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UniStar NUCLEAR ENERGY

10 CFR 50.4
10 CFR 52.79

June 21, 2012

UN#12-055

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: UniStar Nuclear Energy, NRC Docket No. 52-016
Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3,
RAI 253, Seismic System Analysis

References:
1) Surinder Arora (NRC) to Robert Poche (UniStar Nuclear Energy), "FINAL RAI 253 SEB2 4788" email dated July 12, 2010

2) UniStar Nuclear Energy Letter UN#12-041, from Mark T. Finley to Document Control Desk, U.S. NRC, RAI 253, Seismic System Analysis, dated May 3, 2012

The purpose of this letter is to respond to the request for additional information (RAI) identified in the NRC e-mail correspondence to UniStar Nuclear Energy, dated July 12, 2010 (Reference 1). This RAI addresses Seismic System Analysis, as discussed in Section 3.7 of the Final Safety Analysis Report (FSAR), as submitted in Part 2 of the Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3 Combined License Application (COLA), Revision 8.

Reference 2 indicated that a response to RAI 253, Question 03.07.02-45 would be provided to the NRC by June 21, 2012. Enclosure 1 provides our response to RAI 253, Question 03.07.02-45 and includes revised COLA content. A Licensing Basis Document Change Request has been initiated to incorporate these changes into a future revision of the COLA.

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RAI responses normally provide a table of changes to the CCNPP Unit 3 COLA associated with this RAI response. However, due to the extent of the COLA markup, this table will be provided in a separate letter by July 31, 2012.

Our response does not include any new regulatory commitments. This letter does not contain any sensitive or proprietary information.

If there are any questions regarding this transmittal, please contact me at (410) 369-1907 or Mr. Wayne A. Massie at (410) 369-1910.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 21, 2012

Mark T. Finley

Enclosures: 1) Response to NRC Request for Additional Information RAI No. 253, Question 03.07.02-45, Seismic System Analysis, Calvert Cliffs Nuclear Power Plant, Unit 3

2) Changes to CCNPP Unit 3 COLA Associated with Response to RAI No. 253, Question 03.07.02-45, Calvert Cliffs Nuclear Power Plant, Unit 3

cc: Surinder Arora, NRC Project Manager, U.S. EPR Projects Branch
Laura Quinn-Willingham, NRC Environmental Project Manager, U.S. EPR COL Application
Getachew Tesfaye, NRC Project Manager, U.S. EPR DC Application, (w/o enclosures)
Patricia Holahan, Acting Deputy Regional Administrator, NRC Region II, (w/o enclosures)
Silas Kennedy, U.S. NRC Resident Inspector, CCNPP, Units 1 and 2,
David Lew, Deputy Regional Administrator, NRC Region I (w/o enclosures)

bcc: John Cashman, Senior Engineer, NI, Regulatory Affairs & Engineering
Jon Kirkwood, Bell Bend Licensing
William Kline, Civil Engineer, Regulatory Affairs & Engineering
Philippe Montigny, TI/BOP Manager, Regulatory Affairs & Engineering
Sebastien Thomas, NI Engineering Manager, Regulatory Affairs & Engineering

Enclosure 1

Response to NRC Request for Additional Information
RAI No. 253, Question 03.07.02-45, Seismic System Analysis
Calvert Cliffs Nuclear Power Plant, Unit 3

RAI 253

Question 03.07.02-45

Follow-up to Question 03.07.02-17

In the background portion of its response, the applicant stated that certain SSCs within the fire protection/suppression systems (including the Fire Water Storage Tanks and Fire Protection Building) do not fall into the category of SSCs that have the potential to interact with their proximate Seismic Category I SSCs, and thus these SSCs comply with SRP 3.7.2 Acceptance Criteria 8A. Criterion 8A states that "The collapse of the non-Category I structure will not cause the non-Category I structure to strike a Category I structure." However, both the Fire Water Storage Tanks and Fire Protection Building are designated as Seismic Category II-SSE (SC II-SSE) and are designed to remain elastic under SSE excitation. Therefore they are designed not to collapse and as such meet Acceptance Criterion 8C of SRP 3.7.2. The applicant is requested to clarify its response in this regard.

In the first paragraph under the first bullet of the **Response** section, the applicant states that, "Both Cat II and Cat II-SSE SSCs will be designed to remain elastic at the SSE excitation." However, it also states that the design will be based on codes and standards such as ASCE 4-98, ACI 349 as appropriate. The staff finds this part of the the applicant's response to be too general, and it does not provide the staff with the information needed to determine if the approach used by the applicant will result in the SC II-SSE structures remaining elastic under an SSE excitation. The seismic design requirements for the SC II-SSE structures are similar to seismic category I structures, and they are required to remain functional after an SSE. Therefore, in order for the staff to conclude that these structures will remain functional after an SSE, the applicant is requested to provide details of the seismic analysis of these structures (seismic models, method of analysis, modeling of fluid-structure interaction for the Fire Water Storage Tanks, etc.), following the guidance provided in SRP 3.7.2 and 3.7.3, and include this information in the FSAR.

In the second paragraph under the first bullet of the **Response** section, the applicant states that Cat II-SSE SSCs which include mechanical/electrical equipment and piping will be qualified as if they are Seismic Category I SSCs. The applicant is requested to describe in detail how the in-structure response spectra, if required, are developed to support this qualification.

In the third paragraph under the first bullet of the **Response** section**,** there is a discussion of seismic margin as it pertains to reactor core damage. The applicant is requested to clarify why this discussion has been introduced into the response and its relevance to the design of the SC II and SC II-SSE portions of the Fire Protection System.

In the fourth paragraph under the first bullet of the **Response** section, the applicant states that Cat II-SSE SSCs and those Cat II SSCs that are in the proximity of Cat I SSCs will be designed using the site SSE spectrum. It then states that in light of their potential for interaction with the U.S. EPR standard plant SSCs, the rest of the Cat II and Cat II-SSE SSCs will be designed using the Certified Seismic Design Response Spectrum (CSDRS) to assure equivalent margin as that for the standard plant SSCs. Because it is not clear from the response, the applicant is requested to provide in a tabular format the Cat II-SSE SSCs and Cat II SSCs referred to and the design ground motion spectrum to be used for each. For the CSDRS, the applicant is requested to clarify to which CSDRS it is referring (soft, medium or hard soil case) and to

describe the implications of the fact that the CSDRS at low frequencies fails to envelope the site SSE. The information provided in this response should be included in the FSAR.

In the first paragraph under the second bullet of the **Response** section, the applicant states that the methods of analysis and acceptance criteria for the above ground portions of the fire protection system that are SC II-SSE are provided in U.S. EPR FSAR Section 3.9.2.2.2 (which references the AREVA Piping Topical Report) and in U.S. EPR FSAR Section 3.12. For buried segments the applicant states these requirements are provided in U.S EPR FSAR Section 3.12.3.8 (which also references the AREVA Piping Topical Report). The AREVA topical report presents the U.S. EPR Design Certification code requirements, acceptance criteria, analysis methods and modeling techniques for ASME Class 1, 2 and 3 piping and pipe supports while Section 3.12 addresses ASME Code Class 1, 2, and 3 piping systems, piping components, and their associated supports. In neither case are the requirements or acceptance criteria for fire protection piping identified. In Table 3.2-1 for Fire Suppression Systems of the UHS MWIS, UHS EB, and Fire Protection Building and for standpipes and hose stations of the UHS MWIS and UHS EB, under the "Comments/Commercial Code" column, the ANSI/ASME B31.1 piping code is listed as being applicable. The applicant is requested to provide additional information which specifically describes the methods of analysis (seismic models, seismic input, damping values,etc.), design allowable stresses, and the piping design codes that will be used for SC II and SC II-SSE Fire Protection Systems and include this information in the FSAR.

The staff requests this information to assist in understanding the seismic methods and acceptance criteria used for fire-protection structures systems and components (SSCs) and how the design of those fire protection SSCs classified as SC II-SSE ensures they remain functional following a design basis earthquake event.

