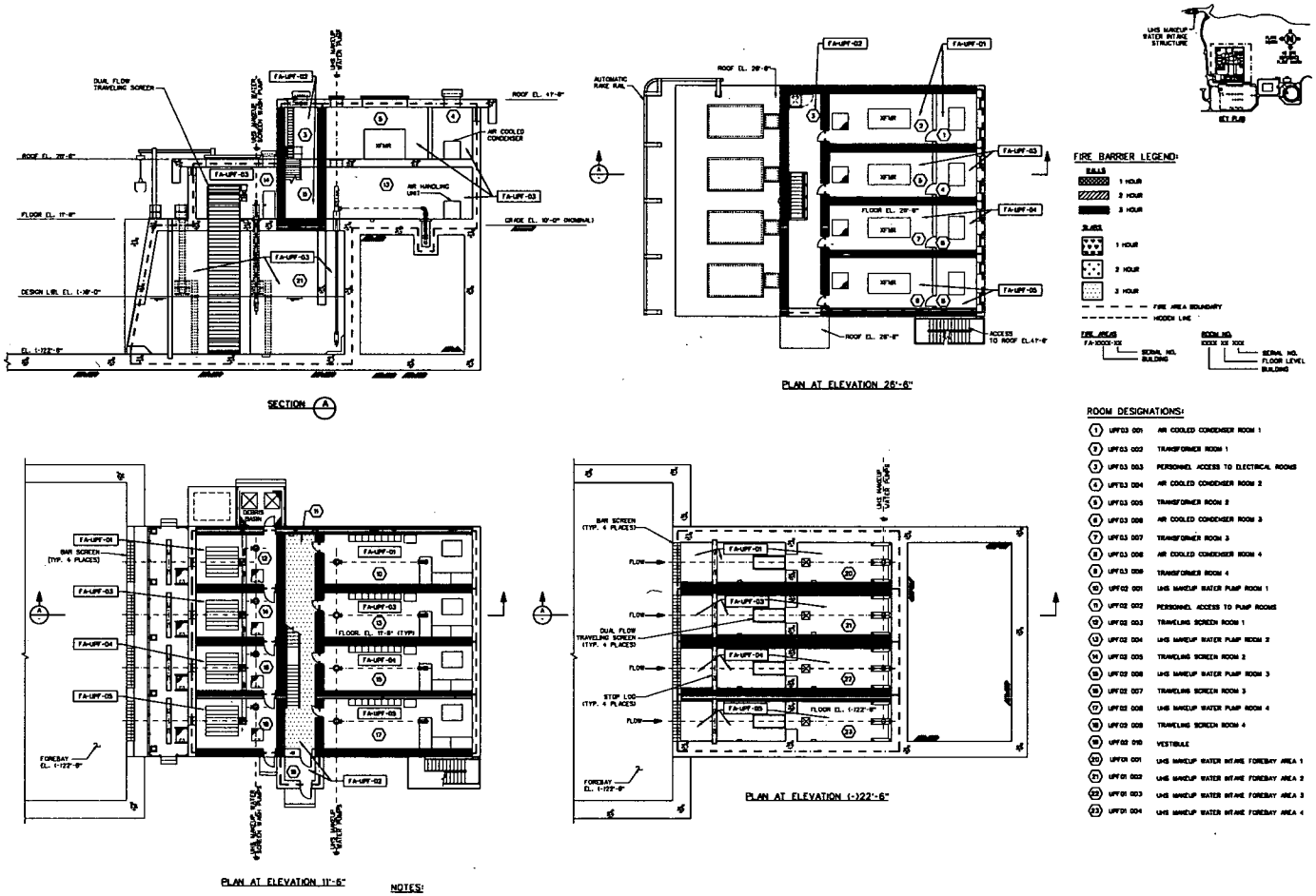
The Water Treatment Building will be provided with full area sprinkler protection, except for secondary containment areas associated with the tank storage of water reactive chemicals. These areas will be provided with automatic fire detection in accordance with the provisions of the IBC.

16. Manual pull stations may not necessarily be located in each individual fire area; however, they are located in accordance with NFPA requirements.

17. During detailed design, an engineering evaluation shall be performed to confirm the inability of smoke and hot gases to migrate into other fire areas to the extent that they could adversely affect safe-shutdown capabilities, including operator actions.

Figure Replaced

Figure 9B-23—{CCNPP Unit 3 Fire Barrier Location, UHS Makeup Water Intake Structure, Plan View and Section A-A}



UN#10-285

Enclosure 8

Markup pages of FSAR Chapter 14.0

Calvert Cliffs Nuclear Power Plant, Unit 3

14.2.14.2 Ultimate Heat Sink (UHS) Makeup Water System

1. OBJECTIVES

   a. To demonstrate the ability of the UHS Makeup Water System to supply makeup water as designed.

   b. To establish baseline performance data for future equipment surveillance and ISI.

   c. Verify electrical independence and redundancy of safety-related power supplies.

   d. To demonstrate the ability of the traveling screens to be manually rotated and manually washed off.

2. PREREQUISITES
   Ultimate Heat sink (UHS) Makeup Water System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the UHS Makeup Water System, including the test bypass line, have been completed and the system is functional.

   b. Construction activities on the ESW blowdown lines from the ESW system isolation MOVs to the retention basin have been completed, and the lines are isolable from the ESWS and functional.

   c. Hydrostatic/leak testing of the UHS Makeup Water System, including the test bypass line, has been completed with satisfactory results.

   d. UHS Makeup Water System instrumentation is functional and has been calibrated.

   e. Support systems required for operation of the UHS Makeup Water System are complete and functional.

   f. Test instrumentation available and calibrated.

   g. ~~Temperature controller settings and monitoring functions such as electrical circuit and temperature alarms for heat tracing system are set in accordance with UHS Makeup water system piping design requirements.~~

   h. ~~To ensure the operation, heat tracing systems shall be tested before and after installation of the piping/tubing insulation, as applicable.~~

3. TEST METHOD

   a. Verify that each UHS Makeup Water System division can be operated from the main control room and the remote shutdown panel.

   b. Verify safety-related automatic valves (MOVs, SOVs, AOVs) respond as designed to each of the applicable open/close signal sources, including time delay circuitry..

   c. Verify valve position indication.

   d. Verify position response of valves to loss of motive power.

   e. Verify air release valves operate as designed on pump start.

   f. ~~Verify each traveling screen and screen wash system operates as designed.~~

   g. Verify each discharge strainer operates as designed.

   h. Verify that makeup flow through the test bypass line demonstrates the system can deliver the minimum Technical Specification flow rate to the ESWS Cooling Tower.

i. ~~Verify flow through the room cooler in each room of both the UHS Makeup Water Intake Structure and UHS Electrical Building.~~

j. Verify alarms, interlocks, display instrumentation, and status lights function as designed.

k. Verify head versus flow characteristics for each UHS Makeup Water System pump at design conditions.

l. Verify valve performance data, where required.

m. ~~Verify the temperature controller and monitoring functions for the heat tracing system operate in accordance with the design requirements.~~

n. Verify electrical independence and redundancy of power supplies for safety-related functions.

o. Verify ability of the traveling screens to be manually rotated and manually washed off.

p. Verify adequate system alignment to perform back flushing.

4. DATA REQUIRED

a. Record alarm, interlocks, and control setpoints.

b. Record pump head versus flow and operating data.

c. Record valve performance parameters (e.g., stroke time, developed thrust) for baseline diagnostic testing data.

d. Record valve position upon loss of motive power and valve position indication data.

e. ~~Record temperature controller set points and monitoring functions for proper operation of heat tracing system operation.~~

5. ACCEPTANCE CRITERIA

a. Each UHS Makeup Water System division can be operated, as designed, from the main control room and the remote shutdown panel.

b. The safety-related automatic valves (MOVs, SOVs, AOVs) respond to the designated open/close signal sources, including time delay circuitry, as designed.

c. The valve position indications properly indicate actual valve position.

d. The position response of valves to loss of motive power is correct.

e. The air release valves operate as designed on pump start.

f. ~~The traveling screens and screen wash systems operate as designed.~~

g. The discharge strainers perform as designed.

h. The makeup flow through the test bypass line demonstrates the system can deliver the minimum Technical Specification flow rate to the ESWS Cooling Tower.

i. ~~The flow through the room cooler in each room of both the UHS Makeup Water Intake Structure and UHS Electrical Building is per system design criteria.~~

j. The alarms, interlocks, display instrumentation, and status lights function as designed.

k. The head versus flow characteristics for each UHS Makeup Water System pump at design conditions has been met.

l. The valves meet performance data where required.

m. The UHS Makeup Water System operates per design and as described in Section 9.2.5.

n. ~~Heat tracing operates within temperature controller set point limits, and monitoring functions operate in accordance with design requirements.~~

o. Safety-related components meet electrical independence and redundancy requirements.

p. Traveling screens can be manually rotated and manually washed off.

q. Backflushing can be performed via the discharge strainer debris removal line.

14.2.14.8 UHS Makeup Water Intake Structure Ventilation ~~System~~Systems (Makeup Pump Room Ventilation System, Intake Structure Corridor Ventilation System, Traveling Screen Room Ventilation System)

1. OBJECTIVES

   a. To demonstrate the ability of the UHS Makeup Water Intake Structure Ventilation ~~System~~Systems to provide cooling and heating sufficient to maintain necessary operating environment for the UHS makeup water pumps and related equipment.

   b. To establish baseline operating data for future equipment surveillance and ISI.

   c. Verify electrical independence and redundancy of safety-related power supplies.

2. PREREQUISITES
   UHS Makeup Water Intake Structure Ventilation ~~System~~Systems testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the UHS Makeup Water Intake Structure Ventilation ~~System~~Systems have been completed.

   b. UHS Makeup Water Intake Structure Ventilation ~~System~~Systems instrumentation is complete and functional and has been calibrated.

   c. Support systems required for operation of the UHS Makeup Water Intake Structure Ventilation ~~System~~Systems are complete and functional.

   d. The UHS Makeup Water Intake Structure is in its final configuration (doors and access points installed and wall, ceiling, and floor penetrations in their design condition).

   e. Test instrumentation available and calibrated.

   f. The UHS Makeup Water Intake Structure Ventilation ~~System flow balance has~~Systems air flow balances have been completed.

   g. The UHS Makeup Water System is available for full flow testing.

3. TEST METHOD

   a. Verify control logic and interlock functions for each division.

   b. Verify alarms, displays, indications and status lights both locally and in the main control room for each division.

   c. Verify operation of dampers and damper controls per design requirements.

   d. Verify operation of the ~~exhaust~~ fan units (supply and exhaust, air conditioning unit, and air cooled condenser) and dampers per design requirements.

   e. Verify each division's air flow (both heating and cooling) meets design specifications.

   f. Verify that room temperatures in the pump room and the transformer room in each division can be maintained within the design range.

   g. Verify proper operation of the intake structure corridor ventilation system (including duct heaters) and the traveling screen room ventilation system (including unit heater).

h. Full flow test of the UHS Makeup Water System should be coordinated with UHS Makeup Water Intake Structure Ventilation System testing to simulate the room design heat load.

i. Verify electrical independence and redundancy of power supplies for safety-related functions.

j. Verify proper operation of the air conditioning unit refrigeration system.

4. DATA REQUIRED

a. Fan operating data.

b. Setpoints at which alarms and interlocks occur.

c. ~~Unit heater~~Duct heaters, air conditioning unit electric heating coil, and unit heater operating data.

d. Powered damper operating data.

e. Air flow measurements in ducts.

f. Air flow and temperature measurements in inlets and outlets.

g. Cooling water flow and temperature across the air handling unit coils.

h. Temperatures of each division's pump room, transformer room, traveling screen room, and corridor.

i. Air conditioning unit operating data.

5. ACCEPTANCE CRITERIA

a. The control logic and interlocks function per design.

b. The alarms, displays, indications and status lights, both locally and in the main control room, for each division operate as designed.

c. The operation of dampers and damper controls are as per design requirements.

d. The operation of the fan units and dampers are as per the design requirements.

e. Each division's airflow (both heating and cooling) meet design specifications.

f. The room temperatures in the pump room and the transformer room in each division can be maintained within the design range of ≥41 °F and ≤104 °F.

g. The systems cooling and heating capacities meet or exceed design requirements as specified in equipment supplier published data, for the as-tested ambient conditions.

h. The UHS Makeup Water Intake Structure Ventilation System operates per design requirements and as described in Section 9.4.15.

i. Safety-related components meet electrical independence and redundancy requirements.

j. Tornado dampers perform as designed.

k. Air conditioning unit operating data satisfies manufacturer specifications.

14.2.14.9 ~~UHS Electrical Building Ventilation System~~ Not Used

1. ~~OBJECTIVES~~

   a. ~~To demonstrate the ability of the UHS Electrical Building Ventilation System to provide cooling and heating sufficient to maintain necessary operating environment for the electrical divisions supporting the UHS Makeup Water System.~~

   b. ~~To establish baseline operating data for future equipment surveillance and ISI.~~

   c. ~~Verify electrical independence and redundancy of safety-related power supplies.~~

2. ~~PREREQUISITES~~
   ~~UHS Electrical Building Ventilation System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:~~

   a. ~~Construction activities on the UHS Electrical Building Ventilation System have been completed.~~

   b. ~~UHS Electrical Building Ventilation System instrumentation is complete and functional and has been calibrated.~~

   c. ~~Support systems required for operation of the UHS Electrical Building Ventilation System are complete and functional.~~

   d. ~~The UHS Electrical Building is in its final configuration (doors and access points installed and wall, ceiling, and floor penetrations in their design condition).~~

   e. ~~Test instrumentation available and calibrated.~~

   f. ~~The UHS Electrical Building Ventilation System flow balance has been completed.~~

3. ~~TEST METHOD~~

   a. ~~Verify control logic and interlock functions for each division.~~

   b. ~~Verify alarms, displays, indications and status lights both locally and in the main control room for each division.~~

   c. ~~Verify operation of dampers and damper controls per design requirements.~~

   d. ~~Verify operation of the exhaust fan units and dampers per design requirements.~~

   e. ~~Verify each division's air flow (both heating and cooling) meets design specifications.~~

   f. ~~Verify that room temperatures in the electrical equipment room in each division can be maintained within the design range under design ambient (heating load and cooling load) conditions.~~

   g. ~~Verify electrical independence and redundancy of power supplies for safety-related functions.~~

4. ~~DATA REQUIRED~~

   a. ~~Fan operating data.~~

   b. ~~Setpoints at which alarms and interlocks occur.~~

   c. ~~Unit heater operating data.~~

   d. ~~Powered damper operating data.~~

   e. ~~Air flow measurements in ducts.~~

f. ~~Air flow measurements in inlets and outlets.~~

g. ~~Temperatures of each division's electrical equipment room.~~

5. ~~ACCEPTANCE CRITERIA~~

a. ~~The control logic and interlock functions for each division are as designed.~~

b. ~~The alarms, displays, indications and status lights both locally and in the main control room for each division operate as designed.~~

c. ~~The operation of dampers and damper controls are as per design requirements.~~

d. ~~The operation of the fan units and dampers are as per the design requirements.~~

e. ~~Each division's airflow (both heating and cooling) meet design specifications .~~

f. ~~The room temperatures in the electrical equipment room in each division can be maintained within the design range of >41 °F and < 104 °F under design ambient (heating load and cooling load) conditions.~~

g. ~~The UHS Electrical Building Ventilation System operates per design requirements and as described in Section 9.4.11.~~

h. ~~Safety-related components meet electrical independence and redundancy requirements.~~

14.2.14.13 UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ Communications System

1. OBJECTIVES

   a. To demonstrate the adequacy of the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ intra-plant communications system to provide communications between vital plant areas.

   b. Verify that non-safety-related communication system functions as designed to limit malfunctions or failures.

   c. To demonstrate that the UHS makeup water structure ~~and UHS electrical building~~ communication systems meet design requirements.

2. PREREQUISITES
   UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ Communication System testing shall be performed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the intraplant communications system have been completed.

   b. Support systems required for operation of the intraplant communications system are complete and functional.

   c. Plant equipment that contributes to the ambient noise level in the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ shall be in operation.

3. TEST METHOD

   a. Verify the intraplant portable wireless communication system functions as designed in the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~.

   b. Verify that the intraplant (PABX) telephone system functions as designed in the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~.

   c. Verify the intraplant sound powered telephone system functions as designed in the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~.

   d. Verify the intraplant public address system functions as designed in the UHS Makeup Water Intake Structure and ~~UHS Electrical Building~~.

   e. Verify the security radio system functions as designed in the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~.

   f. Verify that the communication equipment will perform under the anticipated maximum plant noise levels in the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~.

   g. Verify the effectiveness of the exclusion zones established for protecting the safety-related I&C equipment from mis-operation due to EMI/RFI effects from the portable phones and radios of the communications system or verify the adequacy of the lack of exclusion zones in the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~.

   h. Verify that the communication system responds as designed to actual or simulated limiting malfunctions or failures.

4. DATA REQUIRED

   a. Record the results of communication attempts from each system and its locations.

5. ACCEPTANCE CRITERIA

   a. The intraplant communication system operates in the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ to the same level of performance as described in the U.S. EPR FSAR Section 9.5.2.

   b. The communications equipment in the UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~ is capable of operating under maximum noise conditions.

   c. Safety-related I&C equipment performance is not adversely impacted by the portable phones and radios of the communications system.

   d. The portable wireless communication system provides radio coverage throughout the plant, except in areas restricted due to potential EMI/RFI considerations.

   e. The portable wireless communication system provides an interconnection to the public switched telephone network (PSTN) to allow offsite communications.

   f. The digital telephone system provides plant-wide intercom capability.

   g. The digital telephone system provides an interconnection to the PSTN to allow offsite communications.

   h. The public address and alarm system operates as described in the design specification.

   i. The sound powered system operates as described in the design specification.

   j. The security communication system operates as described in the design specification.}

Table 14.3-1—{Site Specific Analyses (Safety Significant Features)}

Item #	Safety Significant Design Feature	Part 10 ITAAC Table
1	For the Ultimate Heat Sink (UHS) Makeup Water Intake Structure~~ and UHS Electrical Building~~, fire barriers are provided that protect and separate the UHS makeup pumps and~~ each~~ associated electrical ~~division~~equipment.	Table 2.4-7 ~~Table 2.4-8~~
2	The pump house area of the CCNPP Unit 3 UHS Makeup Water Intake Structure ~~and the UHS Electrical Building have~~has the following design features: ♦ ~~A flood-tight outer structure,~~ ♦ ~~Divisionally separated by flood-tight walls,~~ ♦ Interior flood-protection measures to protect UHS makeup pump and transformer rooms~~ and UHS electrical divisions~~, ♦ The interior and exterior structures are able to withstand the static and dynamic flood forces.	Table 2.4-7 ~~Table 2.4-8~~
3	For the Switchgear Building, fire barriers are provided that protect the SBO Diesel Generators and their fuel supplies and that separate the SBO Diesel Generators from the normal power supplies.	Table 2.4-~~12~~11
4	An on-site Operational Support Center is provided.	Table 2.3-1
5	The elevation of the UHS makeup pump suction is sufficiently low.	Table 2.4-~~24~~22
6	Properties of backfill material (i.e., structural fill) for Seismic Category I structures.	Table 2.4-1
7	Compaction requirements for backfill for Seismic Category I structures.	Table 2.4-1
8	There are at least two preferred power circuits that are physically independent.	Table 2.4-~~28~~26
9	Forebay is Seismic Category I, and is designed as Seismic Category I	Table 2.4-30

Table 14.3-2—{Site Specific SSC ITAAC Screening Summary}

Site-Specific Structure, System, or Component	U.S. EPR Interface	Selected for ITAAC
Structure		
Fire Protection Building	Yes	Yes
Switchgear Building	Yes	Yes
Turbine Building	Yes	Yes
Security Access Building	Yes	Yes
UHS Makeup Water Intake Structure, including CCNPP Unit 3 Forebay	Yes	Yes
~~UHS Electrical Building~~	~~Yes~~	~~Yes~~
Warehouse Building	Yes	Yes
Central Gas Supply Building	Yes	Yes
Grid Systems Control Building (i.e., Control House)	Yes	Yes
Circulating Water System Cooling Tower Structure	Yes	Yes
Circulating Water System Pump Building	Yes	Yes
Circulating Water System Makeup Water Intake Structure	Yes	Yes
Circulating Water System Retention Basin	No	No
Desalinization / Water Treatment Building (i.e., Desalinization Plant)	Yes	Yes
Waste Water Treatment Facility	Yes	Yes
Buried Ductbanks	Yes	Yes
Buried Pipe	Yes	Yes
Structural fill and Backfill under Seismic Category I and SC II-SSE structures	Yes	Yes
Access Building	Yes	Yes
Sheetpile Wall	Yes	Yes
Component		
Waterproofing membrane for Seismic Category I Concrete Foundations, Walls and Buried Concretr Commodities Exposed to Low pH Groundwater	No	Yes
System		
Offsite Power System	Yes	Yes
Power Transmission System (Main Generator, Main Transformer, Protection & Synchronization)	Yes	Yes
Essential Service Water Blowdown System	No	No
Essential Service Water Makeup System Chemical Treatment System	No	No
Normal Essential Service Water Makeup System	No	No
UHS Makeup Water System	Yes	Yes
Potable Water System, including Potable Water Tank	No	No
Sanitary Waste Water System	No	No
Raw Water System, including Desalinization Plant	Yes	Yes
Circulating Water System, including support systems (i.e., Cooling Tower Makeup System, Cooling Tower Blowdown System, Chemical Treatment System, Circulating Water System Seal Well, and Circulating Water System Outfall)	No	No
UHS Makeup Water Intake Structure Ventilation ~~System~~Systems	No	Yes
~~UHS Electrical Building Ventilation System~~	~~No~~	~~Yes~~
Fire Protection Building Ventilation System	No	Yes
Central Gas Distribution System	No	No
Fire Detection and Alarm Systems for Balance of Plant	No	No
Fire Water Distribution System, including Fire Protection Storage Tanks	Yes	Yes
Fire Suppression Systems for UHS Makeup Water Intake Structure~~, UHS Electrical Building,~~ and Fire Protection Building)	No	Yes
Fire Suppression Systems for site specific Buildings other than UHS Makeup Water Intake Structure~~, UHS Electrical Building,~~ and Fire Protection Building	No	No
Standpipes and Hose Stations for site specific Buildings other than UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~	No	No
Standpipes and Hose stations for UHS Makeup Water Intake Structure ~~and UHS Electrical Building~~	No	Yes

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Markup pages of FSAR Chapter 17.0

Calvert Cliffs Nuclear Power Plant, Unit 3

Table 17.4-1—{Site Specific Systems and Structures Included Within RAP}

SSC Names	Qualitative Determination for Inclusion Within RAP
DISTRIBUTED UTILITIES	
UHS Makeup Water System	Considered in design basis analysis. The system function is considered important in the Safety Analysis Report. A contribution to initiators. Technical Specification considerations .
ELECTRICAL SYSTEMS	
Offsite Power System-partial (plant specific scope)	Contains components imprtant to maintaining system reliability; System failure modes may affect multiple trains/systems; Technical Specification considerations
Switchyard	Contains components imprtant to maintaining system reliability; System failure modes may affect multiple trains/systems; Technical Specification considerations.
STRUCTURES	
UHS Makeup Water Intake Structure	System failure modes may affect multiple trains/systems.
~~UHS Electrical Building~~	~~System failure modes may affect multiple trains/systems.~~
Switchgear Building	System failure modes may affect multiple trains/systems. (Station Blackout)

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Enclosure 10

Markup pages of FSAR Chapter 19.0

Calvert Cliffs Nuclear Power Plant, Unit 3

19.1.5.4.2 External Flooding Evaluation

Section 2.4.3 through 2.4.7 provide an evaluation of the different flooding conditions considered for the CCNPP Unit 3 site, as well as the U.S. EPR FSAR's protection features against those conditions. The flooding conditions include the probable maximum flood (PMF) on streams and rivers, potential dam failures, probable maximum surge and seiche flooding, probable maximum tsunami and ice effect flooding. Maximum flooding levels due to local intense precipitation are also addressed.