Response

UniStar Nuclear Energy is removing the Category II-SSE classification of the Fire Protection System (FPS) from the Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3 Combined License Application (COLA). As specified in Section 4.3.1.4 of the U.S. EPR FSAR, some nonsafety-related systems and components do not fall within the criteria for classification as Seismic Category I or II, but may still be subject to seismic design criteria that are incorporated in, or invoked by, an applicable commercial or industry code. These structures, systems, and components (SSCs) are classified as conventional seismic (CS). The FPS will be a seismically qualified system consistent with the seismic requirements of the U.S. EPR FSAR Revision 3 Sections 3.2, 3.7.2.8, and 9.5. As specified in Section 3.7.2.8 of the U.S. EPR FSAR, the Fire Protection Building (FPB) and Fire Water Storage Tanks (FWSTs) are CS structures. As specified in Section 9.5, the Fire Water Distribution System (Piping) is classified as: (a) Category II (Cat II) for piping within Category I (Cat I) facilities; (b) Cat I for piping within penetration of containment; and (c) Non-Seismically Classified (NSC) elsewhere. The SSCs categorized as CS comply with Standard Review Plan (SRP) 3.7.2 Acceptance Criteria 8A which states that "The collapse of the non-Category I structure will not cause the non-Category I structure to strike a Category I structure."

COLA markups are provided to make the CCNPP Unit 3 COLA consistent with the U.S. EPR classification. Table 1 specifies the adopted classification for the CCNPP Unit 3 FPS.

Table 1	
FPS SSC	SEISMIC
Fire Water Distribution System, Conventional Area (NSC)	NSC
Fire Water Distribution System, Conventional Area (CAT II)	II
Fire Water Storage Tanks	CS
Fire Protection Building	CS
Fire Water Distribution System within RWPB/NAB (NSC)	NSC
Fire Water Distribution System within RWPB/NAB (CAT II)	II
Fire Water Distribution System MWIS (Outside Loop)	II
Fire Water Distribution System MWIS (Inner Loop)	II

I - Seismic Category I
II - Seismic Category II
CS - Conventional Seismic
NSC - Non-Seismically Classified
RWPB - Radioactive Waste Processing Building
MWIS - Makeup water intake structure

Basis for the CCNPP Unit 3 FPS Design

The CCNPP Unit 3 FPS will be designed according to the following criteria:

- Consistent with Section 9.5 of the U.S. EPR FSAR, the seismic design of the FWSTs is in accordance with American National Standards Institute (ANSI) and American Water Works Association (AWWA) ANSI/AWWA D100-2005, "Welded Steel Tanks for Water Storage," (ANSI/AWWA, 2005), referenced by the National Fire Protection Association (NFPA) "Standard for Water Tanks for Private Fire Protection." The seismic design of the FWSTs is in accordance with the American Society of Civil Engineers (ASCE) Standard ASCE 43-05, "Seismic Design Criteria for Structures, Systems and Components in Nuclear Facilities" (ASCE, 2005), with the seismic demand on the structure calculated from the site Safe Shutdown Earthquake (SSE).

- Consistent with Section 9.5 of the U.S. EPR FSAR, the seismic design of the FPB is in accordance with the American Society of Civil Engineers (ASCE) Standard ASCE 43-05, "Seismic Design Criteria for Structures, Systems and Components in Nuclear Facilities" (ASCE, 2005), with the seismic demand on the structure calculated from the site SSE.

- Consistent with the U.S. EPR FSAR, the portion of the underground fire main which supplies fire protection water to the seismically qualified standpipe and hose system is designed to remain functional following an SSE. Isolation valves between seismically qualified portions of the underground fire main and non-seismically qualified portions must remain functional following an SSE, so that they can be manually closed. The portion of the inside fire water distribution system which supplies fire protection water to the seismically qualified standpipe and hose system is designed to remain functional following an SSE. Isolation valves between

seismically qualified portions of the inside fire water distribution system and non-seismically qualified portions must remain functional following an SSE, so that they can be manually closed.

- Seismically qualified FPS piping mains will be designed according to ASCE 4-98, 1983 ASCE Report "Seismic Response of Buried Pipes and Structural Components," and the AREVA Topical Report ANP 10264, "U.S. EPR Piping Analysis and Pipe Support Design Topical Report."

The reference to the Seismic Category II-SSE seismic classification is being deleted from the CCNPP Unit 3 COLA as identified in the COLA Impact section of this response. Therefore, questions relating to the details of the previous Category "Cat II-SSE" are not specifically addressed in this response. The seismic evaluation of SSCs designated as CS will be completed during the detailed design of CCNPP Unit 3, after COL Issuance.

The FPS seismic design basis meets the CCNPP Unit 3 site specific SSE. UNE will remove text in the COLA that references the Certified Seismic Design Response Spectra (CSDRS) as the basis for the design of the FPS.

In the third paragraph under the first bullet of the response to RAI No. 65 Question 03.07.02-17[1], there is a discussion of seismic margin as it pertains to reactor core damage, which is no longer applicable due to the removal of the Seismic Category II-SSE seismic classification.

COLA Impact

Enclosure 2 provides the COLA impact of the response to RAI 253, Question 03.07.02-45.

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[1] UniStar Nuclear Energy Letter UN#09-519, from Greg Gibson to Document Control Desk, U.S. NRC, Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, FSAR Section 3.7 and response to FSAR Section 3.7 RAI sets 19, 25, 58, 63, 65,112,113,139,158,159,167,168,179,180,181, and 193, dated December 29, 2009

Enclosure 2

Calvert Cliffs Nuclear Power Plant, Unit 3

Changes to CCNPP Unit 3 COLA Associated with Response to RAI No. 253, Question 03.07.02-45

Table 2.0-1— {U.S. EPR Site Design Envelope Comparison}
(Page 2 of 6)

	U.S. EPR FSAR Design Parameter Value	CCNPP Unit 3 Site Characteristic Value
Minimum Dynamic Bearing Capacity	Maximum dynamic bearing demand is 35,000 lbs/ft² at the toe of the Seismic Category I structure basemats. The ultimate dynamic bearing capacity divided by 2.0 is greater than or equal to the maximum dynamic bearing demand.	35.2 ksf across the NI basemat with a factor of safety (FOS) of 2.0. 51,100 lbs/ft² across the EPGB basemat with a factor of safety (FOS) of 2.0. 59,000 lbs/ft² across the ESWB basemat with a factor of safety (FOS) of 2.0. (See Section 2.5.4, Table 2.5-65)
Minimum Shear Wave Velocity (Low strain best estimate average value at bottom of basemat)	1000 fps	≥ 1000 fps for the UHS MWIS and Forebay (see section 2.5.2.6 and 2.5.4) ≥ 860 fps for the NI (note h) ≥ 720 fps for the ESWB (note h) ≥ 630 fps for the EPGB (note h) ~~≥ 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 Settlement (across the basemat) 1. Differential Settlement 2. Tilt Settlement	Figure 3.8-124 through Figure 3.8-136 ½ inch in 50 feet in any direction	See section 3.8.5.5.1 for NI Less than ½ inch in 50 feet in any direction of NI Common Basemat. See Section 2.5.4.10.2
Angle of Internal Friction (in situ and backfill)	26.6 degrees (minimum) 30 degrees (maximum)	TBD
Soil Density (γ) (in situ and backfill)	110 lb/ft³ ≤ γ ≤ 134 lb/ft³	TBD
Maximum Ground Water	3.3 ft below grade	Approximately 30 feet below grade (See Section 2.4.12.5)
Minimum Coefficient of Static Friction for Category I Structures (representative of all interfaces between basemat and soil)	0.5	0.45 - Chesapeake Cemented Sand (note b) 0.40 – Backfill (note b) (See Section 2.5.4, Table 2.5-58)

This page provided for reference purposes only.

grain size analysis. The suitability of the design elevation will be determined based on DCP test correlation, grain size, and the soil color code. The grain size and soil color will help differentiate between Stratum IIa - Chesapeake Clay/Silt and Stratum IIb - Chesapeake Sand.