Section 2.4.2 summarizes the flooding evaluations and provides required flood protection requirements. The maximum water level for Nuclear Island due to a local probable maximum precipitation (PMP) is Elevation 81.5 ft (24.8 m) with respect to the reference level. Safety-related structures of the Nuclear Island have a minimum grade slab or entrance at Elevation 84.6 ft (25.8 m) or higher. Grading in the power block area around the safety-related facilities is such that all grades slope away from the structures at a minimum of 1% towards collection ditches. Other than for local PMP flooding, the maximum estimated water surface elevations resulting from all design basis flood considerations discussed in Sections 2.4.2 through 2.4.7 are well below the entrance and grade slab elevations for the power block safety-related facilities. Therefore, flood protection measures are not required for the CCNPP Unit 3 Nuclear Island.

However, flood protection measures are required for the UHS Makeup Water Intake Structure ~~and the UHS Electrical Building~~. The grade level at the UHS intake location is at elevation 10.0 ft (3.05 m). The maximum flood level at the intake location is elevation 33.2 ft (10.11 m) as a result of the surge, wave heights, and wave run-up associated with the probable maximum hurricane (PMH) as discussed in Section 2.4.5.

Flood protection measures for the UHS Makeup Water Intake Structure ~~and the UHS Electrical Building~~, as described in Section 2.4.10, include structural measures to withstand static and dynamic flooding forces, water proofing and water tight doors and hatches. Furthermore, makeup water to the safety-related essential service water cooling tower structures is not required for more than six days of heat removal, if four trains are available. This would provide ample time to provide alternate means to supply the cooling towers. Makeup to the essential service water cooling tower structures is not credited in the U.S. EPR FSAR PRA.

Therefore, the applicable SRP screening criteria in NUREG-0800, SRP Section 2.4.10, are met for the different types of external flooding events, and the risk posed by external flooding can be screened for the CCNPP Unit 3 site.

19.1.5.4.6 Other External Events Risk Evaluation

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

Two types of external events from Table 19.1-1 are addressed in this section. These are turbine generated missiles and collisions with the UHS Makeup Water Intake Structure or ~~UHS Electrical Building~~Forebay.

Turbine Missiles

< Text suppressed for clarity >

Collisions with UHS Makeup Water Intake Structure or ~~UHS Electrical Building~~ Forebay

CCNPP Unit 3 is located on a navigable waterway. The only safety-related structures located near the shore line are the UHS Makeup Water Intake Structure and ~~UHS Electrical Building~~Forebay. These are safety related structures located adjacent to the CWS Makeup Intake Structure. The UHS Makeup Water Intake Structure and the ~~UHS Electrical Building~~Forebay for CCNPP Unit 3 are situated in an area that is set back from the Chesapeake Bay shoreline at the south end of the intake structure for CCNPP Units 1 and 2. Additionally, the portion of the Chesapeake Bay in the vicinity of the intake structure is sufficiently shallow that any vessel of significant size that could possibly cause damage to the intake structure would most likely run aground before it could impact the intake structure (Section 2.2.3.1.5). In the unlikely event of a collision involving the UHS Makeup Water Intake Structure or ~~UHS Electrical Building~~Forebay, no initiating event would occur. If a plant trip were to occur (automatic or manual), the initial inventory of the four Essential Service Water Cooling Tower Structures would have adequate capacity for more than six days of heat removal assuming all four divisions are available. This would provide ample time to provide alternate means to supply the Essential Service Water Cooling Tower Structures. Makeup to the Essential Service Water Cooling Tower Structures is not credited in the PRA. Therefore, collisions with the UHS Makeup Water Intake Structure or ~~UHS Electrical Building~~Forebay have been screened from the PRA.}

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Enclosure 11

Markup Pages of COLA Part 3, Environmental Report

Calvert Cliffs Nuclear Power Plant, Unit 3

1.2.4 COOLING SYSTEM INFORMATION

The two major cooling systems interacting with the environment are the Circulating Water System and the Essential Service Water System. Figure 1.2-3 provides a simplified diagram of these two systems.

1.2.4.1 Circulating Water System

The U.S. EPR uses a Circulating Water Supply System (CWS) to dissipate waste heat rejected from the main condenser and turbine building closed cooling water heat exchangers (via heat exchange with the auxiliary cooling water system) during normal plant operation at full station load. A closed-cycle, wet cooling system is used for CCNPP Unit 3, a departure from the existing CCNPP Units 1 and 2 which have a once-through cooling system. The CCNPP Unit 3 system uses a single mechanical draft cooling tower with plume abatement for heat dissipation. The plume abatement feature will eliminate any visible water vapor plume from the tower. The exhausted steam from the low pressure steam turbine is directed to a surface condenser (i.e., main condenser), where the heat of vaporization is rejected to a closed loop of cooling water. Cooling water from the CWS is also provided to the auxiliary cooling water system. Two 100% capacity auxiliary cooling water system pumps receive cooling water from the CWS and deliver the water to the Closed Cooling Water System (CLCWS) heat exchangers. Heat from the CLCWS System is transferred to the auxiliary cooling water system in the CLCWS System heat exchangers and heated auxiliary cooling water is returned to the CWS. The heated cooling water from the main condenser and auxiliary cooling water system is sent to the spray headers of the cooling tower, where heat content of the cooling water is transferred to the ambient air via evaporative cooling and conduction. After passing through the cooling tower, the cooled water is recirculated back to the main condenser and auxiliary cooling water system to complete the closed cycle cooling water loop. Makeup water from the Chesapeake Bay is required to replace evaporative water losses, drift losses, and blowdown discharge.

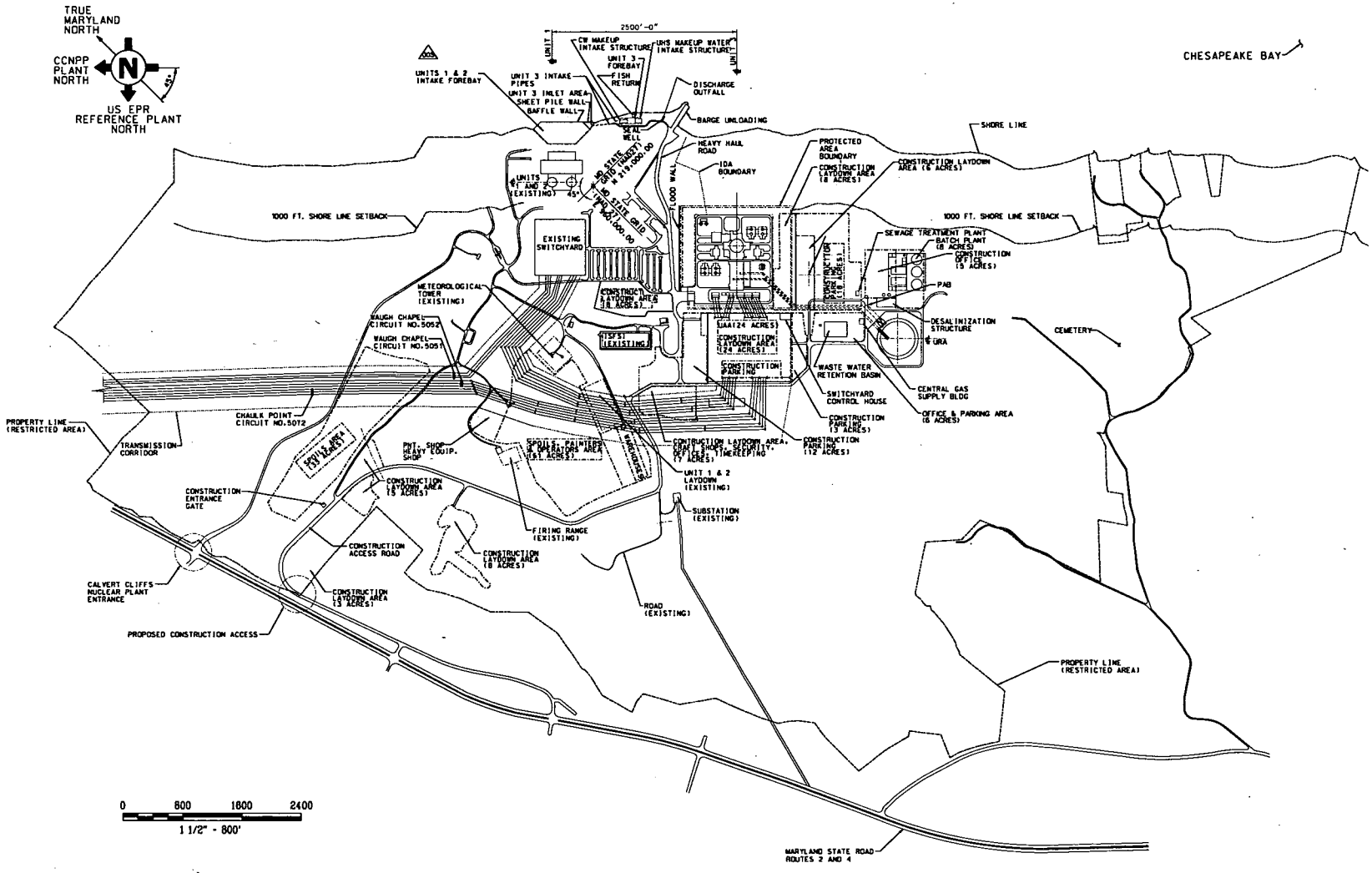
Makeup water for the CWS will be taken from the Chesapeake Bay. Two 60-in (152-cm) diameter intake pipes will run approximately 500 ft (152.4 m) south from a shoreline location near the southern edge of the Units 1 and 2 intake structure to a 100 ft (30.48 m) long, and 80 ft (24.38 m) wide unlined forebay. The forebay will be constructed on the shoreline terrace north of the existing pond and barge slip and will have vertical sheet pile sides that extend to Elevation ~~10~~11.5 ft (3.5~~3.05~~ m) NGVD 29 with an unlined bottom at -22 ft 6 in (-6.86 m) NGVD 29. The CWS pumphouse will be at the northern end of the forebay and the UHS pumphouse will be at the southern end. A rip-rap seawall extending approximately 75 ft (22.9 m) north from the shoreline, east of the pipeline entrance, rip-rap along the shoreline, and a trash rack will be used to protect the pipeline entrance point. The makeup water will be pumped through a common header directly to the cooling tower basin. Blowdown from the cooling tower discharges to a common retention basin to provide retention time for settling of suspended solids and to permit further chemical treatment of the wastewater, if required, prior to discharge to the Chesapeake Bay. The water is pumped through the main condenser, to and from the auxiliary cooling system (all in parallel), and then to the cooling tower to dissipate heat to the atmosphere. Figure 1.2-4 shows the location of the cooling tower for CCNPP Unit 3.

Figure Replaced

Figure 1.2-4—Aerial View of CCNPP Units 1 and 2 with CCNPP Unit 3 Superimposed

Figure Replaced

Figure 2.1-1—CCNPP Site and Proposed New Plant Layout



2.3.1.1.1.1 Local Drainage

The CCNPP site is well drained by a natural network of short, ephemeral streams and creeks within the two sub-watersheds. Approximately 80% of the the CCNPP site is drained through the St. Leonard Creek drainage basin of the Lower Patuxent River watershed. The remaining 20% drains through the Maryland Western Shore watershed discharging northeastward and directly into the Chesapeake Bay by two unnamed creeks, identified as Branch 1 and Branch 2 in Figure 2.3-2. All the streams that drain the CCNPP site that are located east of Maryland Route 2/4 are non-tidal.

Runoff from the CCNPP site that lies within the St. Leonard Creek watershed mainly drains through Johns Creek, a tributary to St. Leonard Creek. The tributaries located upstream of Maryland Route 2/4 that contribute to Johns Creek are the Goldstein Branch, Laveel Branch, and two unnamed branches identified as Branch 3 and Branch 4 in Figure 2.3-2. Approximate lengths and average gradients of these streams are presented in Table 2.3-1.

The St. Leonard Creek watershed has a drainage area of approximately 35.6 mi^2 (92.2 km^2) (CWP, 2004) and mainly includes St. Leonard Creek and its tributaries, including the Perrin Branch, Woodland Branch, Planters Wharf Creek, Johns Creek and its tributaries, Grovers Creek, Rollins Cove, and Grapevine Cove as shown in Figure 2.3-3. The combined flow from these streams discharge into the Patuxent River through St. Leonard Creek. St. Leonard Creek is tidally influenced at the confluence with Johns Creek.

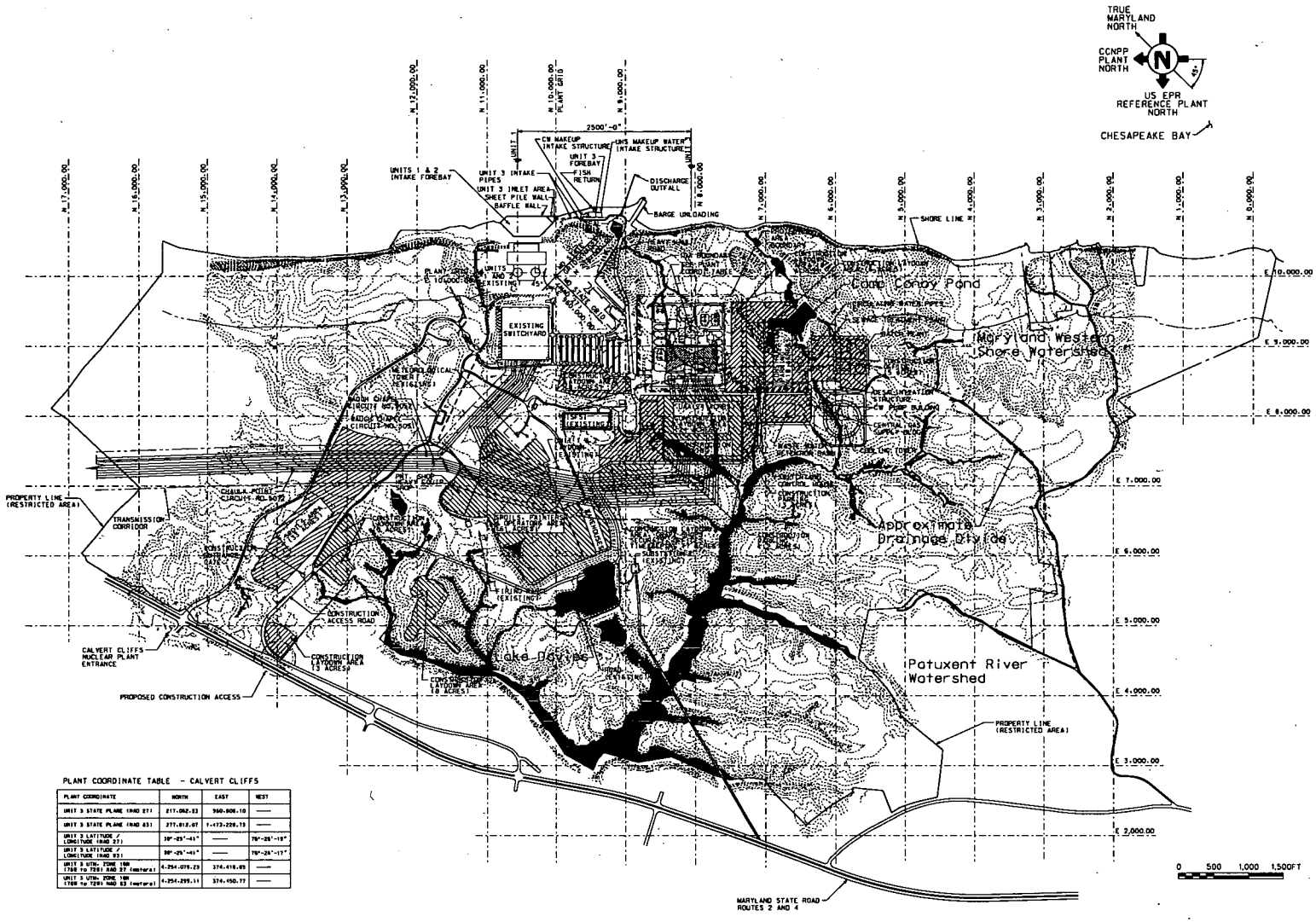
The CCNPP Unit 3 power block will be located in the Maryland Western Shore Watershed as shown in Figure 2.3-2. The circulating water system (CWS) cooling towers and switchyard will be located in the St. Leonard Creek watershed. Power transmission lines from the CCNPP Unit 3 substation will use the CCNPP Units 1 and 2 transmission corridor. From the CCNPP Unit 3 substation, the transmission lines will proceed in a northwestward direction as shown in Figure 2.3-4. Site grading for CCNPP Unit 3 will affect the headwaters of the unnamed creek, Branch 1, in the Maryland Western Shore watershed. In the St. Leonard Creek watershed, the unnamed creek, Branch 3, will be affected by the switchyard. Post-construction drainage from the CCNPP Unit 3 power block area will be directed towards the Chesapeake Bay, while drainage from the CWS cooling tower and switchyard will be directed to Johns Creek.

The design basis flood elevation at the power block area is 81.5 ft (24.8 m) NGVD 29. However, the maximum water level associated with a safety-related structure is 81.4 ft (24.8 m) NGVD 29, which is 3.2 ft (1.0 m) below the reactor complex grade slab at elevation 84.6 ft (25.8 m) NGVD 29. The design basis flood elevation at the safety-related UHS makeup water intake structure is not expected to exceed ~~39.4~~33.2 ft (10.11~~12~~ m)NGVD 29.

Wetlands near the CCNPP Unit 3 construction area consist of small headwater streams with narrow floodplains and associated riparian forest in the St. Leonard watershed; and minor Chesapeake Bay watershed, minor tributary streams and associated small impoundments. Major impoundments within the site include the Lake Davies stormwater impoundment, sequential perennial water bodies that drain the dredge spoil disposal area, and the Camp Conoy fishing pond, The Camp Conoy pond is located at the headwaters of unnamed creek Branch 1 as shown in Figure 2.3-2. Runoff from Lake Davis discharges west to Goldstein Branch, which then discharges to Johns Creek. The sequential ponds discharge directly to Johns Creek upstream of Goldstein Branch. Both the Camp Conoy fishing pond and Lake Davies are man-made. The U.S. Fish and Wildlife Services (USFWS, 2007) have designated the water bodies within the CCNPP site as palustrine wetlands. Camp Conoy pond and Lake Davies are further sub-classified as unconsolidated bottom permanently flooded and emergent semi-permanently flooded wetlands, respectively. Wetlands along the streams and creeks are mostly classified as forested or scrub-shrub wetlands that are seasonally or temporarily flooded.

Figure Replaced

Figure 2.3-4—CCNPP Unit 3 Utilization Plot Plan



PLANT COORDINATE TABLE - CALVERT CLIFFS

PLANT COORDINATE	NORTH	EAST	WEST
UNIT 3 STATE PLANE (NAD 27)	217,062.83	360,906.10	—
UNIT 3 STATE PLANE (NAD 83)	277,012.07	1,473,229.73	—
UNIT 3 LATITUDE / LONGITUDE (NAD 27)	38°-25'-45"	—	76°-26'-19"
UNIT 3 LATITUDE / LONGITUDE (NAD 83)	38°-25'-45"	—	76°-26'-17"
UNIT 3 UTM: ZONE 18N (726 to 726) NAD 27 (meters)	4,254,079.29	374,418.85	—
UNIT 3 UTM: ZONE 18N (726 to 726) NAD 83 (meters)	4,254,299.11	374,450.77	—

3.4.1 DESCRIPTION AND OPERATIONAL MODES

3.4.1.1 Circulating Water Supply System/Auxiliary Cooling Water Systems

The U.S. EPR uses a Circulating Water Supply System (CWS) to dissipate heat. A closed-cycle, wet cooling system is used for CCNPP Unit 3. This is a different design from the existing CCNPP Units 1 and 2 which have a once-through cooling system. The CCNPP Unit 3 system uses a single plume abated mechanical draft cooling tower for heat dissipation. Under the restrictions imposed by Section 316 of the Federal Clean Water Act, closed-cycle cooling is the only practical alternative for CCNPP Unit 3 that would meet both the Section 316(b) intake requirements at new facilities, as well as the ~~Section 316(c) thermal requirements~~Section 316(a) thermal discharge requirements at this multi-facility site. The CWS at CCNPP Unit 3 dissipates up to 1.108 x 10^{10} BTU/hr (2.792 x 10^{9} Kcal/hr) of waste heat rejected from the main condenser and the Closed Cooling Water System (CLCWS) during normal plant operation at full station load. The exhausted steam from the low pressure steam turbine is directed to a surface condenser (i.e., main condenser), where the heat of vaporization is rejected to a loop of CWS cooling water. Cooling water from the CWS is also provided to the auxiliary cooling water system. Two 100% capacity auxiliary cooling water system pumps receive cooling water from the CWS and deliver the water to the CLCWS heat exchangers. Heat from the CLCWS is transferred to the auxiliary cooling water system and heated auxiliary cooling water is returned to the CWS. The heated CWS water is sent to the spray headers of the cooling tower, where the heat content of the water is transferred to the ambient air via evaporative cooling and conduction. After passing through the cooling tower, the cooled water is recirculated back to the main condenser and auxiliary cooling water system to complete the closed cycle cooling water loop. The CWS has nominal flow rate of 785,802 gpm (2,974,584 lpm).

Evaporation in the cooling tower increases the level of solids in the circulating water. To control solids, a portion of the recirculated water must be removed or blown down and replaced with clean water. In addition to the blowdown and evaporative losses, a small percentage of water in the form of droplets (drift) would also be lost from the cooling tower. Peak anticipated evaporative losses are approximately 22,160 gpm (83,885 lpm). Maximum blowdown is approximately 22,121 gpm (83,737 lpm). The drift losses are conservatively 39 gpm (148 lpm) based upon 0.005% of the CWS nominal flow rate for water balance purposes. The actual drift rate will be 0.0005%. Makeup water from the Chesapeake Bay is required to replace the 44,320 gpm (167,770 lpm) losses from evaporation, blowdown and drift.

Makeup water for the CWS will be taken from the Chesapeake Bay by pumps at a maximum rate of approximately 47,383 gpm (179,365 lpm). This is based on maintaining the CWS and supplying the desalination plant with 3,063 gpm (11,595 lpm). The pumps will be installed in a new intake structure located between the existing CCNPP Units 1 and 2 intake structure and the existing barge slip. The makeup water is pumped through a common header directly to the cooling tower basin. Blowdown from the cooling tower discharges to a common retention basin to provide time for settling of suspended solids and to permit further chemical treatment of the wastewater, if required, prior to discharge to the Chesapeake Bay. Figure 3.1-1 shows the location of the CCNPP Unit 3 intake structure, cooling tower, retention basin and discharge.

The CWS water is treated as required to minimize fouling, inhibit scaling on the heat exchange surfaces, to control growth of bacteria, particularly Legionella bacteria, and to inhibit corrosion of piping materials. Water treatment is discussed in Section 3.6.

3.4.1.3.1.2 Chesapeake Bay Water Level

CCNPP Units 1 and 2 rely on the Chesapeake Bay for safe shutdown and are designed for a minimum bay low water level of -4.0 ft (-1.2 m) NGVD 29 and can continue to operate at an extreme low water elevation of -6.0 ft (-1.8 m) NGVD 29. CCNPP Unit 3 does not rely on Chesapeake Bay water for safe shutdown since the UHS tower basin contains sufficient storage volume for shutdown loads. The unit is not required to be shutdown based on minimum Chesapeake Bay water level. However, the extreme low water elevation of -6.0 ft (-1.8 m) NGVD 29 is incorporated into the design and operation of the UHS makeup water system.

The maximum flood level at the intake location is Elevation ~~39.4~~33.2 ft (~~12.0~~10.11 m) NGVD 29 as a result of the surge, wave heights, and wave run-up associated with the probable maximum hurricane (PMH). Thus, the UHS intake structure ~~and the electrical building associated with the UHS makeup pumps~~ would experience flooding during a PMH and flood protection measures are required for ~~these buildings.~~this building. The UHS makeup water pump room and electrical room are protected by watertight doors. The air-cooled condenser room is protected by having louvers located above the maximum flood level. The nonsafety-related traveling screen room is susceptible to flooding but screen rotation is not required for pump operation. All safety-related structures in the power block area have a minimum grade slab or entrance at Elevation 84.6 ft (25.8 m) NGVD 29 or higher.

3.4.2.1 Chesapeake Bay Intake Structure

The Chesapeake Bay intake system consists of the existing CCNPP Units 1 and 2 intake channel, the CCNPP Unit 3 intake channel, the non-safety-related CWS makeup pump intake structure and associated equipment including the non-safety-related CWS makeup pump, the safety-related UHS makeup water system intake structure and associated equipment including the safety-related UHS makeup water pumps, and the makeup water chemical treatment system. The general site location of the new intake system is shown in Figure 3.4-3. Figure 3.4-4 and Figure 3.4-5 show the intake structure in more detail.

The existing intake system consists of the CCNPP Units 1 and 2 dredged channel that extends approximately 4,500 ft (13,80 m) offshore and a 560 ft (171 m) wide, 56 ft (17 m) deep curtain wall that extends the full width of the intake channel creating an embayment in which the intake structures are located (BGE, 1970). The top of the curtain wall is approximately 5 ft (1.5 m) above the water and the bottom is at elevation -28 ft (-8.5 m). Due to siltation, the effective opening is 17 ft (5.2 m), originally the opening was 23 ft (7 m) high. Velocity under the curtain wall at design depth is estimated to be approximately 0.4 ft/sec (0.12 m/sec). Velocities are currently somewhat greater due to siltation (CGG, 2005).

The new CCNPP Unit 3 intake area will be constructed with a sheet pile wall extending approximately 180 linear feet from the existing shoreline to the existing baffle wall and extending approximately 90 feet channelward from the approximate mean high water shoreline creating an approximately 9,000 ft^2 (836.1 m^2) wedge shaped pool. Approximately 50 ft (15.2 m) of existing shoreline armor protection will be removed to install the new sheet pile wall. Once the new sheet pile wall is in place, approximately 60 ft (18.3 m) of armor within the wedge shaped pool will be removed and temporary upland sheet piling will be installed along the makeup water pipe route. This upland sheet piling will extend out into the wedge shaped pool approximately 30 ft (9.1 m) to facilitate dewatering, installation of pipe and the associated ~~trash rack~~security bars. The area within the wedge shaped pool surrounded by the pipe line sheet piling will be dewatered and dredged by mechanical method to create an approximately 30 ft (9.1 m) wide by 30 ft (9.1 m) long by 25 ft (7.6 m) deep area, resulting in approximately 900 yds^3 (688.1 m^3) of sand and gravel which will be deposited at an existing upland, environmentally controlled area at the Lake Davies laydown area onsite. After dredging, two 60 in (152.4 cm) diameter intake pipes will be installed with ~~trash racks~~security bars at the pipe openings, extending approximately 20 ft (6.1m) channelward to a bottom elevation of -25 ft (-7.62 m) mean low water level. After installation of the pipes and associated ~~trash racks~~security bars, shoreline armour protection approximately 80 ft (24.4 m) in length and extending 10 ft (3.1 m) channelward will be restored within the wedge shaped area. In addition, armour protection will be extended out beyond the new sheet pile wall approximately 75 ft (22.9 m) and extend 205 ft (62.5 m) channelward. As a final step, the temporary sheet pile wall around the 60 in (152.4 cm) intake pipes will be removed allowing the area to reflood and submerge the pipes.

The new CCNPP Unit 3 intake piping consists of two runs of 60 inch (152.4 cm) diameter safety related concrete pipes approximately 490 ft (149.4 m) long. These pipes convey water from the CCNPP Unit 3 intake area to a CCNPP Unit 3 common safety-related forebay approximately 100 ft (30.5 m) long by 80 ft (24.4 m) wide area with ~~an earthen bottom~~ a concrete basemat at Elevation -22.5 ft (-6.9 m) NGVD 29 and vertical ~~sheet pile sides~~concrete walls extending to Elevation ~~10~~11.5 ft (~~3.1~~3.5 m) NGVD 29. The nonsafety related CWS intake structure and the safety related UHS makeup water intake structure are situated at opposite ends of the common forebay.

3.4.2.1 Chesapeake Bay Intake Structure (continued)

The new CCNPP Unit 3 intake piping draws water from the ~~intake~~Units 1 & 2 intake channel area. The piping is oriented perpendicular to the intake channel flow~~tidal flow of the bay~~. This orientation minimizes the ~~component of the tidal flow parallel to the intake area flow and reduces the~~ potential of fish entering the piping and common forebay as shown on Figure 3.4-3. The flow velocity into the existing intake area from the bay is no more than 0.5 fps (0.15 mps). The flow through the new channel is determined by plant operating conditions. ~~Velocities will also depend on the Chesapeake Bay water level. At the minimum Chesapeake Bay level of -4.0 ft (-1.22 m) NGVD 29, the~~ The average flow velocity along the new intake channel would be less than 0.5 fps (0.15 mps), based on the maximum makeup demand of approximately 47,383 gpm (179,365 lpm). The average flow velocities at the circulating water makeup structure and the UHS makeup structure would be less than 0.3 fps (0.09 mps) and less than 0.1 fps (0.03 mps), respectively. Due to circulatory flow in the common forebay, siltation may occur and sediment removal~~Since the common forebay will also act as a siltation basin, dredging~~ may be required after long term operation to maintain the ~~channel~~forebay invert elevation.

The new CCNPP Unit 3 CWS makeup water intake structure will be an approximately ~~78~~120 ft (~~24~~36.6 m) long, ~~55~~60 ft (~~17~~18.3 m) wide concrete structure with individual pump bays. Three 50% capacity, vertical, wet pit CWS makeup pumps provide up to 44,000 gpm (166,588 lpm) of makeup water.

The CCNPP Unit 3 UHS makeup water intake structure is approximately ~~75~~90 ft (~~22.9~~ 27.4 m) long, 60 ft (18.3 m) wide concrete structure with individual pump bays. Four 100% capacity, vertical, wet pit UHS water makeup pumps are capable of providing up to 3,000 gpm (11,356 lpm) of makeup water or 750 gpm (2,839 lpm) for each pump.

In the UHS makeup intake structure, one makeup pump is located in ~~each~~an independent pump bay, along with one dedicated traveling screen and trash rack. Each pump bay is furnished with cross bay stop log slots to permit isolation of pumps on an individual bay basis. ~~There are cross bay stop log slots to permit isolation of pumps on an individual bay basis.~~

For the CWS makeup water intake structure, flow from two traveling screens and trash racks into a common inlet area ~~forebay~~ feeds the three CWS makeup pumps. Each CWS pump is located in its own pump bay with cross bay stop log slots to permit isolation of individual pumps. Debris collected by the trash racks and the traveling screens ~~will be~~is collected in a debris basin for cleanout and disposal as solid waste. The through-trash rack and through-screen mesh flow velocities ~~will be~~is less than 0.5 fps (0.15 mps). The trash bar spacing is 3.5 in (8.9 cm) from center to center. The dual flow type of traveling screens with a flow pattern of double entry-center exit will be used for both the CWS and UHS intakes. This arrangement prevents debris carry over. The screen panels will be either metallic or plastic mesh with a mesh size of 0.079 to 0.118 in (2 to 3 mm) square. The screen panels are~~mesh~~ is mechanically rotated above the water for cleaning via a screen wash system~~spray water~~. The screen wash system for the CWS Makeup Water consists of two screen wash pumps (single shaft) that provide a pressurized spray to remove debris from the water screens. The screen wash system for the UHS Makeup Water System consists of four screen wash pumps that provide a pressurized spray to remove debris from the respective traveling screens. In both intake structures, the flow velocities through the screens are less than 0.5 fps (0.15 mps) in the worst case scenario (minimum bay level with highest makeup demand flow). Nevertheless, a fish return system will be provided on the CWS intake to reduce mortality of aquatic species, consistent with the intent of Clean Water Act Section 316(b) regulations.

The growth of slime, algae and other organic materials will be monitored in the intake structure and their components as well as the accumulation of debris on the trash racks. Cleaning will be performed, as necessary.

The combined pumping flow rate from Chesapeake Bay for CCNPP Unit 3 will be a maximum of approximately 47,383 gpm (179,365 lpm).

Figure Replaced

Figure 3.4-3—Circulating Water Intake/Discharge Structure Location Plan for CCNPP Unit 3

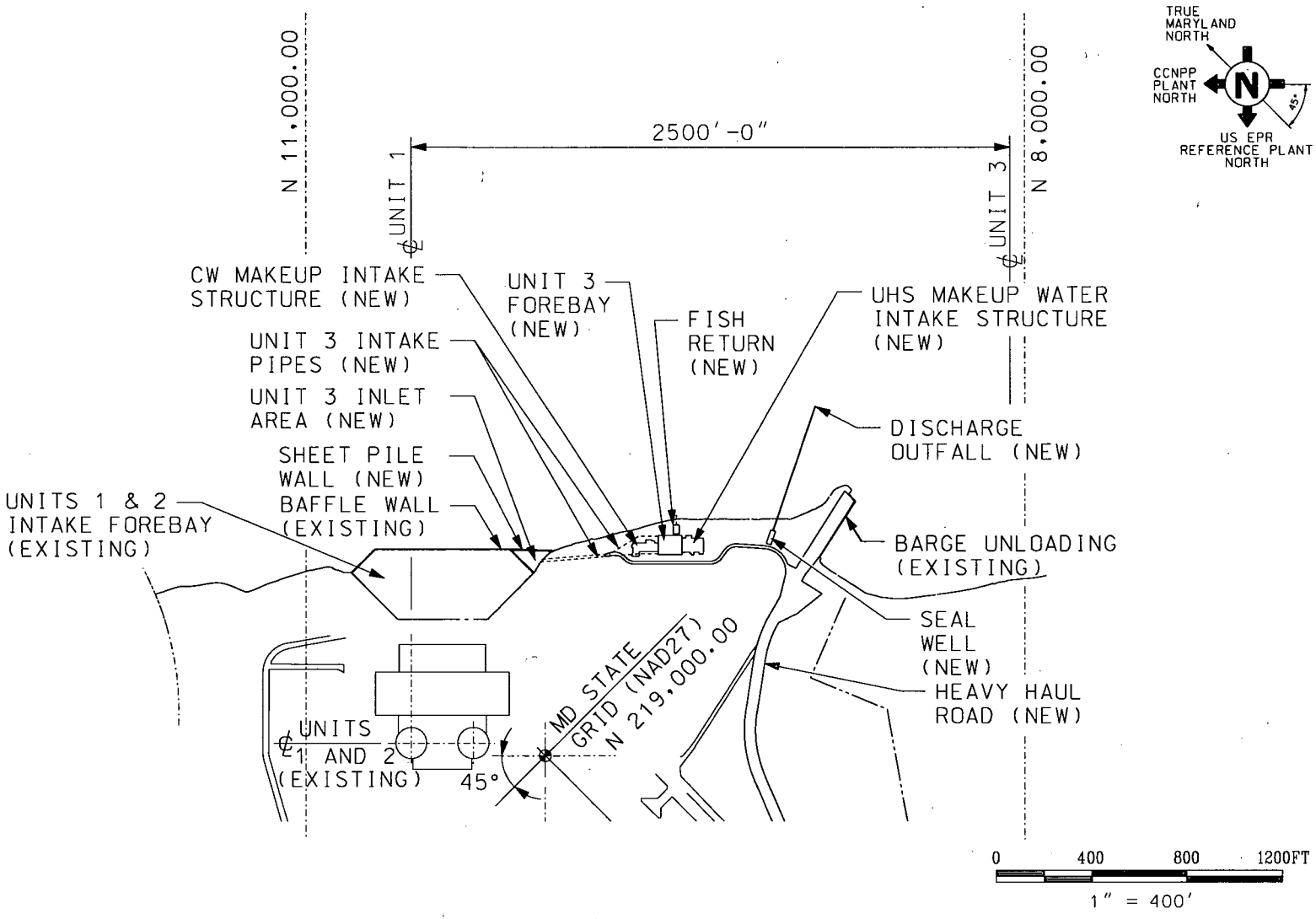


Figure Replaced

Figure 3.4-4—Plan View of Chesapeake Bay Intake System for CCNPP Unit 3

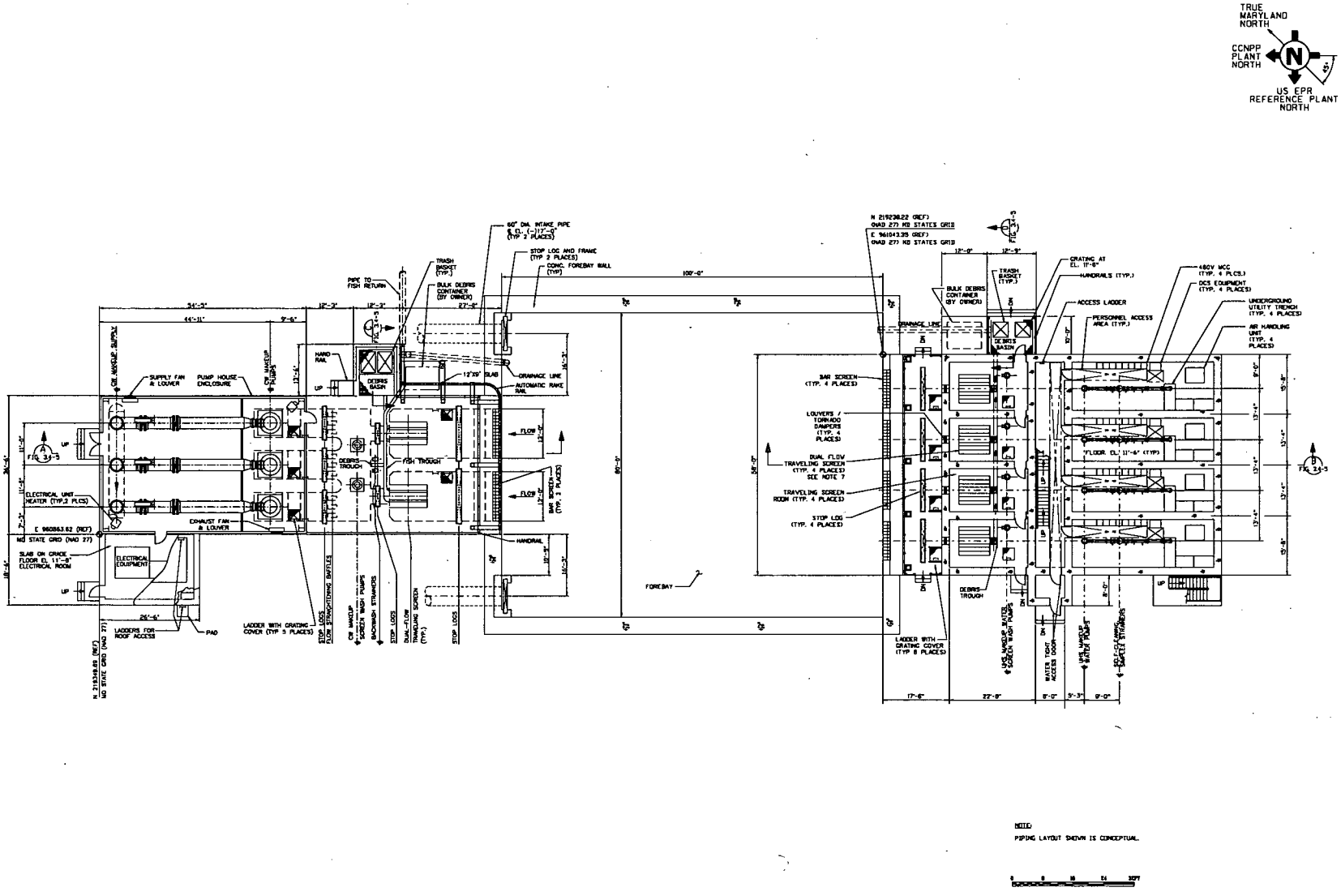
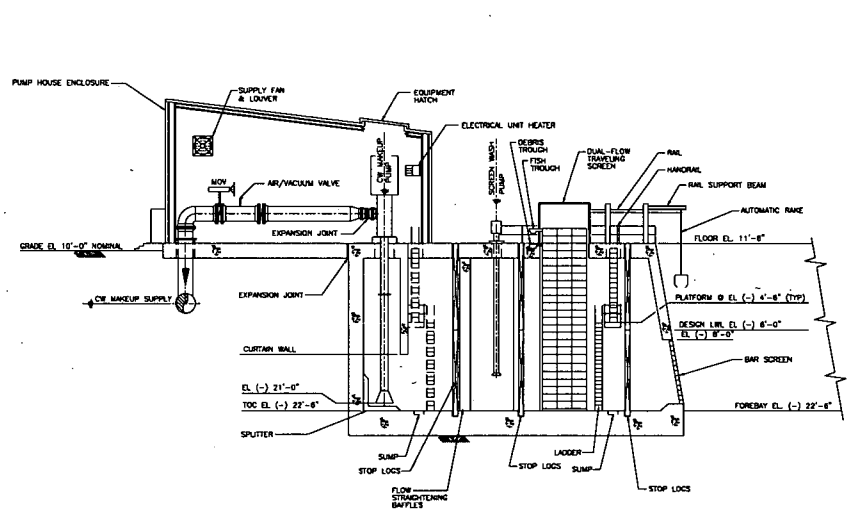
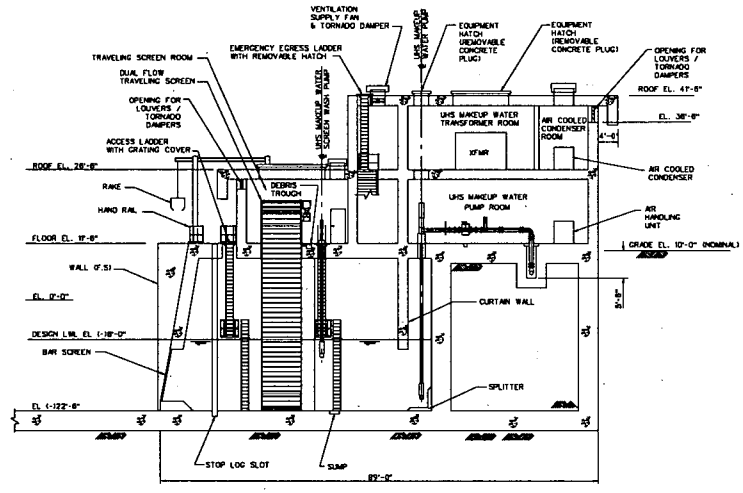


Figure Replaced

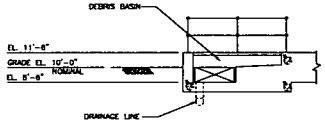
Figure 3.4-5—Section View of Chesapeake Bay Intake System for CCNPP Unit 3



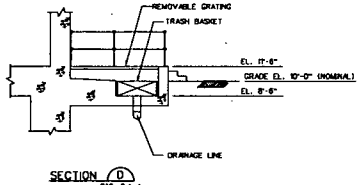
SECTION A
FIG. 3.4-4



SECTION B
FIG. 3.4-4



SECTION C
FIG. 3.4-4



SECTION D
FIG. 3.4-4

NOTE:
PIPING LAYOUT SHOWN IS CONCEPTUAL.