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. The Geotechnical Engineer will be responsible for final approval of the foundation soils. A geologist will map the exposed stratum. Photos and videotape of the exposed stratum will be collected for documentation. Finally, acceptance will be documented on a Final Foundation Acceptance form that is completed by the responsible parties and included in the report.

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 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.

2.5.4.5.3 Compaction Specifications

Testing of structural backfill is described in Section 2.5.4.2.4. For foundation support and backfill against walls, structural fill should be granular in nature, with well-graded sand, gravel or crushed gravel, and typically should not contain more than 10 percent by weight of material passing No. 200 sieve and no less than 95 percent by weight passing the 3/4-inch sieve. The maximum allowable aggregate size shall be 1 inch. Gradation shall be determined in accordance with ASTM D422 and D1140. Structural fill should consist of durable materials free from organic matters or any other deleterious or perishable substances, and of such a nature that it can be compacted readily to a firm and non-yielding state.

Structural fill will be compacted at a moisture content of ±3 percent of the optimum, and compaction will be done to 95 percent of Modified Proctor optimum dry density. The maximum dry density and optimum moisture content is determined in accordance with ASTM D1557, "Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3(2700 kN-m/m^3))," (ASTM, 2009).

Fill materials need to be placed in horizontal layers usually not greater than 8 inches in loose thickness. Each layer is required to be spread evenly and mixed thoroughly to obtain uniformity of material and moisture in each layer. When the moisture content of the fill material is below that specified, water needs to be added until the moisture content is as specified. When the moisture content of the fill material is too high, the fill material needs to be aerated through blading, mixing, or other satisfactory methods until the moisture content is as specified. After each fill layer has been placed, mixed and spread evenly, it needs to be

thoroughly compacted to the specified degree of compaction. Compaction needs to be accomplished by acceptable types of compacting equipment. The equipment is required to be of such design and nature that it is able to compact the fill to the specified degree of compaction. Compaction should be continuous over the entire area and the equipment should make sufficient passes to obtain the desired uniform compaction.

Continuous geotechnical engineering observation and inspection of fill placement and compaction operations is required to certify and ensure that the fill is properly placed and compacted in accordance with the project plans and specifications. Field density tests in accordance with ASTM D1556 "Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method, American Society for Testing and Materials" (ASTM, 2007b) are required to be performed for each layer of fill. Moisture content may be determined in the laboratory in accordance with ASTM D2216, "Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass" (ASTM, 2005c) or in the field using nuclear methods in accordance with ASTM D6938 "Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)," (ASTM, 2008b). If the surface is disturbed, the density tests are to be made in the compacted materials below the disturbed zone. When these tests indicate that the degree of compaction of any layer of fill or portion thereof does not meet the specified minimum requirement, the particular layer or portions requires reworking until the specified relative compaction is obtained.

At least one in-place moisture content and field density test are required on every 10,000 square feet of each lift of fill, and further placement is not allowed until the required relative compaction has been achieved. The number of tests is increased if a visual inspection determines that the moisture content is not uniform or if the compacting effort is variable and not considered sufficient to meet the project specification. For critical areas, at least one in-place moisture content and field density test are required at least every 200 cubic yards of compacted fill.

Testing and analysis will be performed to confirm the structural fill shear wave velocity at the bottom of the basemats for Seismic Category I ~~and Seismic Category II-SSE~~ structures meets or exceeds the requirements in Table 2.4-1. The testing will consist of shear wave velocity (V_S) measurements using Spectral Analysis of Surface Waves (SASW). The testing frequency will be selected to produce a V_S profile with depth, at three locations per SASW line. The initial SASW testing will be performed at the foundation elevation along a line (either east-west or north-south) beneath the center line of each structure. A second line, parallel to the first line (and at the same elevation) will be carried out adjacent to each structure in areas free from foundations or other structures. The third and final SASW line will be performed at the final rough or finished grade elevations directly above the second line tested in the area free from foundations. The first and second lines of testing allow direct comparison of the fill quality and variability at the level of the foundation. The second and final testing allows assessment of the increase in V_S with increasing confining pressure due to the backfill loading at the same vertical location. Given the consistency between the first and second SASW lines, conclusions can be drawn regarding the relationship between V_S and confining pressure beneath the structure. The recorded V_S measurements will also be compared with V_S measurements from RCTS testing at comparable confining pressures, allowing correlation of design (laboratory-based) and actual (field-based) measurements.

In addition to SASW testing, a second geophysical method (e.g., down-hole testing) will be utilized to measure VS at one location at final rough or finished grade for each structure for

3.2 CLASSIFICATION OF STRUCTURES, SYSTEMS, AND COMPONENTS

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

3.2.1 Seismic Classification

The U.S. EPR FSAR includes the following COL Item in Section 3.2.1:

> A COL applicant that references the U.S. EPR design certification will identify the seismic classification of applicable site-specific SSCs that are not identified in U.S. EPR FSAR Table 3.2.2-1.

This COL Item is addressed as follows:

The seismic classifications for applicable site-specific structures, systems, and components (SSCs) are provided in Table 3.2-1.

~~{U.S. EPR FSAR Section 3.2.1 states: "The seismic classification of the U.S. EPR SSCs uses the following categories: Seismic Category I, Seismic Category II, radwaste seismic, conventional seismic, and non-seismic." As described in Section 3.2.1.2, CCNPP Unit 3 utilizes an additional seismic classification: Seismic Category II-SSE. This classification is applicable to Fire Protection SSCs that support equipment required to achieve safe shutdown following a seismic event.}~~

3.2.1.1 Seismic Category I

No departures or supplements.

3.2.1.2 Seismic Category II

{~~In addition to the Seismic Category II classification defined in U.S. EPR FSAR Section 3.2.1, CCNPP Unit 3 utilizes a seismic classification of Seismic Category II-SSE. This designation is utilized to address Fire Protection SSC that are required to remain functional during and following a seismic event to support equipment required to achieve safe shutdown in accordance with Regulatory Guide 1.189 (NRC, 2007). Sections 3.7.2.8 and 3.7.3.12 discuss the methods for analysis of these components.~~

Some SSCs that perform no safety-related function could, if they failed under seismic loading, prevent or reduce the functional capability of a Seismic Category I SSC~~, Seismic Category II-SSE SSC,~~ or cause incapacitating injury to main control room occupants during or following an SSE. These non-safety-related SSCs are classified as Seismic Category II.

SSCs classified as Seismic Category II are designed to withstand SSE seismic loads without incurring a structural failure that permits deleterious interaction with any Seismic Category I SSC ~~or Seismic Category II-SSE SSC,~~ or that could result in injury to main control room occupants. The seismic design criteria that apply to Seismic Category II SSCs are addressed in Section 3.7.}

3.2.1.3 Radwaste Seismic

No departures or supplements.

3.2.1.4 Conventional Seismic

No departures or supplements.

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

(Page 5 of 10)

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)
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~~ II	Yes		NFPA 24 NFPA 25 NFPA 804 ANSI/ASME B31.1 (Note 8)
USG	Fire Water Storage Tanks	NS-AQ	D	~~II-SSE~~ CS	~~Yes~~ No	USG/ UZT	NFPA 20 NFPA 22 NFPA 25 AWWA D100 ACI 349/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~~ CS	~~Yes~~ No	USG/UZT	ASCE 43
SGM	Diesel Engine Driven Pumps and Drivers and subsystems, including diesel fuel oil supply	NS-AQ	D	~~II-SSE~~ CS	~~Yes~~ No	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~~ CS	~~Yes~~ No	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)

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

(Page 6 of 10)

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)
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 Stanpipes and Hose Stations for Site Specific Buildings other than UHS Makeup Water Intake Structure 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 and Fire Protection Building	NS-AQ	D	~~II SSE~~ II	Yes	UPF, USG	NFPA 13 NFPA 14 NFPA 25 NFPA 804 ANSI/ASME B31.1 (Note 8)
	Standpipes and Hose Stations for UHS makeup Water Intake Structure	NS-AQ	D	~~II SSE~~ II	Yes	UPF	NFPA 14 NFPA 25 NFPA 804 ANSI/ASME B31.1 (Note 8)
Other Site-Specific Structures							
UMA, UBA	Turbine Building, Switchgear Building	NS-AQ	NA	II	Yes	UMA, UBA	Steel - AISC N690 Concrete - ACI 349
UKE	Access Building	NS-AQ	NA	II	Yes	UKE	Steel - AISC N690 Concrete - ACI 349
UAC	Grid Systems Control Building	NS	N/A	CS	No	UAC	IBC
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

Table 3.2-1— {Classification Summary for Site-Specific SSCs}
(Page 7 of 10)

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)
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

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

In the SSI analysis, the time histories are applied at the FIRS horizon as "within" motions and are used in conjunction with the respective SSI soil profiles, described in Section 3.7.1.3.2.