5.2.1.3 Hydrological Alterations

Operational activities that could result in hydrological alterations within the site and vicinity and at offsite areas are described in Sections 3.3, 3.4, and 3.7.

The principal hydrological alteration onsite associated with CCNPP Unit 3 will occur during construction, when at least one impoundment and several tributaries to Johns Creek will be filled. Some onsite streams may be impacted by either sedimentation or reduced water flow due to measures taken to reduce sedimentation, as described in Section 4.3.2. Once construction is completed, and normal operations begin, it is expected that the streams will experience little ongoing impact.

There have been no clearly discernible onsite or offsite effects of hydrologic alterations for operation of CCNPP Units 1 and 2, and the supply of surface water and groundwater has been sufficient. Operation of CCNPP Unit 3 with a closed loop cooling system will result in much smaller effects on withdrawals and discharges and correspondingly reduced operational effects than would be expected for an open loop cooling system. The provision of a desalinization plant will provide adequate fresh water for operation of CCNPP Unit 3 systems, and will have some additional capacity.

The actual CCNPP Unit 3 intake pumphouse structure will be located in a forebay constructed on the shoreline terrace north of the barge slip ~~within the existing intake area for CCNPP Units 1 and 2~~. Seawater will be supplied via two pipelines reaching the Chesapeake Bay shoreline near the south side of the CCNPP Unit 1 and 2 curtain wall. A sheet pile cofferdam and dewatering system will be installed on the south side of the CCNPP Unit 1 and 2 intake structure to facilitate construction of in the CCNPP Unit 3 shoreline intake piping and trash rack area. A rip-rap seawall extending approximately 75 ft (22.9 m) north from the shoreline, east of the pipeline entrance, and rip-rap along the shoreline will be used to protect the pipeline entrance point, circulating and service water intake structure and pump house. Pilings may also be driven to facilitate construction of new discharge system piping.

Excavation and dredging of the shoreline entrance area for the seawater supply pipelines and trash rack, fish return outfall from the new forebay intake structure, pump house erection and the installation of mechanical, piping, and electrical systems follow the piling operations and continue through site preparation into plant construction. Excavated and dredged material will be transported to an onsite spoils area located outside the boundaries of designated wetlands.

The barge slip will be dredged to accommodate the construction shipments. New sheet pile will be installed and 50,000 yds^3 (38,228 m^3) of spoils are estimated to be generated from this activity. Placement of the discharge pipeline will require excavating and backfilling a trench on the Chesapeake Bay floor. No additional spoils are expected to be generated.

Dredging of the barge slip, shoreline pipeline entrance and fish return outfall areas are expected to be one time event. Consequently, any hydrologic alterations, such as disruption of the longshore current and drift mechanism, are expected to be local, transitory, reversible, and small. Additionally, based on operational experience at CCNPP Units 1 and 2, it is expected that no maintenance dredging will be needed to keep the shoreline pipeline entrance clear. However, since the common forebay will also act as a siltation basin, dredging may be required to maintain the forebay depth and intake area clearances.

5.2.2.1.2 Non-Consumptive Use

Non-consumptive uses of water downstream from the plant are described in Section 2.3.2.1.3. The major non-consumptive surface water use categories in the vicinity of the site are recreation, fisheries, marinas, parks, and transportation. The recreational activities include swimming, fishing and boating along the Patuxent River and in the Chesapeake Bay. Fisheries in the Chesapeake Bay are described in Section 2.4.2. Transportation on the Chesapeake Bay will not be affected by the construction or operation of CCNPP Unit 3. No effect on fisheries navigation, or recreational use of the Chesapeake Bay is expected.

The Chesapeake Bay water intake system design consists of a wedge-shaped expansion of the CCNPP Units 1 and 2 intake channel forebay, the CCNPP Unit 3 forebay and related piping; the CCNPP Unit 3 non-safety-related CWS makeup water intake structure and associated equipment, including the non-safety related CWS makeup pump; the safety-related UHS makeup water intake structure and associated equipment, including the safety-related UHS makeup water pumps; and the makeup water chemical treatment system.

The Unit 3 forebay is approximately 100 feet by 120 feet by 30 feet deep and located between the Units 1 and 2 intake and the barge slip. It draws water from the extended Units 1 and 2 intake forebay through intake water piping installed for CCNPP Unit 3. The location of the intake system is depicted in Figure 2.3-4. Figure 3.4-3, and Figure 3.4.-4 provide detailed renderings of the intake structure and channel.

The CCNPP Unit 3 CWS makeup water intake structure is approximately ~~78~~120 feet long, ~~55~~60 feet wide and 30 feet deep concrete structure with individual pump bays.The UHS makeup water intake structure is approximately ~~75~~90 feet long, 60 feet wide and 30 feet deep concrete structure with individual pump bays. Four, 100% capacity, makeup pumps are available to provide makeup water.

The CCNPP Unit 3 CWS and UHS makeup intakes will meet the U.S. Environmental Protection Agency (EPA) Phase 1 design criteria, as described in Section 5.3.1.1. The overall percentage of Chesapeake Bay water entrained will remain less than 1%, with the maximum additional makeup required to meet the CCNPP Unit 3 cooling water requirement of 44,320 gpm (167,770 lpm). An additional 3,063 gpm will be required to support desalination plant operation.

While fish impingement and entrainment will occur, CCNPP Unit 3 will employ the impingement/entrainment mitigation techniques (low velocity approach, screens, etc.) currently utilized by CCNPP Units 1 and 2 to minimize the impact on aquatic resources. A fish return system and outfall will be used at the CCNPP Unit 3 CWS makeup water intake to reduce the mortality of aquatic species. Details of the fish return system are provided in Section 3.4.

Design approach velocities for both CCNPP Unit 3 intake structures will be less than 0.5 ft/s (0.15 m/s). The intake structures will incorporate fish and invertebrate protection measures that maximize impingement survival. The through trash rack and through screen mesh flow velocities will be less than 0.5 ft/s (0.15 m/s). The screen wash system provides a pressurized spray to remove debris from the water screens. In both intake structures, a fish return system is provided, even though the flow velocities through the screens are less than 0.5 ft/s (0.15 m/s) in the worst case scenario (minimum Chesapeake Bay level with highest makeup demand flow). The fish return system and outfall, as described in Section 3.4, will be used at the CCNPP Unit 3 CWS makeup water intake to reduce the mortality of aquatic species.

9.4.2.1 Intake and Discharge Systems

< Text suppressed for clarity >

Intake System

The Chesapeake Bay intake system would consists of the CCNPP Units 1 and 2 intake channel; the CCNPP Unit 3 intake piping, the CCNPP Unit 3 non-safety-related CWS makeup water intake structure and associated equipment, including the non-safety-related CWS makeup pump; the safety-related UHS makeup water intake structure and associated equipment, including the safety-related UHS makeup water pumps; and the makeup water chemical treatment system.

The CCNPP Unit 3 intake piping consists of two runs of 60-inch diameter safety related concrete pipes approximately 490 ft (149.4 m) long. These pipes convey water from the CCNPP Units 1 and 2 intake channel to a common forebay approximately 100 ft (30.48 m) long, 80 ft (24.38 m) wide structure with an earthen bottom at Elevation -22 ft 6 in (-6.86 m) NGVD 29 and vertical sheet pile sides extending to Elevation ~~10~~11.5 ft (~~3.05~~3.5 m) NGVD 29. The nonsafety-related CWS intake structure and the safety-related UHS makeup water intake structure are situated at opposite ends of the common forebay.

The new CCNPP Unit 3 intake piping draws water from the existing intake channel for CCNPP Units 1 and 2. The piping is oriented perpendicular to the tidal flow of the bay. This orientation minimizes the component of the tidal flow parallel to the channel flow and reduces the potential of fish entering the piping and common forebay as shown on Figure 3.4-3. The flow velocities at the circulating water makeup structure and the UHS makeup structure would be less than 0.3 feet per second (fps) (0.1 mps) and less than 0.1 fps (0.03 mps), respectively.

The new CCNPP Unit 3 CWS makeup water intake structure will be an approximately ~~78~~120 ft (~~24~~36.6 m) long, ~~55~~60 ft (~~17~~18.3 m) wide concrete structure with individual pump bays. Three 50 percent capacity, vertical, wet pit CWS makeup pumps provide makeup water.

The new UHS makeup water intake will be approximately ~~75~~90 ft (~~22.9~~27.4 m) long, 60 ft (18.3 m) wide concrete structure with individual pump bays. Four 100 percent capacity vertical wet pit UHS makeup pumps will be available to provide saltwater makeup water.

In both the CWS and UHS makeup intake structures, one makeup pump is located in each pump bay, along with one dedicated traveling band screen and trash rack. Debris collected by the trash racks and the traveling water screens will be collected in a debris basin for cleanout and disposal as solid waste. The through-trash rack and through-screen mesh flow velocities will be less than 0.5 fps (0.15 m/s). Table 9.4-3 summarizes the environmental impacts of the circulating water intake alternatives for CCNPP Unit 3. In both intake structures, there is no need for a fish return system since the flow velocities through the screens are less than 0.5 fps (0.15 mps) in the worst case scenario (minimum bay level with highest makeup demand flow). Nevertheless, a fish return system will be provided as part of the combined makeup water intake structure design to reduce mortality of aquatic species.

The fish return system will be located on the east side (bay side) of the Unit 3 intake forebay. Screen wash water and fish collected from the traveling screens of Unit 3 makeup water structure will be diverted to the new fish return facility and returned to the Chesapeake Bay via a buried pipe to a new shoreline outfall. The outfall will be submerged below low tide to minimize impacts to fish into the Chesapeake Bay from any drop at the pipe exit.

UN#10-285

Enclosure 12

Markup Pages of COLA Part 10, ITAAC

Calvert Cliffs Nuclear Power Plant, Unit 3

Table 2.4-1—{Structural Fill and Backfill Under Seismic Category I and Seismic Category II-SSE Structures Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	Structural fill material under Seismic Category I and Category II-SSE structures is installed to meet a minimum of 95 percent of the Modified Proctor density.	Testing will be performed during placement of the structural fill material.	A report exists that concludes the installed structural fill material under Seismic Category I and Category II-SSE structures meets a minimum of 95 percent of the Modified Proctor density.
2	Shear wave velocity of structural fill material beneath the Emergency Power Generation Buildings (EPGB) is greater than or equal to 630 ft/sec at the bottom of the foundation and below.	Field measurements and analyses of shear wave velocity in structural fill will be performed when structural fill placement is at the elevation of the bottom of the foundation and at finish grade.	An engineering report exists that concludes that the shear wave velocity within the structural fill material placed under the EPGB at its foundation depth and below is greater than or equal to 630 ft/sec.
3	Shear wave velocity of structural fill material beneath the Essential Service Water Buildings (ESWB) is greater than or equal to 720 ft/sec at the bottom of the foundation and below.	Field measurements and analyses of shear wave velocity in structural fill will be performed when structural fill placement is at the elevation of the bottom of the foundation and at finish grade.	An engineering report exists that concludes that the shear wave velocity within the structural fill material placed under the ESWB at its foundation depth and below is greater than or equal to 720 ft/sec.
~~4~~	~~Shear wave velocity of structural fill material beneath the Ultimate Heat Sink Electrical Building (UHS EB) is greater than or equal to 720 ft/sec at the bottom of the foundation and below.~~	~~Field measurements and analyses of shear wave velocity in structural fill will be performed when structural fill placement is at the elevation of the bottom of the foundation and at finish grade.~~	~~An engineering report exists that concludes that the shear wave velocity within the structural fill material placed under the UHS EB at its foundation depth and below is greater than or equal to 720 ft/sec.~~
4 ~~5~~	Shear wave velocity of structural fill material beneath the Fire Protection Buildings (FPB) and associated Fire Protection Tanks (FPT) is greater than or equal to 630 ft/sec at the bottom of the foundation and below.	Field measurements and analyses of shear wave velocity in structural fill will be performed when structural fill placement is at the elevation of the bottom of the foundation and at finish grade.	An engineering report exists that concludes that the shear wave velocity within the structural fill material placed under the FPB & FPT at their foundation depths and below is greater than or equal to 630 ft/sec.

Table 2.4-7—{Ultimate Heat Sink Makeup Water Intake Structure Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	The UHS Makeup Water Intake Structure, including the interior structures, is Seismic Category I and is designed to withstand design basis loads and load combinations without a loss of structural integrity.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the UHS Makeup Water Intake Structure, including the interior structures, using analytical assumptions, or under conditions which bound the Seismic Category I design requirements and to determine that the UHS Makeup Water Intake Structure, including the interior structures, is designed to withstand design basis loads and load combinations without loss of structural integrity.	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the UHS Makeup Water Intake Structure, including its interior structures, can withstand design basis seismic loads without loss of safety function and is capable of withstanding the structural design basis loads in accordance with the Structural Acceptance Criteria.
1		b. An inspection will be performed of the UHS Makeup Water Intake Structure, including the interior structures, to verify that the construction is as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	b. Inspection reports exist and conclude that the as-built UHS Makeup Water Intake Structure, including its interior structures, is constructed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).

Table 2.4-7—{Ultimate Heat Sink Makeup Water Intake Structure Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
2	For the UHS Makeup Water Intake Structure's below grade concrete foundation and walls, a low water to cement ratio concrete mixture will be utilized.	Tests, inspections, or a combination of tests and inspections will be conducted to ensure the concrete meets the low water to cement ratio limit.	A report exists that concludes the concrete utilized to construct the as-built UHS Makeup Water Intake Structure's below grade concrete foundation and walls have a maximum water to cementitious materials ratio of 0.40.
3	The basic configuration of the UHS Makeup Water Intake Structure separates each mechanical <u>and electrical</u> division of the UHS Makeup Water Supply System by an internal hazards separation barrier so that the impact of internal hazards, including fire and flood, is contained within the mechanical <u>and electrical</u> division of hazard origination.	a. An inspection of the as-built basic configuration of the mechanical <u>and electrical</u> division structures as determined in the part (h) analysis will be performed. During construction, deviations from the approved design will be analyzed for design basis internal hazards and deviations from the approved design have been reconciled.	a. A report exists and concludes that the as-built basic configuration of the mechanical <u>and electrical</u> divisions structures provides separation and deviations from the approved design have been reconciled.
3		b. A fire protection analysis will be performed.	b. A report exists and concludes that completion of fire protection analysis indicates barriers, doors, dampers, and penetrations providing separation have a minimum 3-hour fire rating and mitigate the propagation of smoke to the extent that safe shutdown is not adversely affected.

Table 2.4-7—{Ultimate Heat Sink Makeup Water Intake Structure Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
3		c. Inspection of the as-built conditions of barriers, doors, dampers, and penetrations existing within the internal hazards protective barriers separating the four mechanical and electrical divisions, versus construction drawings of barriers, doors, dampers, and penetrations as determined in the part (b) analysis, will be performed.	c. A report exists and concludes that the as-built configuration of fire barriers, doors, dampers and penetrations that separate the four mechanical and electrical divisions agrees with the construction drawings.
3		d. Testing of dampers that separate the four mechanical and electrical divisions will be performed.	d. A report exists and concludes that the dampers that separate the four mechanical and electrical divisions close on receipt of signal.
3		e. A post-fire safe shutdown analysis will be performed.	e. A report exists and concludes that completion of the post-fire safe shutdown analysis indicates that at least one success path comprised of the minimum set of SSC is available for safe shutdown.
3		f. An internal flooding analysis for the mechanical and electrical divisions will be performed.	f. A report exists and concludes that the completion of the internal flooding analysis for the mechanical divisions indicates that the impact of internal flooding is contained within the mechanical and electrical division of origin.

Table 2.4-7—{Ultimate Heat Sink Makeup Water Intake Structure Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
3		g. A walkdown of the mechanical and electrical divisions features identified in the internal flooding analysis in part (f) that maintain the impact of the internal flooding to the mechanical and electrical division of origin will be performed and deviations from the approved design have been reconciled.	g. A report exists and concludes that the mechanical and electrical division flood protection features that maintain the impact of internal flooding to the mechanical and electrical division of origin are installed and agree with the construction drawings and deviations from the approved design have been reconciled.
3		h. An analysis to identify the internal hazards separation barrier limits will be performed.	h. A report exists and concludes that the completion of the UHS Makeup Water Intake Structure internal hazards separation barrier analysis indicates that the impact of internal hazards, including fire and flood, is contained within the mechanical and electrical division of hazard origination.
4	The pump house area of the UHS Makeup Water Intake Structure exterior structural walls or floors having exterior penetrations are protected against external flooding by watertight seals.	An inspection of the pump house area of the UHS Makeup Water Intake Structure exterior structural wall and floor penetrations will be performed	A report exists and concludes that watertight seals exist for exterior penetrations of the pump house area of the UHS Makeup Water Intake Structure structural walls and floors.
5	The water tight measures (i.e., water stops, fittings, submarine doors, and hatches) for the UHS Makeup Water Intake Structure are designed to withstand the structural design basis loads and load combinations.	a. Analyses will be performed to determine that the water tight measures (i.e., water stops, fittings, submarine doors, and hatches) for the UHS Makeup Water Intake Structure are designed to withstand the structural design	a. A report exists that concludes the as-built water tight measures (i.e., water stops, fittings, submarine doors, and hatches) for the UHS Makeup Water Intake Structure can withstand the structural design basis loads and meet the Structural Acceptance

Table 2.4-7—{Ultimate Heat Sink Makeup Water Intake Structure Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
		basis loads and load combinations.	Criteria.
5		b. An inspection will be conducted to verify the as built water tight measures (i.e., water stops, fittings, submarine doors, and hatches) for the UHS Makeup Water Intake Structure are installed as specified on the construction drawings and deviations from the approved design have been reconciled.	b. A report exists that concludes the as-built water tight measures (i.e., water stops, fittings, submarine doors, and hatches) for the UHS Makeup Water Intake Structure agrees with construction drawings and deviations from the approved design are reconciled.