3.7.1.1.2.3 Design Ground Motion Time History for Common Basemat Intake Structures

In the case of the CBIS, which are analyzed as embedded structures, the "within" acceleration time histories at each FIRS horizon are calculated using the computer program SHAKE2000 (described in Appendix 3F). In this analysis, the Site SSE spectrally matched time histories are used as input "outcrop" motions at the foundation level in conjunction with the strain-compatible profiles for the Intake area, presented in Section 3.7.1.3.3. No further iterations on soil properties are performed as the acceleration time history is converted from "outcrop" to "within." The analysis results in a set of three "within" motions (two horizontal and one vertical) at the same FIRS horizon. Three sets are developed corresponding to the LB, BE and UB profiles for the CBIS, as presented in Figure 3.7-16 through Figure 3.7-18. The development of the within acceleration time histories is discussed in detail in Appendix 3F. The time histories are applied at the FIRS horizon as "within" motions and are used in conjunction with the corresponding SSI soil profiles, described in Section 3.7.1.3.3.

3.7.1.2 Percentage of Critical Damping Values

Operating Basis Earthquake (OBE) structural damping values, defined in Table 2 of RG 1.61, Rev 1 (NRC, 2007c), are used for the dynamic analysis of site-specific Seismic Category I SSCs and confirmatory SSI analysis of the NI Common Basemat Structures as well as for the EPGB and ESWB. In-structure response spectra (ISRS) for site-specific Seismic Category I structures are also based on OBE structural damping values.

The damping values for site-specific ~~Seismic Category II-SSE and~~ Seismic Category II structures are in accordance with RG 1.61, Rev. 1 (NRC, 2007c).

3.7.1.3 Supporting Media for Seismic Category I Structures

3.7.1.3.1 Nuclear Island Common Basemat

The supporting media for the seismic analysis of the NI Common Basemat Structures is shown in Figure 3.7-19 and Table 3.7-2 through Table 3.7-4. The presented soil profiles are site-specific and are strain-compatible with the Site SSE. Lower bound and upper bound profiles are calculated maintaining a minimum variation of 0.5 on the shear modulus. An evaluation of the CCNPP Unit 3 site-specific soil profiles with respect to the criteria provided in U.S. EPR FSAR Section 2.5.2.6 is described in Section 2.5.2.6.

Confirmatory site-specific SSI analyses are performed, as described in Section 3.7.2. The resulting in-structure response spectra (ISRS) at representative locations of the NI structures, as reported in Section 3.7.2.5.1, are found to be bounded by the corresponding U.S. EPR FSAR ISRS.

3.7.1.3.2 EPGB and ESWB

The supporting media for the seismic analysis of the EPGB and ESWB in the NI area are presented in Figure 3.7-21. The presented soil profiles are site-specific and are strain-compatible with the Site SSE. The development of the Site SSE strain-compatible soil profiles is described in detail in Appendix 3F.

Note that in contrast to Figure 3.7-19, where the top layer is located at the bottom of the NI common basemat foundation at approximately 40 ft (12 m) below grade, Figure 3.7-21

earthquake excitation are calculated using the clear dimensions between the walls perpendicular to the direction of motion and the minimum height of water during a hurricane (Elev. -4.0 ft NGVD 29). The impulsive water masses are rigidly attached to the walls, and the convective water masses are connected to the walls using springs with appropriate stiffness. The entire water mass is lumped at the basemat nodes for earthquake ground motion in the vertical direction. The hydrodynamic loads are included for walls both in the Forebay and basement of the UHS Makeup Water Intake Structure.

The maximum sloshing heights in both directions for the UHS Makeup Water Intake Structure and the Forebay are approximately 0.6 ft (0.2 m) and 0.5 ft (0.15 m), respectively. The minimum available freeboard for the UHS Makeup Water Intake Structure and the minimum clearance for the Forebay are significantly higher than the maximum sloshing heights.

The earthquake excitation along the North-South and vertical directions cause symmetric loading on the structure, whereas the earthquake excitation along the East-West direction causes anti-symmetric loading on the structure. The seismic SSI analysis is performed by applying appropriate symmetric and anti-symmetric boundary conditions in the plane of symmetry of the half model shown in Figure 3.7-23, as indicated in Table 3.7-7.

3.7.2.3.3 Seismic Category II Structures

~~Site-specific Seismic Category II-SSE structures, systems, and components (SSCs) are analyzed and designed to meet the same requirements as the Seismic Category I SSCs.~~ The Seismic Category II Circulating Water Makeup Intake Structure is analyzed along-with the Seismic Category I Forebay and Seismic Category I UHS Makeup Water Intake Structure, as described in Section 3.7.2.3.2. Other site-specific Seismic Category II structures are designed using conventional codes and standards, but are also analyzed for Site SSE.

3.7.2.3.4 Conventional Seismic (CS) Structures

No departures or supplements.

3.7.2.4 Soil-Structure Interaction

This section describes the confirmatory soil-structure interaction (SSI) analyses for the Nuclear Island Common Basemat Structures, EPGB, and ESWB. In addition the SSI analysis of the CBIS are also described.

The complex frequency response analysis method is used for the SSI analyses, in accordance with the requirements of NUREG-0800 Section 3.7.2, Acceptance Criteria 1.A and 4 and Section 3.7.1, Acceptance Criteria 4.A.vii (NRC, 2007a). During the SSI analyses, the effects of foundation embedment (for ESWB and CBIS), soil layering, soil nonlinearity, ground water table, and variability of soil and rock properties on the seismic response of the structures are accounted for, as described in the following sections. In particular, Sections 3.7.2.4.1 through 3.7.2.4.6 provide the steps followed to perform the SSI analyses. Section 3.7.2.4.7 describes the computer codes used in the analyses.

3.7.2.4.1 Step 1 – SSE Strain Compatible Soil Properties

3.7.2.4.1.1 Nuclear Island Common Basemat Structures

For the Nuclear Island Common Basemat Structures, confirmatory SSI analyses are performed for the lower bound, best estimate and upper bound soil profiles established in Section 3.7.1.3.1 and shown in 3.7-2, 3.7-3 and 3.7-4. Soil properties used in the SSI analysis are

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3.7.2.5.2 EPGB and ESWB

U.S. EPR FSAR Section 3.7.2.5 describes the development of floor response spectra for the EPGB and ESWB. The soil cases are described in U.S. EPR FSAR Table 3.7.1-6 and the ground design response spectra are shown in U.S. EPR FSAR Figures 3.7.1-33 and 3.7.1-34 for the EPGB and ESWB.

For site-specific confirmatory analysis, ISRS are generated for EPGB and ESWB at locations identified in U.S. EPR FSAR Section 3.7.2.5, using the guidelines described in U.S. EPR FSAR Section 3.7.2.5. The ISRS are however, calculated from 0.2 to 100 Hz, and correspond to the envelope of the ISRS for the site-specific strain-compatible BE, LB and UB soil profiles. For the purposes of confirmatory analyses, 3.7-64 to 3.7-72 show the comparison of 5 percent damped ISRS, which are representative of the response at all damping values, with the corresponding ISRS from U.S. EPR FSAR. The site-specific ISRS for these structures are enveloped by the corresponding design certification ISRS by a large margin, except for frequencies less than approximately 0.3 Hz. Reconciliation of the accelerations at these low frequencies is discussed in Section 2.5.2.6.