~~Table 2.4-8 {Ultimate Heat Sink Electrical Building Inspections, Tests, Analyses, and Acceptance Criteria}~~

	~~Commitment Wording~~	~~Inspection, Tests, or Analysis~~	~~Acceptance Criteria~~
~~1~~	~~The UHS Electrical Building, including its interior structures, is Seismic Category I, and is designed to withstand design basis loads and load combinations without a loss of structural integrity.~~	~~a. Type tests, analyses, or a combination of type tests and analyses will be performed on the UHS Electrical Building, including its interior structures, using analytical assumptions, or under conditions which bound the Seismic Category I design requirements and to determine that the UHS Electrical Building, including its interior structures, is designed to withstand design basis loads and load combinations without a loss of structural integrity.~~	~~a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the UHS Electrical Building, including its interior structures, can withstand design basis seismic loads without loss of safety function and is capable of withstanding all the structural design basis loads in accordance with the Structural Acceptance Criteria.~~
		~~b. An inspection will be performed of the UHS Electrical Building, including its interior structures, to verify that the construction is as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).~~	~~b. Inspection reports exist and conclude that the as-built UHS Electrical Building, including its interior structures, is constructed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).~~
~~2~~	~~For the UHS Electrical Building's below grade concrete foundation and walls, a low water to cement ratio concrete mixture will be is utilized.~~	~~Tests, inspections, or a combination of tests and inspections will be conducted to ensure the concrete meets the low water to cement ratio limit.~~	~~A report exists that concludes the concrete utilized to construct the as-built UHS Electrical Building's below grade concrete foundation and walls have a maximum water to cementitious materials ratio of 0.40.~~

~~Table 2.4-8 – {Ultimate Heat Sink Electrical Building Inspections, Tests, Analyses, and Acceptance Criteria}~~

	~~Commitment Wording~~	~~Inspection, Tests, or Analysis~~	~~Acceptance Criteria~~
~~3~~	~~The basic configuration of the UHS Electrical Building separates each electrical division of the UHS Makeup Water Supply System by an internal hazards separation barrier so that the impact of internal hazards, including fire and flood, is contained within the mechanical division of hazard origination.~~	~~a. An inspection of the as-built basic configuration of the electrical division structures as determined in the part (h) analysis will be performed. During construction, deviations from the approved design will be analyzed for design basis internal hazards and deviations from the approved design have been reconciled.~~	~~a. A report exists and concludes that the as-built basic configuration of the electrical divisions structures provides separation and deviations from the approved design have been reconciled.~~
~~3~~		~~b. A fire protection analysis will be performed.~~	~~b. A report exists and concludes that completion of fire protection analysis indicates barriers, doors, dampers, and penetrations providing separation have a minimum 3-hour fire rating and mitigate the propagation of smoke to the extent that safe shutdown is not adversely affected.~~
~~3~~		~~c. Inspection of the as-built conditions of barriers, doors, dampers, and penetrations existing within the internal hazards protective barriers separating the four electrical divisions, versus construction drawings of barriers, doors, dampers, and penetrations as determined in the part (b) analysis, will be performed.~~	~~c. A report exists and concludes that the as-built configuration of fire barriers, doors, dampers and penetrations that separate the four electrical divisions agrees with the construction drawings.~~
~~3~~		~~d. Testing of dampers that separate the four electrical divisions will be performed.~~	~~d. A report exists and concludes that the dampers that separate the four electrical divisions close on receipt of signal.~~

~~Table 2.4-8 – {Ultimate Heat Sink Electrical Building Inspections, Tests, Analyses, and Acceptance Criteria}~~

	~~Commitment Wording~~	~~Inspection, Tests, or Analysis~~	~~Acceptance Criteria~~
~~3~~		~~e. A post-fire safe shutdown analysis will be performed.~~	~~e. A report exists and concludes that completion of the post-fire safe shutdown analysis indicates that at least one success path comprised of the minimum set of SSC is available for safe shutdown.~~
~~3~~		~~f. An internal flooding analysis for the electrical divisions will be performed.~~	~~f. A report exists and concludes that the completion of the internal flooding analysis for the electrical divisions indicates that the impact of internal flooding is contained within the electrical division of origin.~~
~~3~~		~~g. A walkdown of the electrical divisions features identified in the internal flooding analysis in part (f) that maintain the impact of the internal flooding to the electrical division of origin will be performed and deviations from the approved design have been reconciled.~~	~~g. A report exists and concludes that the electrical division flood protection features that maintain the impact of internal flooding to the electrical division of origin are installed and agree with the construction drawings and deviations from the approved design have been reconciled.~~
~~3~~		~~h. An analysis to identify the internal hazards separation barrier limits will be performed.~~	~~h. A report exists and concludes that the completion of the UHS Electrical Building internal hazards separation barrier analysis indicates that the impact of internal hazards, including fire and flood, is contained within the mechanical division of hazard origination.~~

~~Table 2.4-8 – {Ultimate Heat Sink Electrical Building Inspections, Tests, Analyses, and Acceptance Criteria}~~

	~~Commitment Wording~~	~~Inspection, Tests, or Analysis~~	~~Acceptance Criteria~~
4	~~The UHS Electrical Building exterior structural walls or floors having exterior penetrations are protected against external flooding by watertight seals.~~	~~An inspection of the UHS Electrical Building exterior structural wall and floor penetrations will be performed.~~	~~A report exists and concludes that watertight seals exist for exterior penetrations of the UHS Electrical Building structural walls and floors.~~
~~5~~	~~The water tight measures (i.e., water stops, fittings, submarine doors, and hatches) for the UHS Electrical Building are designed to withstand the structural design basis loads and load combinations.~~	~~a. Analyses will be performed to determine that the water tight measures (i.e., water stops, fittings, submarine doors, and hatches) for the UHS Electrical Building are designed to withstand the structural design basis loads and load combinations.~~	~~a. A report exists for the UHS Electrical Building that concludes the as-built water tight measures (i.e., water stops, fittings, submarine doors, and hatches) can withstand the structural design basis loads and meets the Structural Acceptance Criteria.~~
~~5~~		~~b. An inspection will be performed to verify the water tight measures (i.e., water stops, fittings, submarine doors, and hatches) for the UHS Electrical Building are installed as specified on the construction drawings as determined in the part (b) analysis and deviations from the approved design have been reconciled.~~	~~b. A report exists that concludes the as-built water tight measures (i.e., water stops, fittings, submarine doors, and hatches) for the UHS Electrical Building agrees with construction drawings and deviations from the approved design are reconciled.~~

Table 2.4-8 ~~9~~ —{Buried Duct Banks and Pipes Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	Seismic Category I buried electrical duct banks traverse ~~from~~ (See FSAR Figures 3.8-1 and 3.8-2): ~~1. The UHS Makeup Water Intake Structure to the UHS Electrical Building.~~ ~~2. Each~~ 1. from each Essential Service Water Building to the UHS Makeup Water Intake Structure ~~Electrical Building, including underneath the main heavy haul road~~. ~~3. The~~ 2. from the Safeguards Buildings to the four Essential Service Water Buildings and from the Safeguards Buildings to both Emergency Power Generating Buildings.	Inspections of the as-built buried Seismic Category I electrical duct banks will be conducted.	A report exists and concludes that the as-built Seismic Category I buried electrical duct banks traverse: ~~1. The UHS Makeup Water Intake Structure to the UHS Electrical Building. 2. Each~~ 1. from each Essential Service Water Building to the UHS Makeup Water Intake Structure ~~Electrical Building, including underneath the main heavy haul road. 3. The~~ 2. from the Safeguards Buildings to the four Essential Service Water Buildings and both from the Safeguards Buildings to Emergency Power Generation Buildings.

Note:
The following tables were unchanged except for the table number.

Table 2.4-~~10~~ 09 — {Fire Protection Building Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~11~~ 10 — {Turbine Building Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~12~~ 11 — {Switchgear Building Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~13~~ 12 — {Warehouse Building Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~14~~ 13 — {Security Access Building Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~15~~ 14 — {Central Gas Supply Building Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~16~~ 15 — {Grid Systems Control Building Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~17~~ 16 — {Circulating Water Cooling Tower Structure Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~18~~ 17 — {Circulating Water Pump Building Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~19~~ 18 — {Circulating Water Makeup Intake Structure Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~20~~ 19 — {Desalinization / Water Treatment Building Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4- 20 ~~21~~ —{Ultimate Heat Sink Makeup Water Intake Structure Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	There are four divisions of the UHS Makeup Water Intake Structure Ventilation System.	Inspection of the as-built system shall be conducted to verify that there are four divisions of the UHS Makeup Water Intake Structure Ventilation System.	An inspection report exists and confirms that the as-built UHS Makeup Water Intake Structure Ventilation System has four divisions.
2	Each of the four safety related mechanical divisions of the UHS Makeup Water Intake Structure Ventilation System are physically separated from each other.	An inspection will be performed.	Each of the four safety related mechanical divisions of the as-built UHS Makeup Water Intake Structure Ventilation System is physically separated from other mechanical divisions by structural barriers, 3-hour fire barriers, or a combination of structural and 3-hour barriers.
3	Electrical Independence is provided on connections between each of the four safety related divisions of the UHS Makeup Water Intake Structure Ventilation System.	a. Analyses will be performed to determine the test specification for electrical isolation devices on connections between the four UHS Makeup Water Intake Structure Ventilation System divisions.	a. A test plan exists that provides the test specification for determining whether a device is capable of preventing the propagation of credible electrical faults on connections between the four safety related UHS Makeup Water Intake Structure Ventilation System divisions.
		b. Type tests, analyses, or a combination of type tests and analyses will be performed on the electrical isolation devices between the four safety related UHS Makeup Water Intake Structure Ventilation System divisions.	b. A report exists and concludes that the Class 1E isolation devices used between the four safety related UHS Makeup Water Intake Structure Ventilation System divisions prevent the propagation of credible electrical faults.

Table 2.4- 20 ~~21~~ —{Ultimate Heat Sink Makeup Water Intake Structure Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
		c. Inspections will be performed on connections between the four safety related UHS Makeup Water Intake Structure Ventilation System divisions.	c. Class 1E electrical isolation devices exist on connections between the four safety related UHS Makeup Water Intake Structure Ventilation System divisions.
4	Each safety related division of the UHS Makeup Water Intake Structure Ventilation System powered by their respective Class 1E division.	Tests will be performed to verify each safety related division of the UHS Makeup Water Intake Structure Ventilation System is independently powered by their respective Class 1E division.	A Report exists that concludes each safety related division of the as-built UHS Makeup Water Intake Structure Ventilation System is independently powered by their respective Class 1E division.
5	a. Components of the UHS Makeup Water Intake Structure Ventilation System identified in Table 2.4-37 as ASME AG-1 Code are designed in accordance with ASME AG-1 Code requirements.	a. Inspections will be performed to verify the existence of ASME AG-1 Code Design Verification Reports ~~as determined in the part (d) analysis~~.	a. ASME AG-1 Code Design Verification Reports (AA-4400) exist for Makeup Water Intake Structure Ventilation System components identified in Table 2.4-37 ~~determined in the part (d) analysis~~ as ASME AG-1 Code.
5	b. Components of the UHS Makeup Water Intake Structure Ventilation System identified in Table 2.4-37 ~~determined in the part (d) analysis~~ as ASME AG-1 Code are fabricated in accordance with ASME AG-1 Code requirements, including welding requirements.	b. Inspections will be performed to verify components are fabricated in accordance with ASME AG-1 Code requirements.	b. For UHS Makeup Water Intake Structure Ventilation System components identified in Table 2.4-37 ~~determined in the part (d) analysis~~ as ASME AG-1 Code, reports exist and conclude that the component meets ASME AG-1 Code requirements, including welding requirements.

Table 2.4- 20 ~~21~~ —{Ultimate Heat Sink Makeup Water Intake Structure Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
5	c. Components of the UHS Makeup Water Intake Structure Ventilation System identified in Table 2.4-37 ~~determined in the part (d) analysis~~ as ASME AG-1 Code are inspected and tested in accordance with ASME AG-1 Code requirements.	c. Inspections and tests will be performed on the components.	c. For UHS Makeup Water Intake Structure Ventilation System components identified in Table 2.4-37 ~~determined in the part (d) analysis~~ as ASME AG-1 Code, reports exist and conclude that the components meet ASME AG-1 Code inspection and testing requirements.
~~5~~	~~d. Components of the UHS Makeup Water Intake Structure Ventilation System identified as ASME AG-1 Code are designed in accordance with ASME AG-1 Code requirements.~~	~~d. An analysis to identify the ASME AG-1 Code components of the UHS Makeup Water Intake Structure Ventilation System will be performed.~~	~~d. A report exists indicating the ASME AG-1 Code components of the UHS Makeup Water Intake Structure Ventilation System.~~
6	a. The UHS Makeup Water Intake Structure Ventilation System equipment identified as Seismic Category I ~~in the part (e) analysis~~ in Table 2.4-37 can withstand seismic design basis loads without loss of safety function.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the UHS Makeup Water Intake Structure Ventilation System equipment identified as Seismic Category I ~~in the part (e) analysis~~ in Table 2.4-37 using analytical assumptions, or under conditions which bound the Seismic Category I design requirements.	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the UHS Makeup Water Intake Structure Ventilation System equipment identified as Seismic Category I ~~in the part (e) analysis~~ in Table 2.4-37 can withstand design basis seismic loads without loss of safety function.

Table 2.4- 20 ~~21~~ —{Ultimate Heat Sink Makeup Water Intake Structure Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
6	b. The UHS Makeup Water Intake Structure Ventilation System equipment are designated Seismic Category I in Table 2.4-37 ~~in the part (e) analysis~~, and can withstand seismic design basis loads without loss of the safety function.	b. Inspections will be performed of the Seismic Category I UHS Makeup Water Intake Structure Ventilation System equipment identified in Table 2.4-37 ~~in the part (e) analysis~~ to verify that the equipment, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	b. Inspection reports exist and conclude that the as-built Seismic Category I UHS Makeup Water Intake Structure Ventilation System equipment identified in Table 2.4-37 ~~in the part (e) analysis~~, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).
6	c. Portions of the UHS Makeup Water Intake Structure Ventilation System piping and ducting identified as Seismic Category I in Figure 2.4-2 ~~in the part (e) analysis~~ can withstand seismic design basis loads without loss of safety function.	c. Type tests, analyses or a combination of type tests and analyses will be performed on the piping and ducting identified as Seismic Category I in Figure 2.4-2 ~~in the part (e) analysis~~ using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.	c. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the UHS Makeup Water Intake Structure Ventilation System piping and ducting identified as Seismic Category I in Figure 2.4-2 ~~in the part (e) analysis~~ can withstand seismic design basis loads without loss of safety function.

Table 2.4- 20 ~~21~~ —{Ultimate Heat Sink Makeup Water Intake Structure Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
6	d. Portions of the UHS Makeup Water Intake Structure Ventilation System piping and ducting identified as Seismic Category I in Figure 2.4-2 ~~in the part (e) analysis~~ can withstand seismic design basis loads without loss of safety function.	d. Inspections will be performed of the Seismic Category I UHS Makeup Water Intake Structure Ventilation System piping and ducting identified in Figure 2.4-2 ~~in the part (e) analysis~~ to verify that the piping and ducting, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses) .	d. Inspection reports exist and conclude that the as-built Seismic Category I UHS Makeup Water Intake Structure Ventilation System piping and ducting identified in Figure 2.4-2 ~~in the part (e) analysis~~, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).
~~6~~	~~e. The UHS Makeup Water Intake Structure Ventilation System equipment, piping, and ducting is identified as Seismic Category I can withstand seismic design basis loads without loss of safety function.~~	~~e. An analysis to identify the Category I equipment, piping, and ducting of the UHS Makeup Water Intake Structure Ventilation System will be performed.~~	~~e. A report exists indicating the Category I equipment, piping, and ducting of the UHS Makeup Water Intake Structure Ventilation System.~~
7	Each safety related division of the UHS Makeup Water Intake Structure Ventilation System maintains the UHS Makeup Water Intake Structure pump room at a minimum temperature of 41°F (5°C) and a maximum temperature of 104°F (40°C) during operation of its associated division of UHS Makeup Water System.	a. An analysis to determine the heating and cooling capacity of each division of the UHS Makeup Water Intake Structure Ventilation System required to maintain the UHS Makeup Water Intake Structure pump room temperature 41°F (5°C) and 104°F (40°C) during operation of its associated division of UHS Makeup Water System will be performed.	a. A report exists which documents the minimum heating and cooling capacity of each safety related division of the UHS Makeup Water Intake Structure Ventilation System required to maintain the UHS Makeup Water Intake Structure pump room temperature 41°F (5°C) and 104°F (40°C) during operation of its associated division of UHS Makeup Water System.

Table 2.4- 20 ~~21~~ —{Ultimate Heat Sink Makeup Water Intake Structure Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
7		b. An inspection of the equipment manufacturer's documentation for each safety related UHS Makeup Water Intake Structure Ventilation System air handling unit to verify it meets the minimum required heating/cooling capacity determined in the analysis (part a) will be performed.	b. Each safety related UHS Makeup Water Intake Structure Ventilation System air handling unit is rated in the equipment manufacturer's documentation with greater than or equal to the minimum required heating/cooling capacity determined in the (part a) analysis.
8	Each safety related division of the UHS Makeup Water Intake Structure Ventilation System is initiated automatically.	Tests of the as-built system will be conducted by supplying a simulated signal to each as-built division.	A report exists that concludes that each safety related division of the as-built UHS Makeup Water Intake Structure Ventilation System starts upon receipt of a simulated automatic initiation signal.
9	The UHS Makeup Water Intake Structure Ventilation System equipment that could impact the capability of Seismic Category I structures, systems, or components to perform their safety function are designated as Seismic Category II in Table 2.4-37, and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the UHS Makeup Water Intake Structure Ventilation equipment listed as Seismic Category II in Table 2.4-37 using analytical assumptions, or under conditions, which bound the Seismic Category II design requirements to verify the equipment can withstand seismic design basis loads without impacting the capability of equipment designated Seismic Category I from performing its safety function.	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the UHS Makeup Water System equipment listed as Seismic Category II in Table 2.4-37 can withstand seismic design basis loads without impacting the capability of equipment designated Seismic Category I from performing its safety function.

Table 2.4- 20 ~~21~~ —{Ultimate Heat Sink Makeup Water Intake Structure Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
9		b. Inspections will be performed of the Seismic Category I UHS Makeup Water Intake Structure Ventilation System equipment listed in Table 2.4-37 to verify that the equipment, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	b. Inspection reports exist and conclude that the as-built Seismic Category I UHS Makeup Water Intake Structure Ventilation System equipment listed in Table 2.4-37, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).
9	c. UHS Makeup Water Intake Structure Ventilation System piping and ducting that could impact the capability of Seismic Category I structures, systems, or components to perform its safety function are identified as Seismic Category II in Figure 2.4-2, and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.	c. Type tests, analyses or a combination of type tests and analyses will be performed on the piping and ducting identified as Seismic Category II in Figure 2.4-2 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.	c. Seismic qualification reports (SQDP, EQDP, or analyses) exist and concludes that the as-designed UHS Makeup Water Intake Structure Ventilation System piping and ducting identified as Seismic Category II in Figure 2.4-2 can withstand seismic design basis loads without impacting the capability of equipment designated Seismic Category I from performing its safety function.

Table 2.4- 20 ~~21~~ —{Ultimate Heat Sink Makeup Water Intake Structure Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
9	d. UHS Makeup Water Intake Structure Ventilation System piping and ducting that could impact the capability of Seismic Category I structures, systems, or components to perform its safety function are identified as Seismic Category II in Figure 2.4-2, and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.	d. Inspections will be performed of the as-built Seismic Category II UHS Makeup Water Intake Structure Ventilation System piping and ducting identified in Figure 2.4-2 to verify that the components, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	d. Inspection reports exist and conclude that the as-built Seismic Category II UHS Makeup Water Intake Structure Ventilation System piping and ducting identified in Figure 2.4-2, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).

~~Table 2.4-22—{Ultimate Heat Sink Electrical Building Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}~~

	~~Commitment Wording~~	~~Inspection, Tests, or Analysis~~	~~Acceptance Criteria~~
~~1~~	~~There are four divisions of the UHS Electrical Building Ventilation System.~~	~~Inspection of the as-built system shall be conducted to verify that there are four divisions of the UHS Electrical Building Ventilation System.~~	~~An inspection report exists and confirms that the UHS as-built Electrical Building Ventilation System has four divisions.~~
~~2~~	~~Each of the four mechanical divisions of the UHS Electrical Building Ventilation System are physically separated from each other.~~	~~An inspection will be performed to verify each of the four mechanical divisions of the UHS Electrical Building Ventilation System are physically separated from each other.~~	~~An inspection report exists and confirms that each of the four mechanical divisions of the as-built UHS Electrical Building Ventilation System is physically separated from other mechanical divisions by structural barriers, 3-hour fire barriers, or a combination of structural and 3-hour barriers.~~
~~3~~	~~Each division of the UHS Electrical Building Ventilation System shall be electrically independent.~~	~~Inspections and/or analysis of the as-built system shall be conducted.~~	~~For the as-built UHS Electrical Building System, electrical isolation exists between each division of Class 1E components and between Class 1E components and non-class 1E components.~~
~~4~~	~~Each division of the UHS Electrical Building Ventilation System is independently powered by their respective Class 1E division.~~	~~Tests will be performed to verify each division of the UHS Electrical Building Ventilation System is independently powered by their respective Class 1E division.~~	~~A Report exists that concludes each division of the as-built UHS Electrical Building Ventilation System is independently powered by their respective Class 1E division.~~
~~5~~	~~a. Components of the UHS Electrical Building Ventilation System identified as ASME AG-1 Code are designed in accordance with ASME AG-1 Code requirements.~~	~~a. Inspections will be performed to verify the existence of ASME AG-1 Code Design Verification Reports as determined in the part (d) analysis.~~	~~a. ASME AG-1 Code Design Verification Reports (AA-4400) exist for Electrical Building Ventilation System components determined in the part (d) analysis as ASME AG-1 Code.~~

~~Table 2.4-22 {Ultimate Heat Sink Electrical Building Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}~~

	~~Commitment Wording~~	~~Inspection, Tests, or Analysis~~	~~Acceptance Criteria~~
~~5~~	~~b. Components of the UHS Electrical Building Ventilation System determined in the part (d) analysis as ASME AG-1 Code are fabricated in accordance with ASME AG-1 Code requirements, including welding requirements.~~	~~b. Inspections will be performed to verify components are fabricated in accordance with ASME AG-1 Code requirements.~~	~~b. For UHS Electrical Building Ventilation System components determined in the part (d) analysis as ASME AG-1 Code, reports exist and conclude that the component meets ASME AG-1 Code requirements, including welding requirements.~~
~~5~~	~~c. Components of the UHS Electrical Building Ventilation System determined in the part (d) analysis as ASME AG-1 Code are inspected and tested in accordance with ASME AG-1 Code requirements.~~	~~c. Inspections and tests will be performed on the components.~~	~~c. For UHS Electrical Building Ventilation System components determined in the part (d) analysis as ASME AG-1 Code, reports exist and conclude that the components meets ASME AG-1 Code inspection and testing requirements.~~
~~5~~	~~d. Components of the UHS Electrical Building Ventilation System identified as ASME AG-1 Code are designed in accordance with ASME AG-1 Code requirements.~~	~~d. An analysis to identify the ASME AG-1 Code components of the UHS Electrical Building Ventilation System will be performed.~~	~~d. A report exists indicating the ASME AG-1 Code components of the UHS Electrical Building Ventilation System.~~
~~6~~	~~a. The UHS Electrical Building Ventilation System equipment are designated Seismic Category I in the part (e) analysis, and can withstand seismic design basis loads without loss of safety function.~~	~~a. Type tests, analyses, or a combination of type tests and analyses will be performed on the UHS Electrical Building Ventilation System equipment identified as Seismic Category I in the part (e) analysis using analytical assumptions, or under conditions which bound the Seismic Category I design requirements.~~	~~a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the UHS Electrical Building Ventilation System equipment listed as Seismic Category I in the part (e) analysis can withstand design basis seismic loads without loss of safety function.~~