3.7.2.5.3 Common Basemat Intake Structures

ISRS at the location of safety-related equipment within the UHS Makeup Water Intake Structure are generated using the SSI model described in Section 3.7.2.4. The ISRS are calculated from 0.1 to 50 Hz, which meets the guidelines provided in RG 1.122, Revision 1 (NRC, 1978). For the UHS Makeup Water Intake Structure, the ISRS are calculated at 0.5 percent, 2 percent, 3 percent, 4 percent, 5 percent, 7 percent and 10 percent damping. The ISRS are enveloped for the site-specific strain-compatible BE, LB and UB soil profiles.

For the UHS Makeup Water Intake Structure, the ISRS are developed at the location of safety-related makeup pumps and facilities, as shown in 3.7-73 through 3.7-78 and at the location of safety-related electrical equipment supported at EL +26.5 ft in the CBIS, and are shown in 3.7-79 through Figure 3.7-81. ISRS will be generated at the support locations of additional safety-related equipment, as required.

3.7.2.6 Three Components of Earthquake Motion

As indicated in Section 3.7.2.4, the SSI analysis of the site-specific Seismic Category I structures is performed using the integrated finite element model, with the input ground motion applied separately in the three directions. The ISRS in the UHS Makeup Water Intake Structure are determined by using the Square Root of Sum of Squares (SRSS) of the calculated response spectra in a given direction, due to earthquake motion in the three directions.

The maximum member forces and moments due to the three earthquake motion components are combined using the Square Root of the Sum of the Squares (SRSS) combination rule to obtain the maximum total member forces and moments. The SRSS method rule used is consistent with the requirements of RG 1.92, Revision 2 (NRC, 2006).

3.7.2.7 Combination of Modal Responses

No departures or supplements.}

3.7.2.8 Interaction of Non-Seismic Category I Structures with Seismic Category I Structures

The U.S. EPR FSAR includes the following COL Item and conceptual design information in Section 3.7.2.8:

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A COL applicant that references the U.S. EPR design certification will provide the site-specific separation distances for the Access Building and Turbine Building.

The COL Item is addressed as follows:

The conceptual design information in U.S. EPR FSAR, Tier 2 , Figure 3B-1 provides the separation gaps between the AB and SBs 3 and 4 and between the TB and the NI Common Basemat Structures. This information is incorporated by reference.

The U. S. EPR FSAR includes the following COL Item and conceptual design information in Section 3.7.2.8 - Access Building:

> A COL applicant that references the U.S. EPR design certification will demonstrate that the response of the Access Building to an SSE event will not impair the ability of Seismic Category I systems, structures, or components to perform their design basis safety functions.
>
> [[The Access Building is analyzed to site-specific SSE load conditions and designed to the codes and standards associated with Seismic Category I structures so that the margin of safety is equivalent to that of a Category I structure with the exception of sliding and overturning criteria. Because the Access Building does not have a safety function, it may slide or uplift provided that the gap between the Access Building and any Category I structure is adequate to prevent interaction. The effects of sliding, overturning, and any other calculated building displacements (e.g., building deflections, settlement) must be considered when demonstrating the gap adequacy between the Access Building and adjacent Category I structures. The separation gaps between the Access Building and SBs 3 and 4 are 0.98 ft and 1.31 ft, respectively (see Figure 3B-1).]]
>
> For COL applicants that incorporate the conceptual design for the Access Building presented in the U.S. EPR FSAR (i.e ., [[the Access Building is analyzed to site-specific SSE load conditions and designed to the codes and standards associated with Seismic Category I structures so that the margin of safety is equivalent to that of a Category I structure with the exception of sliding and overturning criteria]]), this COL item is addressed by demonstrating that the gap between the Access Building and adjacent Category I structures is sufficient to prevent interaction. The effects of sliding, overturning, and any other calculated building displacements (e.g., building deflections, settlement) must be considered when demonstrating the gap adequacy between the Access Building and adjacent Category I structures.

This COL Item is addressed as follows:

{The Access Building is classified as Seismic Category II structure and will be designed to satisfy SRP 3.7.2 Acceptance Criterion 8.C.}

The U. S. EPR FSAR includes the following COL Item and conceptual design information in Section 3.7.2.8 - Turbine Building:

> A COL applicant that references the U.S. EPR design certification will demonstrate that the response of the TB (including Switchgear Building on the common basemat) to an SSE event will not impair the ability of Seismic Category I systems, structures, or components to perform their design basis safety functions.

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[[The TB is analyzed to site-specific SSE load conditions and designed to the codes and standards associated with Seismic Category I structures so that the margin of safety is equiv alent to that of a Category I structure with the exception of sliding and overturning criteria. Because the TB does not have a safety function, it may slide or uplift provided that the gap between the TB and any Category I structure is adequate to prevent interaction. The effects of sliding, overturning, and any other calculated building displacements (e.g., building deflections, settlement) must be considered when demonstrating the gap adequacy between the TB and adjacent Category I structures. The separation between the TB and N I Common Basemat Structures is approximately 30 ft (see Figure 3B-1).]]

For COL applicants that incorporate the conceptual design for the TB presented in the U.S. EPR FSAR (i .e., [[the TB is analyzed to site-specific SSE load conditions and designed to the codes and standards associated with Seismic Category I structures so that the margin of safety is equivalent to that of a Category I structure with the exception of sliding and overturning criteria]]), this COL item is addressed by demonstrating that the gap between the TB and adjacent Category I structures is sufficient to prevent interaction. The effects of sliding, overturning, and any other calculated building displacements (e.g., building deflections, settlement) must be considered when demonstrating the gap adequacy between the TB and adjacent Category I structures.

This COL Item is addressed as follows:

{The Turbine Building and Switchgear Building (also referred to as the Turbine Island (TI) structure) are classified as Seismic Category II structures. These structures were analyzed and designed to the same requirements as other Seismic Category I structures for site-specific SSE loads. This design methodology meets the NUREG 0800 SRP 3.7.2 Acceptance Criterion 8.C.}

The U.S. EPR FSAR includes the following COL Item and conceptual design information in Section 3.7.2.8 - Fire Protection Storage Tanks and Buildings:

A COL applicant that references the U.S. EPR design certification will provide the seismic design basis for the sources of fire protection water supply for safe plant shutdown in the event of a SSE.

[[The Fire Protection Storage Tanks and Buildings are classified as Conventional Seismic Structures.]] RG 1.189 requires that a water supply be provided for manual firefighting in areas containing equipment for safe plant shutdown in the event of a SSE. [[The fire protection storage tanks and building are designed to provide system pressure integrity under SSE loading conditions. Seismic load combinations are developed in accordance with the requirements of ASCE 43-05 using a limiting acceptance condition for the structure characterized as essentially elastic behavior with no damage (i.e., Limit State D) as specified in the Standard.]]

The COL Item is addressed as follows:

The U.S EPR FSAR Section 3.7.2.8 states that the Fire Protection Storage Tanks and Buildings are classified as Conventional Seismic Structures and that RG 1.189 (NRC, 2007) requires that a water supply be provided for manual firefighting in areas containing equipment for safe plant shutdown in the event of a SSE. The U.S. EPR FSAR Section 3.7.2.8 also states the fire protection

storage tanks and building are designed to provide system pressure integrity under SSE loading conditions.

~~In addition to the Seismic Classifications defined in U.S. EPR FSAR Section 3.2.1, a seismic classification of Seismic Category II-SSE is utilized. This designation is utilized to ensure the design basis requirement that Fire Protection SSC are required to remain functional during and following a seismic event to support equipment required to achieve safe shutdown.~~

Refer to Section 3.2.1 and U.S. EPR FSAR Section 3.2.1 for further discussion of seismic classifications. In addition, Section 3.2.1 categorizes Fire Protection SSC into two categories:

1. SSC that must remain functional during and after an SSE ~~(i.e., Seismic Category II-SSE)~~; and
2. SSC that must remain intact after an SSE without deleterious interaction with [any] Seismic Category I ~~or Seismic Category II-SSE (i.e., Seismic Category II)~~. [SSC]

~~Fire Protection SSC required to remain functional during and following a safe shutdown earthquake to support safe shutdown of the plant following a design basis seismic event are designated as Seismic Category II-SSE. 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 sub systems 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.~~

U.S. EPR FSAR Section 3.7.2.8 addresses the interaction of the following Non-Seismic Category I structures with Seismic Category I structures:

- Nuclear Auxiliary Building
- Access Building
- Turbine Building
- Radioactive Waste Processing Building

{The following CCNPP Unit 3 Non-Seismic Category I structures identified in Table 3.2-1 could also potentially interact with Seismic Category I SSC:

- Buried and above ground Seismic Category II ~~and Seismic Category II-SSE~~ Fire Protection SSC, including Fire Water Storage Tanks and Fire Protection Building.

- Seismic Category II Turbine Building and Switchgear Building
- Seismic Category II Access Building
- Conventional Seismic Grid Systems Control Building
- Seismic Category II Circulating Water Makeup Intake Structure
- Conventional Seismic Sheet Pile Wall.
- Existing Baffle Wall.

. These piping mains will be designed according to ASCE 4-98, 1983 ASCE Report "Seismic Response of Buried Pipes and Structural Components," and the Areva Topical Report ANP 10264, "U.S. EPR Piping Analysis and Pipe Support Design Topical Report."

The buried ~~Seismic Category II-SSE~~ Fire Protection SSC identified in Table 3.2-1 are seismically analyzed using the design response spectra identified in Section 3.7.1.1.1.4 ~~for use in the analysis of the Seismic Category I site-specific buried utilities. The analysis of the buried Seismic Category II-SSE fire protection SSC will confirm they remain functional during and following an SSE in accordance with NRC Regulatory Guide 1.189 (NRC, 2007). Section 3.7.3.12 further defines the methodology for the analysis of buried Fire Protection piping. Seismic Category II-SSE buried piping is an embedded commodity that by its nature does not significantly interact with above ground Seismic Category I SSC. The buried Seismic Category II-SSE Fire Protection SSCs are designed to the same requirements as the buried Seismic Category I SSCs.~~

The above ground Seismic Category II and ~~Seismic Category II-SSE~~ Fire Protection SSC, including Fire Water Storage Tanks and Fire Protection Building, identified in Table 3.2-1 are seismically analyzed utilizing the appropriate design response spectra. Seismic load combinations are developed in accordance with the requirements of ASCE 43-05 (ASCE, 2005) using a limiting acceptance condition for the structure characterized as essentially elastic behavior with no damage (i.e., Limit State D) as specified in the Standard. The analysis of the above ground ~~Seismic Category II-SSE~~ fire protection SSC will confirm they remain functional during and following an SSE in accordance with NRC Regulatory Guide 1.189 (NRC, 2007). The analysis of the above ground Seismic Category II fire protection SSCs will confirm they maintain a pressure boundary after an SSE event.

Table 3.7-11 provides the criteria used to prevent seismic interaction of Turbine Building, Switchgear Building, Access Building, Circulating Water Makeup Intake Structure and Grid Systems Control Building with other Seismic Category I structures, systems and components (SSCs).

The Seismic Category II Turbine Building (TB), Switchgear Building (SB) and Access Building (AB) are located in the vicinity of the Nuclear Island Common Basemat Structures. These buildings are analyzed and designed to prevent their failure under site-specific SSE loading conditions and to maintain margin of safety equivalent to that of Seismic Category I structures. The structural steel components of these structures are designed using ANSI/AISC N690 (ANSI/AISC, 2004). The reinforced concrete components of these structures are designed using ACI 349 (ACI, 2001). Therefore, the design methodology for these structures meets NUREG-0800 Section 3.7.2, Acceptance Criterion 8.C (NRC, 2007a). During detailed design, the elastic displacements of the TB, the SB and the AB will be computed using classical finite element analysis methods. The elastic displacements will be combined with those of the nearest Seismic Category I structures. It will be confirmed that the combined elastic displacements are less than the provided separation distances.

NRC, 2008. Earthquake Engineering Criteria for Nuclear Power Plants, Title 10, Code of Federal Regulations, Part 50, Appendix S, U. S. Nuclear Regulatory Commission, February 2008.}

3.7.3 Seismic Subsystem Analysis

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No departures or supplements.

3.7.3.1 Seismic Analysis Methods

No departures or supplements.

3.7.3.2 Determination of Number of Earthquake Cycles

No departures or supplements.

3.7.3.3 Procedures Used for Analytical Modeling

{No departures or supplements.}

3.7.3.4 Basis for Selection of Frequencies

{No departures or supplements.}

3.7.3.5 Analysis Procedure for Damping

{No departures or supplements.}

3.7.3.6 Three Components of Earthquake Motion

No departures or supplements.

3.7.3.7 Combination of Modal Responses

No departures or supplements.

3.7.3.8 Interaction of Non-Seismic Category I Subsystems

No departures or supplements.

3.7.3.9 Multiply-Supported Equipment and Components with Distinct Inputs

No departures or supplements.

3.7.3.10 Use of Equivalent Vertical Static Factors

No departures or supplements.

3.7.3.11 Torsional Effects of Eccentric Masses

No departures or supplements.

3.7.3.12 Buried Seismic Category I Piping and Conduits

{For CCNPP Unit 3, a buried duct bank refers to multiple PVC electrical conduits encased in reinforced concrete.

The seismic analysis and design of Seismic Category I buried reinforced concrete electrical duct banks is in accordance with IEEE 628-2001 (R2006) (IEEE, 2001), ASCE 4-98 (ASCE, 2000) and ACI 349-01(ACI, 2001), including supplemental guidance of Regulatory Guide 1.142 (NRC, 2001).

Side walls of electrical manholes are analyzed for seismic waves traveling through the surrounding soil in accordance with the requirements of ASCE 4-98 (ASCE, 2000), including dynamic soil pressures.

Seismic Category I buried Essential Service Water Pipes, Seismic Category I buried Intake Pipes and Seismic Category II and ~~Seismic Category II-SSE~~ buried Fire Protection pipe are analyzed for the effects of seismic waves traveling through the surrounding soil in accordance with the specific requirements of ASCE 4-98 (ASCE, 2000):

- Long, straight buried pipe sections, remote from bends or anchor points, are designed assuming no relative motion between the flexible structure and the ground (i.e. the structure conforms to the ground motion).
- The effects of bends and differential displacement at connections to buildings are evaluated using equations for beams on elastic foundations, and subsequently combined with the buried pipe axial stress.

For long straight sections of buried pipe, maximum axial strain and curvature are calculated per equations contained in ASCE 4-98 (ASCE, 2000). These equations reflect seismic wave propagation and incorporate the material's modulus of elasticity to determine the corresponding maximum axial and bending stresses. The procedure combines stresses from compression, shear and surface waves by the square root of the sum of the squares (SRSS) method. Maximum stresses for each wave type are then combined using the SRSS method. Subsequently, seismic stresses are combined with stresses from other loading conditions, e.g., long-term surcharge loading.

For straight sections of buried pipe, the transfer of axial strain from the soil to the buried structure is limited by the frictional resistance developed. Consequently, axial stresses may be reduced by consideration of such slippage effects, as appropriate.

The seismic analysis of bends of buried pipe is based on the equations developed for beams on elastic foundations. Specifically, the transverse leg is assumed to deform as a beam on an elastic foundation due to the axial force in the longitudinal leg. The spring constant at the bend depends on the stiffness of the longitudinal and transverse legs as well as the degree of fixity at the bend and ends of the legs.

Seismic analysis of restrained segments of buried pipe utilizes guidance provided in Appendix VII, Procedures for the Design of Restrained Underground Piping, of ASME B31.1-2004 (ASME, 2004).}

3.7.3.13 Methods for Seismic Analysis of Category I Concrete Dams

The U.S. EPR FSAR includes the following COL Item in Section 3.7.3.13:

> A COL applicant that references the U.S. EPR design certification will provide a description of methods for seismic analysis of site-specific Category I concrete dams, if applicable.