~~Table 2.4-22 {Ultimate Heat Sink Electrical Building Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}~~

	~~Commitment Wording~~	~~Inspection, Tests, or Analysis~~	~~Acceptance Criteria~~
~~6~~	~~b. The UHS Electrical Building Ventilation System equipment are designated Seismic Category I in the part (e) analysis, and can withstand seismic design basis loads without loss of the safety function.~~	~~b. Inspections will be performed of the Seismic Category I UHS Electrical Building Ventilation System equipment identified in the part (e) analysis to verify that the equipment, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).~~	~~b. Inspection reports exist and conclude that the as-built Seismic Category I UHS Electrical Building Ventilation System equipment identified in the part (e) analysis, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).~~
~~6~~	~~c. Portions of the UHS Electrical Building Ventilation System piping and ducting identified as Seismic Category I in the part (e) analysis can withstand seismic design basis loads without loss of safety function.~~	~~c. Type tests, analyses or a combination of type tests and analyses will be performed on the piping and ducting shown as Seismic Category I in the part (e) analysis using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.~~	~~c. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the UHS Electrical Building Ventilation System piping and ducting in the part (e) analysis can withstand seismic design basis loads without loss of safety function.~~
~~6~~	~~d. Portions of the UHS Electrical Building Ventilation System piping and ducting identified as Seismic Category I in the part (e) analysis can withstand seismic design basis loads without loss of safety function.~~	~~d. Inspections will be performed of the Seismic Category I UHS Electrical Building Ventilation System piping and ducting identified in the part (e) analysis to verify that the piping and ducting, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).~~	~~d. Inspection reports exist and conclude that the as-built Seismic Category I UHS Electrical Building Ventilation System piping and ducting identified in the part (e) analysis, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).~~

~~Table 2.4-22 {Ultimate Heat Sink Electrical Building Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}~~

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
~~6~~	~~e. The UHS Electrical Building Ventilation System equipment, piping, and ducting are designated Seismic Category I, and can withstand seismic design basis loads without loss of safety function.~~	~~e. An analysis to identify the Category I equipment, piping, and ducting of the UHS Electrical Building Ventilation System will be performed.~~	~~e. A report exists indicating the Category I equipment, piping, and ducting of the UHS Electrical Building Ventilation System.~~
~~7~~	~~Each division of the UHS Electrical Building Ventilation System maintains the UHS Electrical Building electrical room at a minimum temperature of 41°F (5°C) and a maximum temperature of 104°F (40°C) during operation of its associated division of UHS Makeup Water System.~~	~~a. An analysis to determine the heating and cooling capacity of each division of the UHS Electrical Building Ventilation System required to maintain the UHS Electrical Building electrical room temperature 41°F (5°C) and 104°F (40°C) during operation of its associated division of UHS Makeup Water System will be performed.~~	~~a. A report exists which documents the minimum heating and cooling capacity of each division of the UHS Electrical Building Ventilation System required to maintain the UHS Electrical Building electrical room temperature 41°F (5°C) and 104°F (40°C) during operation of its associated division of UHS Makeup Water System.~~
		~~b. An inspection of the equipment manufacturer's documentation for each UHS Electrical Building Ventilation System air handling unit to verify it meets the minimum required heating/cooling capacity determined in the analysis (part a) will be performed.~~	~~b. Each UHS Electrical Building Ventilation System air handling unit is rated in the equipment manufacturer's documentation with greater than or equal to the minimum required heating/cooling capacity determined in the (part a) analysis.~~

~~Table 2.4-22 {Ultimate Heat Sink Electrical Building Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}~~

	~~Commitment Wording~~	~~Inspection, Tests, or Analysis~~	~~Acceptance Criteria~~
~~8~~	~~Each division of the UHS Electrical Building Ventilation System is initiated automatically.~~	~~Tests of the as-built system will be conducted by supplying a simulated signal to each as-built division.~~	~~A report exists that concludes that each division of the as-built UHS Electrical Building Ventilation System starts upon receipt of a simulated automatic initiation signal.~~

Note:
The following table was unchanged except for the table number.

Table 2.4-~~23~~ 21 — {Fire Protection Building Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~24~~ 22 —{Ultimate Heat Sink Makeup Water System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	There are four divisions of the UHS Makeup Water System.	Inspection of the as-built system shall be conducted to verify that there are four divisions of the UHS Makeup Water System.	An inspection report exists and confirms that the as-built UHS Makeup Water System has four divisions.
4	Each division of the UHS Makeup Water System is independently powered by their respective Class 1E division.	Tests will be performed to verify each division of the UHS Makeup Water System is independently powered by their respective Class 1E division.	A report exists that concludes each division of the as-built UHS Makeup Water System is independently powered by their respective Class 1E division.
2	Each of the four mechanical divisions of the UHS Makeup Water System are physically separated from each other.	An inspection will be performed to verify each of the four mechanical divisions of the UHS Makeup Water System are physically separated from each other.	A report exists that concludes each of the four mechanical divisions of the as-built UHS Makeup Water System is physically separated from other mechanical divisions by structural barriers, 3-hour fire barriers, or a combination of structural and 3-hour barriers.
3	Each division of the UHS Makeup Water System shall be electrically independent.	Inspections and/or analysis of the as-built system shall be conducted.	For the as-built UHS Makeup Water, electrical isolation exists between each division of Class 1E components and between Class 1E components and non-class 1E components.
5	The UHS Makeup Water System equipment identified as Seismic Category I in Table 2.4-29 ~~31~~ can withstand seismic design basis loads without loss of safety function.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the UHS Makeup Water System equipment listed as Seismic Category I in Table 2.4-29 ~~31~~ using analytical assumptions, or under conditions which bound the Seismic Category I design requirements.	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the UHS Makeup Water System equipment listed as Seismic Category I in table 2.4-29 ~~31~~can withstand seismic design basis loads without loss of safety function.

Table 2.4-~~24~~ 22 —{Ultimate Heat Sink Makeup Water System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
5		b. Inspections will be performed of the Seismic Category I UHS Makeup Water System equipment listed in Table 2.4-29 ~~31~~ to verify that the equipment, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	b. Inspection reports exist and conclude that the as-built Seismic Category I UHS Makeup Water System equipment listed in Table 2.4-29 ~~31~~, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).
6	a. The UHS Makeup Water System equipment that could impact the capability of Seismic Category I structures, systems, or components to perform their safety function are designated as Seismic Category II identified in Table 2.4-29 ~~31~~, and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the UHS Makeup Water System equipment listed as Seismic Category II in Table 2.4-29 ~~31~~ using analytical assumptions, or under conditions, which bound the Seismic Category II design requirements to verify the piping and equipment can withstand seismic design basis loads without impacting the capability of equipment designated Seismic Category I from performing its safety function.	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the UHS Makeup Water System equipment listed as Seismic Category II in Table 2.4-29 ~~31~~ can withstand seismic design basis loads without impacting the capability of equipment designated Seismic Category I from performing its safety function.

Table 2.4-~~24~~ 22 —{Ultimate Heat Sink Makeup Water System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
6	b. The UHS Makeup Water System equipment that could impact the capability of Seismic Category I structures, systems, or components to perform its safety function are designated as Seismic Category II in Table 2.4-29 ~~31~~, and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.	b. Inspections will be performed of the Seismic Category II UHS Makeup Water System equipment listed in Table 2.4-29 ~~31~~ to verify that the equipment, including anchorage, is installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	b. Inspection reports exist and conclude that the as-built Seismic Category II UHS Makeup Water System equipment listed in Table 2.4-29 ~~31~~, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).
6	c. UHS Makeup Water System piping that could impact the capability of Seismic Category I structures, systems, or components to perform its safety function are identified as Seismic Category II in Figure 2.4-1, and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.	c. Type tests, analyses or a combination of type tests and analyses will be performed on the piping identified as Seismic Category II in Figure 2.4-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.	c. Seismic qualification reports (SQDP, EQDP, or analyses) exist and concludes that the as-designed UHS Makeup Water System piping identified as Seismic Category II in Figure 2.4-1 can withstand seismic design basis loads without impacting the capability of equipment designated Seismic Category I from performing its safety function.

Table 2.4-~~24~~ 22 —{Ultimate Heat Sink Makeup Water System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
6	d. UHS Makeup Water System piping that could impact the capability of Seismic Category I structures, systems, or components to perform its safety function are identified as Seismic Category II in Figure 2.4-1, and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.	d. Inspections will be performed of the as-built Seismic Category II UHS Makeup Water System piping identified in Figure 2.4-1 to verify that the components, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	d. Inspection reports exist and conclude that the as-built Seismic Category II UHS Makeup Water System piping identified in Figure 2.4-1, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).
7	The UHS Makeup Water Intake Structure dual-flow traveling screens and screen wash pump are designed to withstand seismic design basis loads without a loss of their mechanical function.	a. Type tests, analyses, or a combination of type tests and analyses will be performed to verify that the UHS Makeup Water dual flow traveling screens and screen wash pump can withstand seismic design basis loads without a loss of mechanical function.	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the as-built UHS Makeup Water dual flow traveling screens and screen wash pump can withstand seismic design basis loads without a loss of mechanical function.
7		b. Inspections will be performed to verify that the as-built UHS Makeup Water dual flow traveling screens and screen wash pump, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	b. Inspection reports exist and conclude that the as-built UHS Makeup Water dual flow traveling screens and screen wash pump, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).

Table 2.4-~~24~~ 22 —{Ultimate Heat Sink Makeup Water System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
8	a. Components listed in Table 2.4-29 ~~31~~ as ASME Section III are designed in accordance with ASME Section III Code requirements.	a. Inspections will be performed to verify the existence of ASME Section III Code Design Reports.	a. ASME Section III Code Design Reports (NCA-3550) exist for components listed as ASME Section III in Table 2.4-29 ~~31~~.
8	b. Components listed in Table 2.4-29 ~~31~~ as ASME Code Section III are fabricated in accordance with the requirements of ASME Section III.	b. Inspections will be performed to verify that the design report has been revised to reflect as-built deviations from the design if applicable.	b. For components listed as ASME Code Section III in Table 2.4-29 ~~31~~, the as-built component satisfies design requirements of ASME Code Section III as demonstrated in the Design Report (NCA-3550).
8	c. Pressure boundary welds on components listed in Table 2.4-29 ~~31~~ as ASME Code Section III are in accordance with ASME Code Section III requirements.	c. Inspections of pressure boundary welds will be performed to verify that welding is performed in accordance with ASME Code Section III requirements.	c. For components listed as ASME Code Section III in Table 2.4-29 ~~31~~, ASME Code Section III Data Reports (NCA-8000) exist and conclude that pressure boundary welding has been performed in accordance with ASME Code Section III.
8	d. Components listed in Table 2.4-29 ~~31~~ as ASME Code Section III retain their pressure boundary integrity at their design pressure.	d. Hydrostatic tests will be performed on the components.	d. For components listed as ASME Code Section III in Table 2.4-29 ~~31~~, ASME Code Section III Data Reports exist and conclude that hydrostatic test results comply with ASME Code Section III requirements.
9	a. Portions of the UHS Makeup Water System piping shown as ASME Section III in Figure 2.4-1 are designed in accordance with ASME Section III Code requirements.	a. Inspections of the ASME Code Section III Design Reports (NCA-3550) and associated reference documents will be performed.	a. ASME Code Section III Design Reports (NCA-3550) exist and conclude that portions of the UHS Makeup Water System piping shown as ASME Code Section III in Figure 2.4-1 comply with ASME Code Section III requirements.

Table 2.4-~~24~~ 22 —{Ultimate Heat Sink Makeup Water System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
9	b. Portions of UHS Makeup Water System piping shown as ASME Code Section III in figure 2.4-1 are installed in accordance with Code Section III Design Report.	b. Analyses to reconcile as-built deviations to the ASME Code Design Reports (NCA-3550) will be performed. Piping analyzed using time-history methods will be reconciled to the as-built information.	b. For portions of the UHS Makeup Water System piping shown as ASME Code Section III in Figure 2.4-1, ASME Code Data Reports (N-5) exist and conclude that design reconciliation (NCA-3554) has been completed in accordance with the ASME Code Section III for the as-built system. The report(s) document the as-built condition.
9	c. Portions of the CCWS piping shown as ASME Code Section III in Figure 2.4-1 are installed and inspected in accordance with ASME Code Section III requirements.	c. An inspection of the as-built piping will be performed.	c. For portions of the as-built CCWS piping shown as ASME Code Section III in Figure 2.7.1-1, N–5 Data Reports exist and conclude that installation and inspection are in accordance with ASME Code Section III requirements.
10	Pressure boundary welds in portions of the UHS Makeup Water System piping as shown as ASME Code Section III in Figure 2.4-1are in accordance with ASME Code Section III.	Inspections of pressure boundary welds verify that welding is performed in accordance with ASME Code Section III requirements.	ASME Code Section III Data Reports exist and conclude that pressure boundary welding for portions of the UHS Makeup Water System piping shown as ASME Code Section III in Figure 2.4-1 has been performed in accordance with ASME Code Section III.
11	Portions of the UHS Makeup Water System components shown as ASME Code Section III in Figure 2.4-1 retain their pressure boundary integrity at their design pressure.	Hydrostatic tests will be performed on the system.	For portions of the UHS Makeup Water System components shown as ASME Code Section III in Figure 2.4-1, ASME Code Section III Data Reports exist and conclude that hydrostatic test results comply with ASME Code Section III requirements.

Table 2.4-~~24~~ 22 —{Ultimate Heat Sink Makeup Water System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
12	Portions the UHS Makeup Water System piping shown as ASME Code Section III in Figure 2.4-1 retain their pressure boundary integrity at their design pressure.	Hydrostatic tests will be performed on the system.	For portions of the UHS Makeup Water System piping shown as ASME Code Section III in Figure 2.4-1, ASME Code Section III Data Reports exist and conclude that hydrostatic test results comply with ASME Code Section III requirements.
13	The materials utilized in the equipment and piping of the UHS Makeup Water System are compatible with brackish water.	a. An analysis of the materials utilized in the as-built equipment will be performed.	a. A report exists and concludes that the materials utilized in the equipment installed in the UHS Makeup Water System that is in contact with the water is compatible with brackish water.
13		b. An inspection of the as-built piping will be conducted.	b. The as-built piping for the UHS Makeup Water System is composed of either carbon steel SA-106 Grade B with a rubber liner, or ASME SB-675 stainless steel.
14	The UHS Makeup Water Intake Structure bar screens have a large enough face area that potential blockage to the point of preventing the minimum required flow through them is not a concern.	a. Analyses will be performed of the equipment.	a. A report exists and concludes that the face area for the as-built UHS Makeup Water Intake Structure bar screens is sufficient to permit the minimum required flow in the event of worst-case blockage of the screens.
14		b. Inspections will be performed to verify the as-built equipment is installed as specified on the construction drawings and deviations from the approved design have been reconciled.	b. A report exists and concludes that the as-built face area for the as-built UHS Makeup Water Intake Structure bar screens agrees with construction drawings and deviations from the approved design are reconciled.

Table 2.4-~~24~~ 22 —{Ultimate Heat Sink Makeup Water System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
15	The Class 1E valves in the UHS Makeup Water System perform the required function under system design conditions. 1. UHS makeup pump discharge valves open on pump start. 2. Debris filter blowdown line isolation valves will open during the debris filter backwash cycle. 3. The pump min-flow recirculation valve opens in the event the pump discharge valve fails to open.	Tests and analyses or a combination of tests and analyses will be performed to demonstrate the ability of the Class 1E valves to change position under system design conditions.	1. UHS makeup pump discharge valves open on pump start. 2. Debris filter blowdown line isolation valves will open during the debris filter backwash cycle. 3. The pump min-flow recirculation valve opens in the event the pump discharge valve fails to open.
16	Each division of the UHS Makeup Water System can be initiated manually.	Tests of the as-built system will be conducted to verify that each division of the UHS Makeup Water System can be initiated manually.	An inspection report exists and concludes that each division of the as-built UHS Makeup Water System starts upon receipt of a manual initiation signal.
17	Each division of the UHS Makeup Water System provides makeup water in order to maintain the minimum water level in the ESW cooling tower basins.	Testing and analysis will be performed to verify that each division of the UHS Makeup Water System provides makeup water in order to maintain the minimum water level in the ESW cooling tower basins.	A report exists and concludes that each division of the as-built UHS Makeup Water System is capable of delivering greater than the minimum required flow rate of ≥ 300 gallons per minute of makeup water.
18	The UHS Makeup Water pumps listed in Table 2.4-29 ~~31~~ have sufficient NPSH.	Testing and analyses will be performed to verify NPSHA for the UHS Makeup Water pumps listed in Table 2.4-29 ~~31~~.	The UHS Makeup Water pumps listed in Table 2.4-29 ~~31~~ have NPSHA that is greater than net positive suction head required (NPSHR) at system rated flow.

Table 2.4-~~24~~ 22 —{Ultimate Heat Sink Makeup Water System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
19	The motor-operated valves listed in Table 2.4-29 ~~31~~ can perform the function listed in Table 2.4-29 ~~31~~ under system operating conditions.	Tests and analyses or a combination of tests and analyses will be performed to demonstrate the ability of the valves listed in Table 2.4-29 ~~31~~ to change position as listed in Table 2.4-29 ~~31~~ under system operating conditions.	The valve changes position as listed Table 2.4-29 ~~31~~ under system operating conditions.
20	Check valves listed in Table 2.4-29 ~~31~~ function as listed in Table 2.4-29 ~~31~~.	Tests will be performed for the operation of the check valves listed in Table 2.4-29 ~~31~~.	The check valves listed in Table 2.4-29 ~~31~~ perform the functions listed in Table 2.4-29 ~~31~~.
21	Each division of the UHS Makeup Water System has a surveillance test bypass line as shown in Figure 2.4-1 that allows flow testing of the system during plant operation.	Tests of the as-built system will be conducted.	The as-built surveillance test bypass line for each division the UHS Makeup Water System as shown in Figure 2.4-1 allows flow testing of the system during plant operation.
22	a. Each UHS Makeup Water Intake Structure dual flow traveling screen is designed to be manually rotated, if needed, following a loss of motive power or failure of its electric motor drive.	a. Tests will be performed on each UHS Makeup Water Intake Structure dual flow traveling screen to verify it can be manually rotated upon a loss of motive power or failure of its electric motor drive.	a. Test reports exist and conclude that upon a simulated loss of motive power or failure of its electric motor drive, each UHS Makeup Water Intake Structure dual flow traveling screen can be manually rotated.
22	b. Each UHS Makeup Water Intake Structure dual flow traveling screen is designed to be manually cleaned using an external water source following a loss of its screen wash system.	b. Tests will be performed on each UHS Makeup Water Intake Structure dual flow traveling screen to verify it can be manually cleaned using an external water source following a loss of its screen wash system.	b. Test reports exist and conclude that upon a simulated loss of its screen wash system, each UHS Makeup Water Intake Structure dual flow traveling screen can be manually cleaned using an external water source.

Note:
The following tables were unchanged except for the table number.

Table 2.4-~~25~~ 23 — {Raw Water Supply System Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~26~~ 24 — {Fire Water Distribution System Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~27~~ 25 —{Fire Suppression Systems Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	a. The Standpipe and Hose Station components for the UHS Makeup Water Intake Structure are designated Seismic Category II-SSE in the part (c) analysis and can withstand seismic design basis loads without a loss of the function listed in the part (c) analysis .	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the UHS Makeup Water Intake Structure Standpipe and Hose Station components identified as Seismic Category II-SSE in the part (c) analysis using analytical assumptions, or under conditions which bound the Seismic Category II-SSE design requirements.	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Seismic Category II-SSE UHS Makeup Water Intake Structure Standpipe and Hose Station components identified in the part (c) analysis can withstand seismic design basis loads without a loss of the function listed in the part (c) analysis.
1	b. The Standpipe and Hose Station components for the UHS Makeup Water Intake Structure are designated Seismic Category II-SSE in the part (c) analysis and can withstand seismic design basis loads without a loss of the function listed in the part (c) analysis .	b. Inspections will be performed of the as-built Seismic Category II-SSE UHS Makeup Water Intake Structure Standpipe and Hose Station components identified in the part (c) analysis to verify that the as-built components, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	b. Inspection reports exist and conclude that the as-built Seismic Category II-SSE UHS Makeup Water Intake Structure Standpipe and Hose Station components identified in the part (c) analysis , including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).
1	c. The Standpipe and Hose Station components for the UHS Makeup Water Intake Structure are designated Seismic Category II-SSE and can withstand seismic design basis loads without a loss of the function listed.	c. An analysis to identify the Category II components of the Standpipe and Hose Station for the UHS Makeup Water Intake Structure will be performed.	c. A report exists indicating the Category II components of the Standpipe and Hose Station for the UHS Makeup Water Intake Structure.

Table 2.4-~~27~~ 25 —{Fire Suppression Systems Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
2	The Standpipe and Hose Station components for the UHS Makeup Water Intake Structure are designated Seismic Category II-SSE in the part (c) analysis , and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the Seismic Category II-SSE UHS Makeup Water Intake Structure Standpipe and Hose Station components identified in the part (c) analysis using analytical assumptions, or under conditions which bound the Seismic Category II-SSE design requirements to verify the components-can withstand seismic design basis loads without impacting the capability of equipment designated Seismic Category I from performing its safety function.	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Seismic Category II-SSE UHS Makeup Water Intake Structure Standpipe and Hose Station components identified in the part (c) analysis can withstand seismic design basis loads without impacting the capability of equipment designated Seismic Category I from performing its safety function.
2	b. The Standpipe and Hose Station components for the UHS Makeup Water Intake Structure are designated Seismic Category II-SSE in the part (c) analysis , and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.	b. Inspections will be performed of the Seismic Category II-SSE UHS Makeup Water Intake Structure Standpipe and Hose Station components identified in the part (c) analysis to verify that the as-built components, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	b. Inspection reports exist and conclude that the as-built Seismic Category II-SSE UHS Makeup Water Intake Structure Standpipe and Hose Station components identified in the part (c) analysis , including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).