This COL Item is addressed as follows:

{No Seismic Category I dams will be used at CCNPP Unit 3.}

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 Unit 3 Intake Pipes run from the CCNPP Unit 3 Inlet Area to the CCNPP Unit 3 Forebay (See Figure 2.4-49). 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 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}

{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 are reinforced concrete structures situated along the western shoreline of the Chesapeake Bay. As illustrated in Figure 3.8-4, the Forebay is connected to the CWS Makeup Water Intake Structure (Seismic

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)
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)
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)
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)

CS

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

(Page 14 of 15)

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 Post Indicator Valve(s)		30UZT	M	M		~~SII-SSE~~	NS-AQ	Y (5)
Fire Protection System Hydrant Isolation Valve(s)	CS	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	CS	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)

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

(Page 15 of 15)

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	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. 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))~~ CS (Conventional Seismic)

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 7 of 9)

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 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)
Fire Protection System											
Fire Protection Diesel Engine(s)/Diesel Engine Pump(s)		30USG	M	M	CS	~~SII-SSE~~	NS-AQ		EMC	Y(5)	Y(6)
Fire Protection Diesel Engine Batteries		30USG	M	M	CS	~~SII-SSE~~	NS-AQ		EMC	Y(5)	Y(6)
Fire Protection Diesel Engine(s)/Pump(s) Instrument(s) (local)		30USG	M	M	CS	~~SII-SSE~~	NS-AQ		EMC	Y(5)	Y(6)
Fire Protection Diesel Engine(s)/Pump(s) Valve(s)		30USG	M	M	CS	~~SII-SSE~~	NS-AQ		EMC	Y(5)	Y(6)
Fire Protection System Isolation Valve(s)		30USG	M	M	CS	~~SII-SSE~~	NS-AQ		EMC**	Y(5)	Y(6)

Table 3.11-1— {Site-Specific Environmentally Qualified Electrical/I&C Equipment}
(Page 8 of 9)

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 Water Storage Tanks Isolation Valve(s)			M	M		~~SII-SSE~~ CS	NS-AQ		EMC**	Y(5)	Y(6)
Fire Protection System Post Indicator Valve(s)		30UZT	M	M		~~SII-SSE~~ CS	NS-AQ		EMC**	Y(5)	Y(6)
Fire Protection System Hydrant Isolation Valve(s)		30UZT	M	M		~~SII-SSE~~ CS	NS-AQ		EMC**	Y(5)	Y(6)
Fans/Motors		30USG	M	M		~~SII-SSE~~ CS	NS-AQ			Y (5)	Y (6)
Class 1E Emergency Power Supply (EPSS)											
31BMT05 6.9 kV to 480 V (XFMR)	31BMT05GT0	30UPF03002	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
32BMT05 6.9 kV to 480 V (XFMR)	32BMT05GT0	30UPF03005	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
33BMT05 6.9 kV to 480 V (XFMR)	33BMT05GT0	30UPF03007	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
34BMT05 6.9 kV to 480 V (XFMR)	34BMT05GT0	30UPF03009	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
31BNG 1E 480 V Bus (MCC)	31BNG01GW0	30UPF2001	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
32BNG 1E 480 V Bus (MCC)	32BNG01GW0	30UPF2004	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
33BNG 1E 480 V Bus (MCC)	33BNG01GW0	30UPF2006	M	M	ES	SI	S	1E	EMC	Y(5)	Y(6)
34BNG 1E 480 V Bus (MCC)	34BNG01GW0	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)

Table 3.11-1— {Site-Specific Environmentally Qualified Electrical/I&C Equipment}
(Page 9 of 9)

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)
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)
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.

CS (Conventional Seismic)

9.4.16 FIRE PROTECTION BUILDING VENTILATION SYSTEM

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

The Fire Protection Building Ventilation System provides an environment suitable for the operation of the Fire Protection System pumps. This system provides an ambient air flow quantity to maintain a safe and satisfactory indoor environment for the operation of the fire protection pumps as well as to support personnel access to the three pump rooms.

9.4.16.1 Design Bases

The Fire Protection Building Ventilation System, located in the two, 100% capacity diesel engine driven pump rooms, is an augmented quality system designed to meet ~~Seismic Category II~~ SSE requirements. The ventilation system in the electric motor driven pump room is a non-seismic, augmented quality system.

The Fire Protection Building Ventilation System maintains acceptable ambient conditions for the fire protection system diesel engine driven pumps, diesel fuel oil tanks, electric motor driven pump, jockey pump, pump drivers and controllers. The diesel engine driven pumps and associated equipment are required to operate after a seismic event.

The Fire Protection Building Ventilation System maintains a minimum temperature of 40°F, based on an ambient temperature of -10°F, and a maximum temperature of 120°F, based on an outside ambient temperature of 100°F. This system will support operation of the Fire Protection System pumps and drivers, as well as to support personnel access to these spaces.

Components of the Fire Protection Building Ventilation System are located inside the two diesel engine driven pump rooms and one electric motor driven pump room. Each pump room contains components of the ventilation system to modulate the temperature in there respective rooms.

9.4.16.2 System Description

9.4.16.2.1 General Description

The Fire Protection Building Ventilation System ventilates the two diesel engine driven pump rooms and the electric motor driven pump room, using outside air as the cooling medium. Wall mounted outside air intake louvers with motor operated dampers, electric unit heaters and exhaust fans service the Fire Protection Building. Each pump room has a separate and independent heating and ventilation system.

The heating and ventilation systems for each of the diesel engine driven pump rooms are identical. Each diesel pump room is supplied with wall mounted outside air intake louvers, with motor operated dampers, electric unit heaters, exhaust fans, engine combustion air inlet ductwork with air intake filter, and combustion gas exhaust ductwork for proper pump performance.

The electric motor driven pump room is supplied with wall mounted outside air intake louvers with motor operated dampers, electric unit heaters and an exhaust fan.

Ventilation of the Diesel Engine Driven Pump Rooms

During normal operating conditions the diesel engine driven pump rooms' ventilation system will use two 50% wall mounted intake air louvers for room ventilation air and ventilation air shall be exhausted by one 100% exhaust fan. The intake air louvers and exhaust fan are

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

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 Program 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:

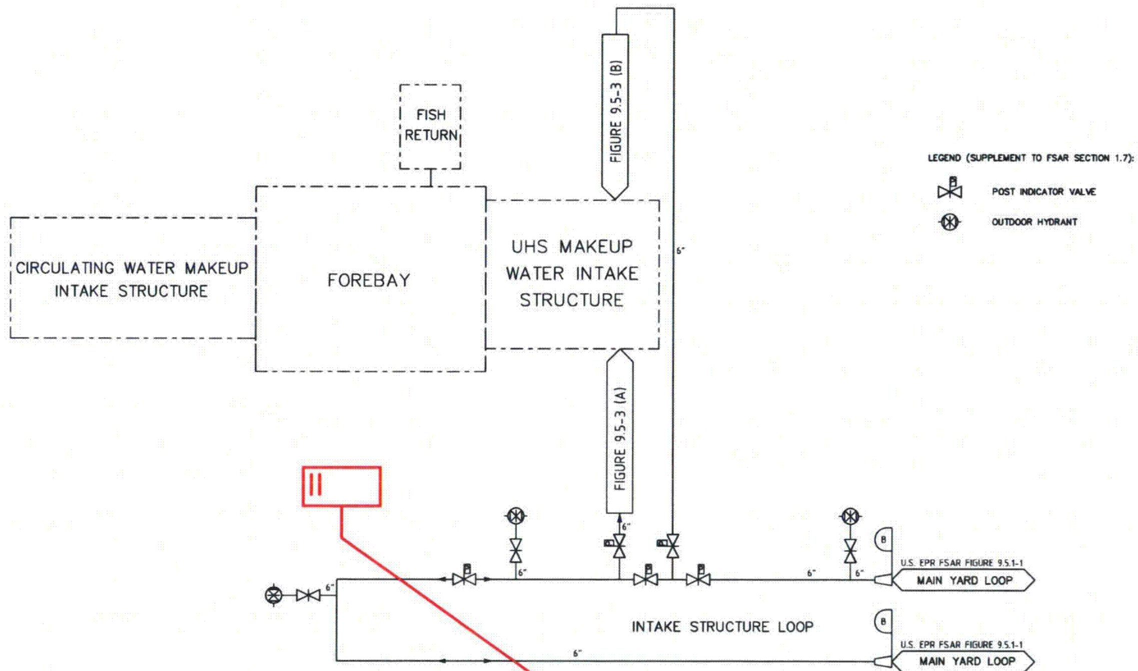
> {Figure 9.5-1, Figure 9.5-2 and Figure 9.5-3 each provide a schematic piping and instrumentation diagram of the fire water distribution system specific to CCNPP Unit 3. These figures supplement the generic piping and instrumentation diagram provided in Figure 9.5.1-1 of the U.S. EPR FSAR.
>
> Figure 9.5-1 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 9.5-2 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 9.5-3. This figure illustrates the ~~Seismic Category II-SSE~~ standpipe and hose stations and the Seismic Category II sprinkler systems specified for the UHS Makeup Water Intake Structure.}