Table 2.4-~~27~~ 25 —{Fire Suppression Systems Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
2	c. The Standpipe and Hose Station components for the UHS Makeup Water Intake Structure are designated Seismic Category II-SSE and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.	c. An analysis to identify the Category II components of the Standpipe and Hose Station for the UHS Makeup Water Intake Structure will be performed.	c. A report exists indicating the Category II components of the Standpipe and Hose Station for the UHS Makeup Water Intake Structure.
3	a. The Fire Suppression System components for the UHS Makeup Water Intake Structure are designated as Seismic Category II in the part (c) analysis, and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the Seismic Category II UHS Makeup Water Intake Structure Fire Suppression System components identified in the part (c) analysis using analytical assumptions, or under conditions which bound the Seismic Category II design requirements to verify the components can withstand seismic design basis loads without impacting the capability of equipment designated Seismic Category I from performing its safety function.	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Seismic Category II UHS Makeup Water Intake Structure Fire Suppression System components, identified in the part (c) analysis can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.

Table 2.4-~~27~~ 25 —{Fire Suppression Systems Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
3	b. The Fire Suppression System components for the UHS Makeup Water Intake Structure are designated as Seismic Category II in the part (c) analysis, and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.	b. Inspections will be performed of the Seismic Category II UHS Makeup Water Intake Structure Fire Suppression System components identified in the part (c) analysis to verify that the as-built components designated Seismic Category II, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	b. Inspection reports exist and conclude that the as-built Seismic Category II UHS Makeup Water Intake Structure Fire Suppression System components identified in the part (c) analysis, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).
3	c. The Fire Suppression System components for the UHS Makeup Water Intake Structure are designated as Seismic Category II and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.	c. An analysis to identify the Category II components of the Fire Suppression System for the UHS Makeup Water Intake Structure will be performed.	c. A report exists indicating the Category II components of the Fire Suppression System for the UHS Makeup Water Intake Structure.
4	~~The Standpipe and Hose Station components for the UHS Electrical Building are designated Seismic Category II-SSE in the part (c) analysis and can withstand seismic design basis loads without a loss of the function listed in the part (c) analysis.~~	~~a. Type tests, analyses, or a combination of type tests and analyses will be performed on the UHS Electrical Building Standpipe and Hose Station components identified as Seismic Category II-SSE in the part (c) analysis using analytical assumptions, or under conditions which bound the Seismic Category II-SSE design requirements.~~	~~a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the as-built Seismic Category II-SSE UHS Electrical Building Standpipe and Hose Station components identified in the part (c) analysis can withstand seismic design basis loads without a loss of the function listed in the part (c) analysis.~~

Table 2.4-~~27~~ 25 —{Fire Suppression Systems Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
4	~~b. The Standpipe and Hose Station components for the UHS Electrical Building are designated Seismic Category II-SSE in the part (c) analysis and can withstand seismic design basis loads without a loss of the function listed in the part (c) analysis.~~	~~b. Inspections will be performed of the as-built Seismic Category II-SSE UHS Electrical Building Standpipe and Hose Station components, identified in the part (c) analysis to verify that the components, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).~~	~~b. Inspection reports exist and conclude that the as-built Seismic Category II-SSE UHS Electrical Building Standpipe and Hose Station components identified in the part (c) analysis, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).~~
4	~~c. The Standpipe and Hose Station components for the UHS Electrical Building are designated Seismic Category II-SSE and can withstand seismic design basis loads without a loss of the function.~~	~~c. An analysis to identify the Category II components of the Standpipe and Hose Station for the UHS Electrical Building will be performed.~~	~~c. A report exists indicating the Category II components of the Standpipe and Hose Station for the UHS Electrical Building.~~

Table 2.4-~~27~~ 25 —{Fire Suppression Systems Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
~~5~~	~~The Standpipe and Hose Station components for the UHS Electrical Building are designated Seismic Category II-SSE in the part (c) analysis and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.~~	~~a. Type tests, analyses, or a combination of type tests and analyses will be performed on the Seismic Category II-SSE UHS Electrical Building Standpipe and Hose Station components identified in the part (c) analysis using analytical assumptions, or under conditions which bound the Seismic Category II-SSE design requirements to verify the components can withstand seismic design basis loads without impacting the capability of equipment designated Seismic Category I from performing its safety function.~~	~~a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Seismic Category II-SSE UHS Electrical Building Standpipe and Hose Station components identified in the part (c) analysis can withstand seismic design basis loads without impacting the capability of equipment designated Seismic Category I from performing its safety function.~~
~~5~~	~~b. The Standpipe and Hose Station components for the UHS Electrical Building are designated Seismic Category II-SSE in the part (c) analysis and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.~~	~~b. Inspections will be performed on the as-built Seismic Category II-SSE UHS Electrical Building Standpipe and Hose Station components identified in the part (c) analysis to verify that the components, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).~~	~~b. Inspection reports exist and conclude that the as-built Seismic Category II-SSE UHS Electrical Building Standpipe and Hose Station components identified in the part (c) analysis, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses). are seismically bounded by the tested or analyzed conditions.~~

Table 2.4-~~27~~ 25 —{Fire Suppression Systems Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
~~5~~	~~c. The Standpipe and Hose Station components for the UHS Electrical Building are designated Seismic Category II-SSE and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.~~	~~c. An analysis to identify the Category II components of the Standpipe and Hose Station for the UHS Electrical Building will be performed.~~	~~c. A report exists indicating the Category II components of the Standpipe and Hose Station for the UHS Electrical Building.~~
~~6~~	~~The Fire Suppression System components for the UHS Electrical Building are designated as Seismic Category II in the part (c) analysis and can withstand design basis seismic loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.~~	~~a. Type tests, analyses, or a combination of type tests and analyses will be performed on the Seismic Category II UHS Electrical Building Fire Suppression System components identified in the part (c) analysis using analytical assumptions, or under conditions which bound the Seismic Category II design requirements, to verify the components can withstand seismic design basis loads without impacting the capability of equipment designated Seismic Category I from performing its safety function.~~	~~a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Seismic Category II UHS Electrical Building Fire Suppression System components identified in the part (c) analysis can withstand seismic design basis loads without impacting the capability of Seismic Category I equipment from performing its safety function.~~

Table 2.4-~~27~~ 25 —{Fire Suppression Systems Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
~~6~~	~~b. The Fire Suppression System components for the UHS Electrical Building are designated as Seismic Category II in the part (c) analysis and can withstand design basis seismic loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.~~	~~b. Inspections will be performed of the as-built Seismic Category II UHS Electrical Building Fire Suppression System components identified in the part (c) analysis to verify that the as-built components, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).~~	~~b. Inspection reports exist and conclude that the as-built Seismic Category II UHS Electrical Building Fire Suppression System components identified in the part (c) analysis, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).~~
~~6~~	~~c. The Fire Suppression System components for the UHS Electrical Building are designated as Seismic Category II and can withstand design basis seismic loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.~~	~~c. An analysis to identify the Category II components of the Fire Suppression System for the UHS Electrical Building will be performed.~~	~~c. A report exists indicating the Category II components of the Fire Suppression System for the UHS Electrical Building.~~
~~7~~ 4	The Fire Suppression System components for the Fire Protection Building are designated as Seismic Category II in the part (c) analysis, and can withstand design basis seismic loads without a loss of the function listed in the part (c) analysis.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the Fire Suppression System components for the Fire Protection Building identified as Seismic Category II in the part (c) analysis using analytical assumptions, or under conditions which bound the Seismic Category II design requirements.	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Seismic Category II Fire Suppression System components for the Fire Protection Building identified in the part (c) analysis can withstand seismic design basis loads without a loss of the function listed in the part (c) analysis.

Table 2.4-~~27~~ 25 —{Fire Suppression Systems Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
~~7~~ 4	b. The Fire Suppression System components for the Fire Protection Building are designated as Seismic Category II in the part (c) analysis, and can withstand design basis seismic loads without a loss of the function listed in the part (c) analysis.	b. Inspections will be performed of the as-built Seismic Category II Fire Suppression System components for the Fire Protection Building identified in the part (c) analysis to verify that the components, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	b. Inspection reports exist and conclude that the as-built Seismic Category II Fire Suppression System components for the Fire Protection Building identified in the part (c) analysis, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).
4	c. The Fire Suppression System components for the Fire Protection Building are designated as Seismic Category II, and can withstand design basis seismic loads without a loss of the function.	c. An analysis to identify the Category II components of the Fire Suppression System for the Fire Protection Building will be performed.	c. A report exists indicating the Category II components of the Fire Suppression System for the Fire Protection Building.

Table 2.4-~~28~~ 26 —{Offsite Power System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
1	The Class 1E electrical distribution equipment listed in the part (c) analysis is qualified Seismic Category I can withstand seismic design basis loads without loss of safety function.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the Class 1E electrical distribution equipment listed as Seismic Category I in the part (c) analysis using analytical assumptions, or under conditions which bound the Seismic Category I design requirements.	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Seismic Category I Class 1E electrical distribution equipment listed in the part (c) analysis can withstand design basis seismic loads without loss of safety function.
1		b. Inspections will be performed of the Seismic Category I Class 1E electrical distribution equipment listed in the part (c) analysis to verify that the equipment, including anchorage, are installed as specified on the construction drawings and deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	b. Inspection reports exist and conclude that the as-built Seismic Category I Class 1E electrical distribution equipment listed in the part (c) analysis, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).
1		c. An analysis to identify the Class 1E electrical distribution equipment will be performed.	c. A report exists indicating the Class 1E electrical distribution equipment.

Table 2.4-~~28~~ 26 —{Offsite Power System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
2	Displays exist or can be retrieved in the MCR and the RSS for the following Class 1E equipment: 1. UHS Makeup Water System (makeup water pumps, pump discharge valves, pump min-flow recirculation valves, pump test bypass line isolation valves, initial fill isolation valve, and debris filter blowdown line isolation valves). 2. UHS Makeup Water Intake Structure Ventilation System (ventilation fans). ~~3. UHS Electrical Building Ventilation System (ventilation fans).~~	a. Tests will be performed for the retrievability of the displays in the MCR or the RSS.	a. The displays for the following Class 1E equipment can be retrieved in the MCR: 1. UHS Makeup Water System (makeup water pumps, pump discharge valves, pump min-flow recirculation valves, pump test bypass line isolation valves, initial fill isolation valve, and debris filter blowdown line isolation valves). 2. UHS Makeup Water Intake Structure Ventilation System (ventilation fans). ~~3. UHS Electrical Building Ventilation System (ventilation fans).~~
2		b. Tests will be performed for the retrievability of the displays in the MCR or the RSS.	b. The displays for the following Class 1E equipment can be retrieved in the RSS: 1. UHS Makeup Water System (makeup water pumps, pump discharge valves, pump min-flow recirculation valves, pump test bypass line isolation valves, initial fill isolation valve, and debris filter blowdown line isolation valves). 2. UHS Makeup Water Intake Structure Ventilation System (ventilation fans). ~~3. UHS Electrical Building Ventilation System (ventilation fans).~~

Table 2.4-~~28~~ 26 —{Offsite Power System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
3	Controls for the following Class 1E equipment exist in the MCR and the RSS: 1. UHS Makeup Water System (makeup water pumps, pump discharge valves, pump min-flow recirculation valves, pump test bypass line isolation valves, initial fill isolation valve, and debris filter blowdown line isolation valves). 2. .UHS Makeup Water Intake Structure Ventilation System (ventilation fans). ~~3. UHS Electrical Building Ventilation System (ventilation fans).~~	a. Tests will be performed to verify the existence of control signals from the MCR and the RSS to the equipment.	a. The controls for the following Class 1E equipment exist in the MCR: 1. UHS Makeup Water System (makeup water pumps, pump discharge valves, pump min-flow recirculation valves, pump test bypass line isolation valves, initial fill isolation valve, and debris filter blowdown line isolation valves). 2. UHS Makeup Water Intake Structure Ventilation System (ventilation fans). ~~3. UHS Electrical Building Ventilation System (ventilation fans).~~
3		b. Tests will be performed to verify the existence of control signals from the MCR and the RSS to the equipment.	b. The controls for the following Class 1E equipment exist in the RSS: 1. UHS Makeup Water System (makeup water pumps, pump discharge valves, pump min-flow recirculation valves, pump test bypass line isolation valves, initial fill isolation valve, and debris filter blowdown line isolation valves). 2. UHS Makeup Water Intake Structure Ventilation System (ventilation fans). ~~3. UHS Electrical Building Ventilation System (ventilation fans).~~

Table 2.4-~~28~~ 26 —{Offsite Power System Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Tests, or Analysis	Acceptance Criteria
4	The Class 1E ~~switchgear, load centers,~~ motor control centers, and transformers and their feeder breakers and load breakers are sized to supply their load requirements, for the following systems: 1. UHS Makeup Water System 2. UHS Makeup Water Intake Structure Ventilation System ~~3. UHS Electrical Building Ventilation System.~~	a. An analysis of the Class 1E ~~switchgear, load centers,~~ motor control centers, and transformers and their feeder breakers and load breakers will be performed.	a. A report exists that concludes that the ratings for the as-built Class 1E ~~switchgear, load centers,~~ motor control centers, and transformers and their feeder breakers and load breakers are greater than their load requirements, for the following systems: 1. UHS Makeup Water System 2. UHS Makeup Water Intake Structure Ventilation System ~~3. UHS Electrical Building Ventilation System.~~
4		b. An inspection of the Class 1E ~~switchgear, load centers,~~ motor control centers, and transformers and their feeder breakers and load breakers will be performed.	b. A report exists and concludes that the ratings of the installed Class 1E ~~switchgear, load centers,~~ motor control centers, and transformers and their feeder breakers and load breakers meet the analysis criteria.

~~Table 2.4-32 {Ultimate Heat Sink (UHS) Makeup Water System Component Mechanical Design}~~
~~(Page 1 of 5)~~

~~Component Description~~	~~Component Tag Number~~	~~Component Location~~	~~ASME Code Section III~~	~~Function~~	~~Seismic Category~~
~~UHS Makeup Water Pump Division 1~~	~~30PED10 AP001 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Run~~	~~I~~
~~UHS Makeup Water Pump Discharge Check Valve Division 1~~	~~30PED10 AA201 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Open - Close~~	~~I~~
~~UHS Makeup Water Pump Discharge Isolation Valve Division 1~~	~~30PED10 AA001 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Open~~	~~I~~
~~UHS Makeup Water Pump Recirculation Isolation Valve Division 1~~	~~30PED10 AA002 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Close~~	~~I~~
~~UHS Makeup Water Pump Discharge Strainer Division 1~~	~~30PED10 AT001 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Run~~	~~I~~
~~UHS Makeup Water Pump Discharge Strainer Blowdown Isolation Valve Division 1~~		~~UHS Makeup Pump Building~~	~~Class 3~~	~~Close~~	~~I~~
~~Piping and Manual Valves Division 1~~		~~UHS Makeup Pump/UHS Makeup Water Electrical Buildings~~	~~Class 3 / B31.1~~	~~Pressure Boundary~~	~~I / II~~
~~Buried Piping Division 1~~		~~Yard Area~~	~~Class 3~~	~~Pressure Boundary~~	~~I~~
~~Air Release/Vacuum Breaker Valves Division 1~~		~~UHS Makeup Pump Building~~	~~Class 3~~	~~Open - Close~~	~~I~~
~~UHS Makeup Pump Bldg AHU Coil Division 1~~		~~UHS Makeup Pump Building~~	~~Class 3~~	~~Pressure Boundary~~	~~I~~
~~UHS Makeup Water Electrical Bldg AHU Coil Division 1~~		~~UHS Makeup Water Electrical Building~~	~~Class 3~~	~~Pressure Boundary~~	~~I~~
~~UHS Makeup Water Dual Flow Traveling Screen Division 1~~		~~UHS Makeup Pump Building~~	~~N/A~~	~~Run~~	~~II / Note 1~~
~~UHS Makeup Water Intake Structure Bar Screen Division 1~~		~~UHS Makeup Pump Building~~	~~N/A~~	—	~~II~~

~~Table 2.4-32 {Ultimate Heat Sink (UHS) Makeup Water System Component Mechanical Design}~~
~~(Page 2 of 5)~~

~~Component Description~~	~~Component Tag Number~~	~~Component Location~~	~~ASME Code Section III~~	~~Function~~	~~Seismic Category~~
~~UHS Makeup Water Screen Wash Pump Division 1~~		~~UHS Makeup Pump Building~~	~~B31.1~~	~~Run~~	~~II~~
~~UHS Makeup Water Pump Division 2~~	~~30PED20 AP001 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Run~~	~~I~~
~~UHS Makeup Water Pump Discharge Check Valve Division 2~~	~~30PED20 AA201 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Open - Close~~	~~I~~
~~UHS Makeup Water Pump Discharge Isolation Valve Division 2~~	~~30PED20 AA001 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Open~~	~~I~~
~~UHS Makeup Water Pump Recirculation Isolation Valve Division 2~~	~~30PED20 AA002 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Close~~	~~I~~
~~UHS Makeup Water Pump Discharge Strainer Division 2~~	~~30PED20 AT001 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Run~~	~~I~~
~~UHS Makeup Water Pump Discharge Strainer Blowdown Isolation Valve Division 2~~		~~UHS Makeup Pump Building~~	~~Class 3~~	~~Close~~	~~I~~
~~Piping and Manual Valves Division 2~~		~~UHS Makeup Pump/UHS Makeup Water Electrical Buildings~~	~~Class 3 / B31.1~~	~~Pressure Boundary~~	~~I / II~~
~~Buried Piping Division 2~~		~~Yard Area~~	~~Class 3~~	~~Pressure Boundary~~	~~I~~
~~Air Release/Vacuum Breaker Valves Division 2~~		~~UHS Makeup Pump Building~~	~~Class 3~~	~~Open - Close~~	~~I~~
~~UHS Makeup Pump Bldg AHU Coil Division 2~~		~~UHS Makeup Pump Building~~	~~Class 3~~	~~Pressure Boundary~~	~~I~~
~~UHS Makeup Water Electrical Bldg AHU Coil Division 2~~		~~UHS Makeup Water Electrical Building~~	~~Class 3~~	~~Pressure Boundary~~	~~I~~

~~Table 2.4-32 {Ultimate Heat Sink (UHS) Makeup Water System Component Mechanical Design}~~
~~(Page 3 of 5)~~

~~Component Description~~	~~Component Tag Number~~	~~Component Location~~	~~ASME Code Section III~~	~~Function~~	~~Seismic Category~~
~~UHS Makeup Water Dual Flow Traveling Screen Division 2~~		~~UHS Makeup Pump Building~~	~~N/A~~	~~Run~~	~~II / Note 1~~
~~UHS Makeup Water Intake Structure Bar Screen Division 2~~		~~UHS Makeup Pump Building~~	~~N/A~~	~~—~~	~~II~~
~~UHS Makeup Water Screen Wash Pump Division 2~~		~~UHS Makeup Pump Building~~	~~B31.1~~	~~Run~~	~~II~~
~~UHS Makeup Water Pump Discharge Check Valve Division 3~~	~~30PED30 AA201 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Open - Close~~	~~I~~
~~UHS Makeup Water Pump Discharge Isolation Valve Division 3~~	~~30PED30 AA001 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Open~~	~~I~~
~~UHS Makeup Water Pump Recirculation Isolation Valve Division 3~~	~~30PED30 AA002 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Close~~	~~I~~
~~UHS Makeup Water Pump Discharge Strainer Division 3~~	~~30PED30 AT001 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Run~~	~~I~~
~~UHS Makeup Water Pump Discharge Strainer Blowdown Isolation Valve Division 3~~		~~UHS Makeup Pump Building~~	~~Class 3~~	~~Close~~	~~I~~
~~Piping and Manual Valves Division 3~~		~~UHS Makeup Pump/UHS Makeup Water Electrical Buildings~~	~~Class 3 / B31.1~~	~~Pressure Boundary~~	~~I / II~~
~~Buried Piping Division 3~~		~~Yard Area~~	~~Class 3~~	~~Pressure Boundary~~	~~I~~
~~Air Release/Vacuum Breaker Valves Division 3~~		~~UHS Makeup Pump Building~~	~~Class 3~~	~~Open - Close~~	~~I~~
~~UHS Makeup Pump Bldg AHU Coil Division 3~~		~~UHS Makeup Pump Building~~	~~Class 3~~	~~Pressure Boundary~~	~~I~~

~~Table 2.4-32 {Ultimate Heat Sink (UHS) Makeup Water System Component Mechanical Design}~~
~~(Page 4 of 5)~~

~~Component Description~~	~~Component Tag Number~~	~~Component Location~~	~~ASME Code Section III~~	~~Function~~	~~Seismic Category~~
~~UHS Makeup Water Electrical Bldg AHU Coil Division 3~~		~~UHS Makeup Water Electrical Building~~	~~Class 3~~	~~Pressure Boundary~~	~~I~~
~~UHS Makeup Water Dual Flow Traveling Screen Division 3~~		~~UHS Makeup Pump Building~~	~~N/A~~	~~Run~~	~~II / Note 1~~
~~UHS Makeup Water Intake Structure Bar Screen Division 3~~		~~UHS Makeup Pump Building~~	~~N/A~~	~~—~~	~~II~~
~~UHS Makeup Water Screen Wash Pump Division 3~~		~~UHS Makeup Pump Building~~	~~B31.1~~	~~Run~~	~~II~~
~~UHS Makeup Water Pump Division 4~~	~~30PED40 AP001 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Run~~	~~I~~
~~UHS Makeup Water Pump Discharge Check Valve Division 4~~	~~30PED40 AA201 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Open - Close~~	~~I~~
~~UHS Makeup Water Pump Discharge Isolation Valve Division 4~~	~~30PED40 AA001 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Open~~	~~I~~
~~UHS Makeup Water Pump Recirculation Isolation Valve Division 4~~	~~30PED40 AA002 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Close~~	~~I~~
~~UHS Makeup Water Pump Discharge Strainer Division 4~~	~~30PED40 AT001 A~~	~~UHS Makeup Pump Building~~	~~Class 3~~	~~Run~~	~~I~~
~~UHS Makeup Water Pump Discharge Strainer Blowdown Isolation Valve Division 4~~		~~UHS Makeup Pump Building~~	~~Class 3~~	~~Close~~	~~I~~
~~Piping and Manual Valves Division 4~~		~~UHS Makeup Pump/UHS Makeup Water Electrical Buildings~~	~~Class 3 / B31.1~~	~~Pressure Boundary~~	~~I / II~~

~~Table 2.4-32 {Ultimate Heat Sink (UHS) Makeup Water System Component Mechanical Design}~~
~~(Page 5 of 5)~~

~~Component Description~~	~~Component Tag Number~~	~~Component Location~~	~~ASME Code Section III~~	~~Function~~	~~Seismic Category~~
~~Buried Piping Division 4~~		~~Yard Area~~	~~Class 3~~	~~Pressure Boundary~~	~~I~~
~~Air Release/Vacuum Breaker Valves Division 4~~		~~UHS Makeup Pump Building~~	~~Class 3~~	~~Open - Close~~	~~I~~
~~UHS Makeup Pump Bldg AHU Coil Division 4~~		~~UHS Makeup Pump Building~~	~~Class 3~~	~~Pressure Boundary~~	~~I~~
~~UHS Makeup Water Electrical Bldg AHU Coil Division 4~~		~~UHS Makeup Water Electrical Building~~	~~Class 3~~	~~Pressure Boundary~~	~~I~~
~~UHS Makeup Water Dual Flow Traveling Screen Division 4~~		~~UHS Makeup Pump Building~~	~~N/A~~	~~Run~~	~~II / Note 1~~
~~UHS Makeup Water Intake Structure Bar Screen Division 4~~		~~UHS Makeup Pump Building~~	~~N/A~~	~~—~~	~~II~~
~~UHS Makeup Water Screen Wash Pump Division 4~~		~~UHS Makeup Pump Building~~	~~B31.1~~	~~Run~~	~~II~~

~~1. UHS Makeup Dual Flow Traveling Screens are designed to withstand design basis seismic loads without a loss of their mechanical function and are designed to permit manual operator rotation and cleaning of the screen panels.~~

Table 2.4-29— {Ultimate Heat Sink (UHS) Makeup Water System Component Mechanical Design}

Page 1 of 4

Component Description	Component Tag Number	Component Location	ASME Code	Function	Seismic Category
UHS Makeup Water Pump Train 1	30PED10 AP001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Check Valve Train 1	30PED10 AA201 A	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Pump Discharge Isolation Valve Train 1	30PED10 AA001 A	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Minimum Flow Valve Train 1	30PED10 AA002 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Train 1	30PED10 AT001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Train 1	30PED10AA006 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 1	Later	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Initial Fill Check Valve Train 1	Later	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Initial Fill Isolation Valve Train 1	Later	UHS Makeup Pump Room	Class 3	Close	I
Piping and Manual Valves Train 1	Later	UHS Makeup Intake Structure	Class 3 / B31.1	Pressure Boundary	I / II
Buried Piping Train 1	Later	Yard Area	Class 3	Pressure Boundary	I
Air Release/Vacuum Breaker Valve Train 1	Later	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Dual Flow Traveling Screen Train 1	Later	UHS Makeup Intake Structure	N/A	Run	II
UHS Makeup Water Intake Structure Bar Screen Train 1	Later	UHS Makeup Intake Structure	N/A	—	II
UHS Makeup Water Screen Wash Pump Train1	Later	UHS Makeup Intake Structure	B31.1	Run	II

Table 2.4-29— {Ultimate Heat Sink (UHS) Makeup Water System Component Mechanical Design}

Component Description	Component Tag Number	Component Location	ASME Code	Function	Seismic Category
UHS Makeup Water Pump Train 2	30PED20 AP001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Check Valve Train 2	30PED20 AA201 A	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Pump Discharge Isolation Valve Train 2	30PED20 AA001 A	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Minimum Flow Valve Train 2	30PED20 AA002 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Train 2	30PED20 AT001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Train 2	30PED20AA006 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 2	Later	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Initial Fill Check Valve Train 2	Later	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Initial Fill Isolation Valve Train 2	Later	UHS Makeup Pump Room	Class 3	Close	I
Piping and Manual Valves Train 2	Later	UHS Makeup Intake Structure	Class 3 / B31.1	Pressure Boundary	I / II
Buried Piping Train 2	Later	Yard Area	Class 3	Pressure Boundary	I
Air Release/Vacuum Breaker Valves Train 2	Later	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Dual Flow Traveling Screen Train 2	Later	UHS Makeup Intake Structure	N/A	Run	II
UHS Makeup Water Intake Structure Bar Screen Train 2	Later	UHS Makeup Intake Structure	N/A	—	II
UHS Makeup Water Screen Wash Pump Train 2	Later	UHS Makeup Intake Structure	B31.1	Run	II

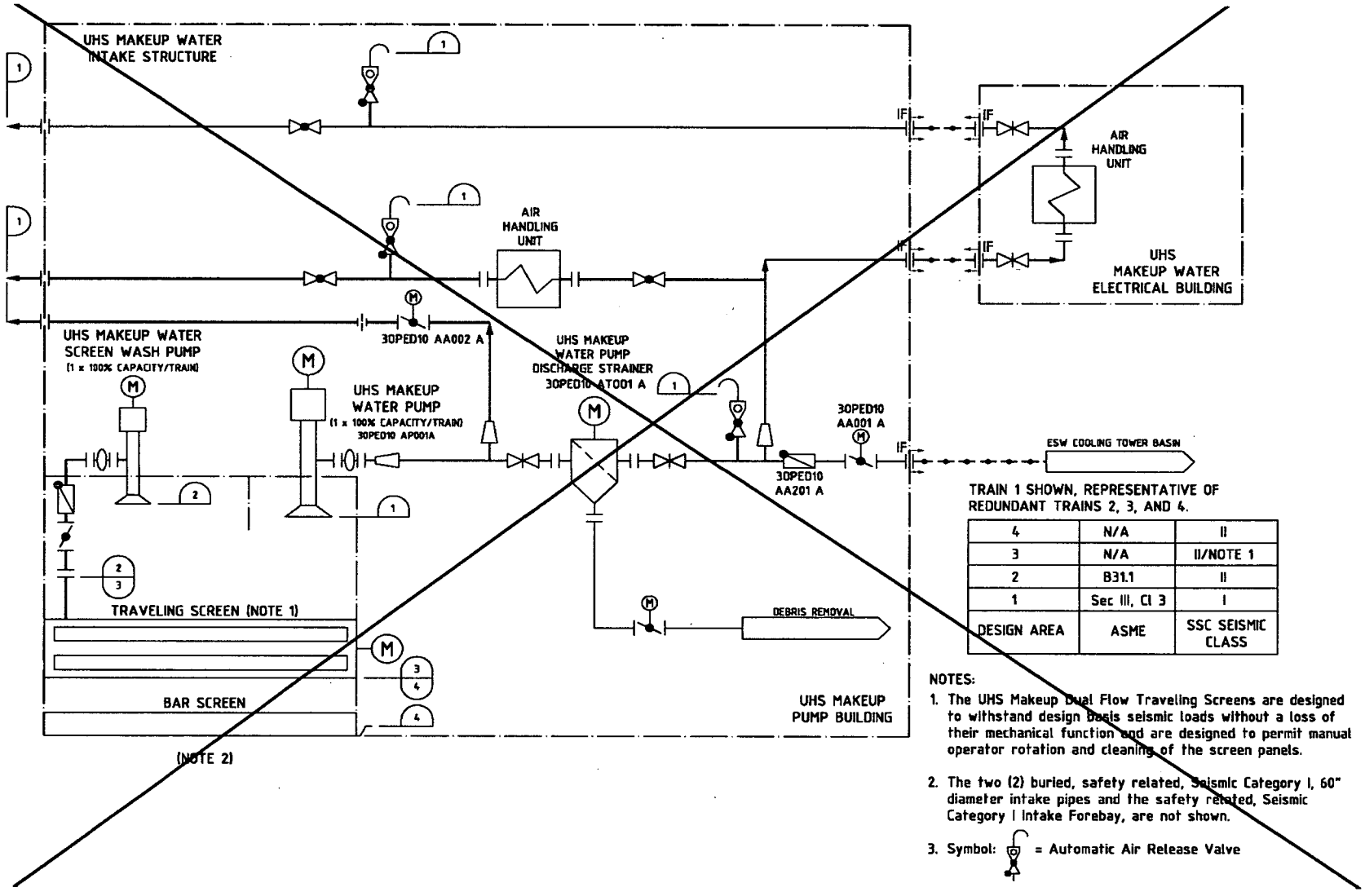
Table 2.4-29— {Ultimate Heat Sink (UHS) Makeup Water System Component Mechanical Design}

Component Description	Component Tag Number	Component Location	ASME Code	Function	Seismic Category
UHS Makeup Water Pump Train 3	30PED30 AP001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Check Valve Train 3	30PED30 AA201 A	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Pump Discharge Isolation Valve Train 3	30PED30 AA001 A	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Minimum Flow Valve Train 3	30PED30 AA002 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Train 3	30PED30 AT001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Train 3	30PED30AA006 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 3	Later	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Initial Fill Check Valve Train 3	Later	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Initial Fill Isolation Valve Train 3	Later	UHS Makeup Pump Room	Class 3	Close	I
Piping and Manual Valves Train 3	Later	UHS Makeup Intake Structure	Class 3 / B31.1	Pressure Boundary	I / II
Buried Piping Train 3	Later	Yard Area	Class 3	Pressure Boundary	I
Air Release/Vacuum Breaker Valves Train 3	Later	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Dual Flow Traveling Screen Train 3	Later	UHS Makeup Intake Structure	N/A	Run	II
UHS Makeup Water Intake Structure Bar Screen Train 3	Later	UHS Makeup Intake Structure	N/A	—	II
UHS Makeup Water Screen Wash Pump Train 3	Later	UHS Makeup Intake Structure	B31.1	Run	II

Table 2.4-29— {Ultimate Heat Sink (UHS) Makeup Water System Component Mechanical Design}

Component Description	Component Tag Number	Component Location	ASME Code	Function	Seismic Category
UHS Makeup Water Pump Train 4	30PED40 AP001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Check Valve Train 4	30PED40 AA201 A	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Pump Discharge Isolation Valve Train 4	30PED40 AA001 A	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Minimum Flow Valve Train 4	30PED40 AA002 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Train 4	30PED40 AT001 A	UHS Makeup Pump Room	Class 3	Run	I
UHS Makeup Water Pump Discharge Strainer Debris Removal Valve Train 4	30PED40AA006 A	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Discharge Strainer Isolation Valve Train 4	Later	UHS Makeup Pump Room	Class 3	Open	I
UHS Makeup Water Pump Initial Fill Check Valve Train 4	Later	UHS Makeup Pump Room	Class 3	Close	I
UHS Makeup Water Pump Initial Fill Isolation Valve Train 4	Later	UHS Makeup Pump Room	Class 3	Close	I
Piping and Manual Valves Train 4	Later	UHS Makeup Intake Structure	Class 3 / B31.1	Pressure Boundary	I / II
Buried Piping Train 4	Later	Yard Area	Class 3	Pressure Boundary	I
Air Release/Vacuum Breaker Valves Train 4	Later	UHS Makeup Pump Room	Class 3	Open – Close	I
UHS Makeup Water Dual Flow Traveling Screen Train 4	Later	UHS Makeup Intake Structure	N/A	Run	II
UHS Makeup Water Intake Structure Bar Screen Train 4	Later	UHS Makeup Intake Structure	N/A	—	II
UHS Makeup Water Screen Wash Pump Train 4	Later	UHS Makeup Intake Structure	B31.1	Run	II

Figure 2.4-1 – {Ultimate Heat Sink Makeup Water System Functional Arrangement}



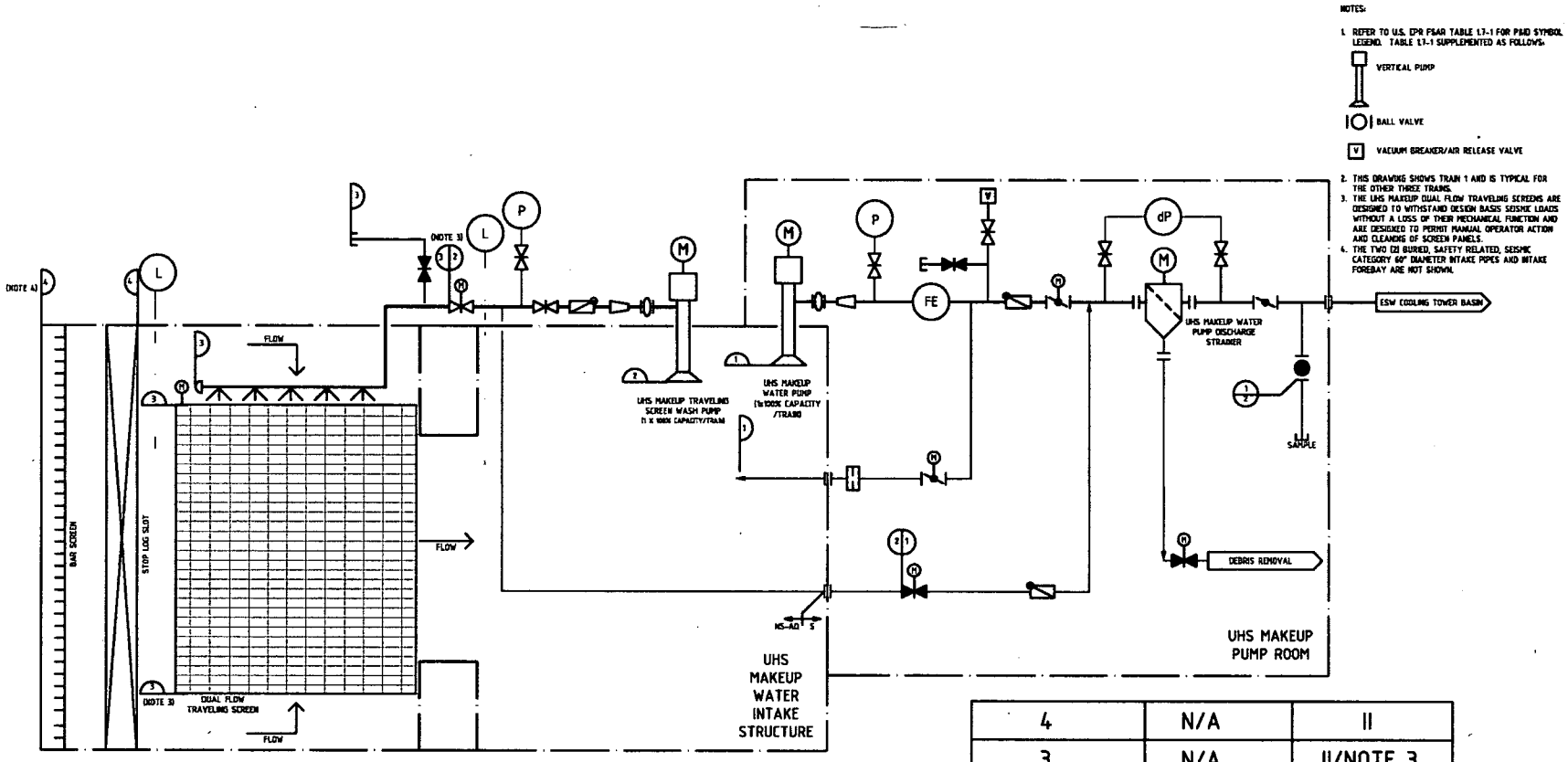
TRAIN 1 SHOWN, REPRESENTATIVE OF REDUNDANT TRAINS 2, 3, AND 4.

4	N/A	II
3	N/A	II/NOTE 1
2	B31.1	II
1	Sec III, Cl 3	I
DESIGN AREA	ASME	SSC SEISMIC CLASS

NOTES:

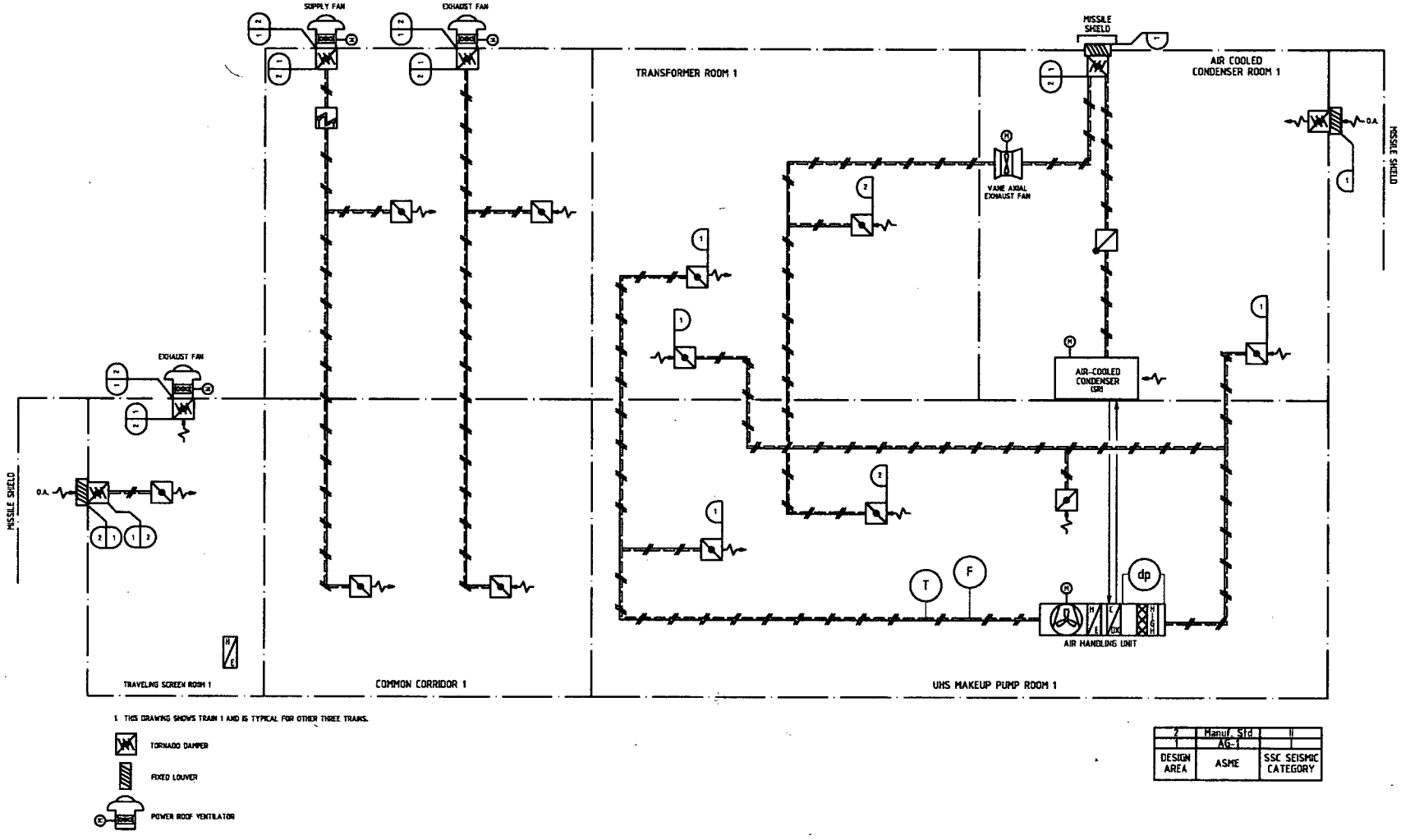
1. The UHS Makeup Dual Flow Traveling Screens are designed to withstand design basis seismic loads without a loss of their mechanical function and are designed to permit manual operator rotation and cleaning of the screen panels.
2. The two (2) buried, safety related, Seismic Category I, 60" diameter intake pipes and the safety related, Seismic Category I Intake Forebay, are not shown.
3. Symbol: = Automatic Air Release Valve

Figure 2.4-1 – {Ultimate Heat Sink Makeup Water System Functional Arrangement}



4	N/A	II
3	N/A	II/NOTE 3
2	B31.1	II
1	Sec III, Cl 3	I
DESIGN AREA	ASME	SSC SEISMIC CATEGORY

Figure 2.4-2 – {Ultimate Heat Sink Makeup Water Intake Structure Ventilation System Functional Arrangement}



Note:
The following tables were unchanged except for the table number.

Table 2.4-~~29~~ 27 — {Power Generation System Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~34~~ 28 — {Class 1E Emergency Power Supply Components for Site-Specific Systems Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~33~~ 30 – {Forebay Structure Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~34~~ 31 – {Waste Water Treatment Facility Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~35~~ 32 – {Access Building Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~36~~ 33 – {Sheet Pile Wall Inspections, Tests, Analyses, and Acceptance Criteria}

Table 2.4-~~37~~ 34 – {Waterproofing Geomembrane Under Nuclear Island Common Basemat Structures and Other Buildings Inspections, Tests, Analyses, and Acceptance Criteria}