Plant Fire Prevention and Control Features

Plant Arrangement

{The site building layout is shown in Figure 2.1-1. An enlargement of the power block area is provided in Figure 2.1-5.} Details of the arrangement of the Turbine Building, Switchgear Building, Auxiliary Power Transformer Area, Generator Transformer Area (the remaining power

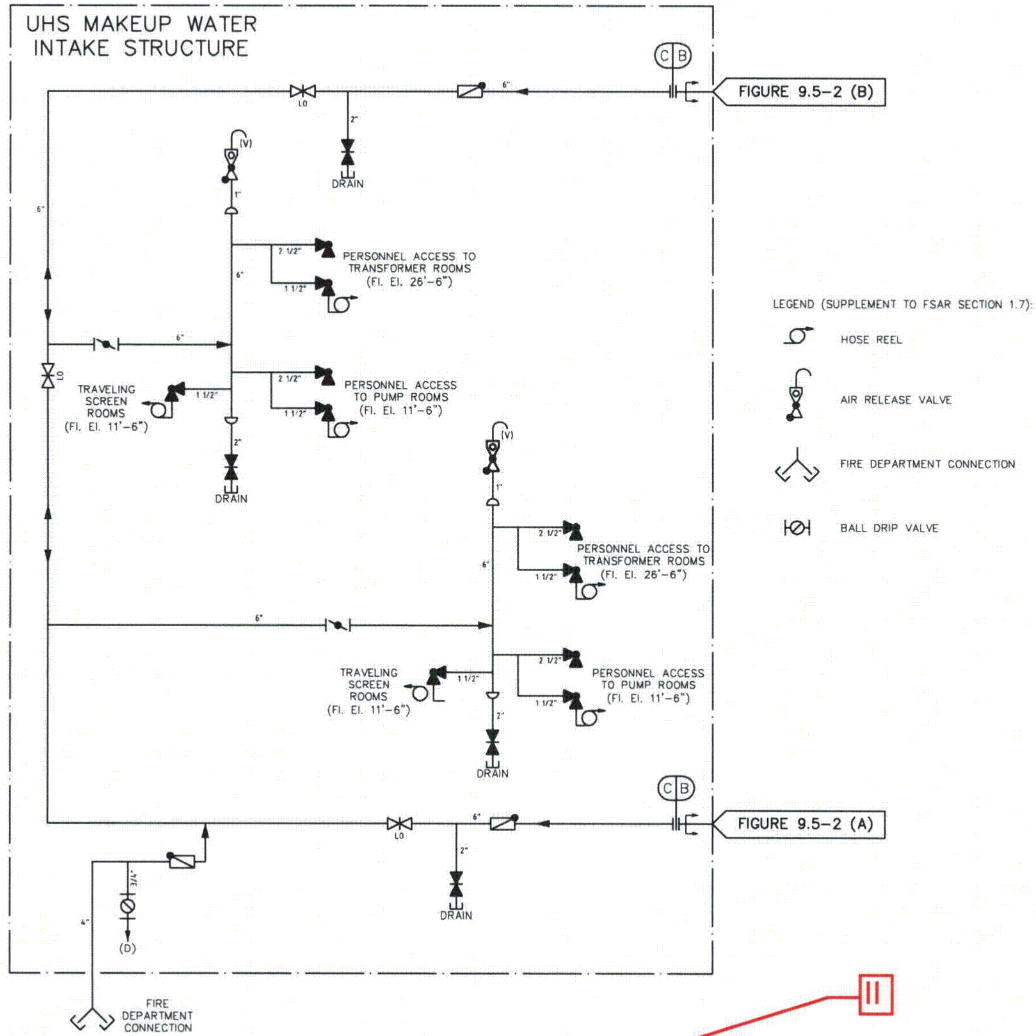
Figure 9.5-2— {CCNPP Unit 3 Fire Water Distribution System – Intake Structure Loop}



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



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
C	NS-AQ	D	250	120	~~II - SSE~~ II	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~~ II	YES	NFPA 24, 2007 ed. NFPA 25, 2002 ed. NFPA 804, 2006 ed. ANSI/ASME B31.1, 2004 ed.

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.

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, Test, 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 [illegible]	Testing will be performed during the placement of the structural fill material.	A report exists that concludes the installed structural fill material under Seismic Category I and II-~~SSE~~ structures meets a minimum of 95 percent Modified Proctor density.
2	Shear w[illegible]material beneat[illegible]ration Buildin[illegible]ual to 630 ft/sec a[illegible]n 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 w[illegible]material beneath the Essential Service Water Buildings (ESWB) is greater than or equal to 720 ft/sec at [illegible]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 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.~~
5	[illegible] wave velocity of structural fill material [illegible]th the Nuclear Island (NI) Common [illegible]at Structures is greater than or equal to [illegible]/sec at the bottom of the foundation and [illegible].	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 NI Common Basemat Structures at their foundation depths and below is greater than or equal to 860 ft/sec.
6	Shear [illegible] material benea[illegible] structures that c[illegible] structures is greate[illegible]t a depth of 6 ft, 72[illegible]nd 860 ft/sec at a depth of 41.5 ft.	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 Seismic Category II structures that can impact Seismic Category I structures is greater than or equal to 630 ft/sec at a depth of 6 ft, 720 ft/sec at a depth of 22 ft, and 860 ft/sec at a depth of 41.5 ft.

Annotations:

A report exists that concludes that the installed structural fill material under the FPB and FPT meets a minimum of 95 percent Modified Proctor density

Structural fill material

is installed to meet a minimum of 95 percent of the Modified Proctor density

Testing will be performed during the placement of the structural fill material.

Table 2.4-9— {Fire Protection Building Inspections, Tests, Analyses, and Acceptance Criteria}

	Commitment Wording	Inspection, Test, or Analysis	Acceptance Criteria
1	The Fire Protection Building will house the following equipment: a. Diesel Driven Fire Pumps, Drivers, and associated piping, valves, equipment, instruments and controls. b. Diesel Fuel Oil Supply Day Tank and associated piping, valves, equipment, instruments, and controls.	An inspection of the as-built structure will be conducted.	The as-built Fire Protection Building houses the: a. Diesel Driven Fire Pumps, Drivers and associated piping, valves, equipment, instruments and controls. b. Diesel Fuel Oil Supply Day Tank and associated piping, valves, equipment, instruments, and controls.
2	The Fire Protection Building is classified as ~~Seismic Category II-SSE~~ that can withstand the applicable structural design basis loads without a loss of structural integrity and remain functional during and after an SSE.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the Fire Protection Building, using analytical assumptions, or under conditions which bound the ~~Seismic Category II-SSE~~ design requirements and to determine that it can withstand the applicable structural design basis loads without losing its structural integrity and will remain functional during and after an SSE. b. An inspection will be performed of the Fire Protection Building, and deviations from the approved design will be analyzed for design basis loads, and will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Fire Protection Building can withstand the applicable structural design basis loads without loss of structural integrity and will remain functional during and after an SSE. b. Inspection reports exist which reconcile deviations during construction and conclude that the as-built Fire Protection Building conforms to the approved design and will withstand design basis loads without loss of structural integrity and will remain functional during and after an SSE.
3	For the Fire Protection Building's concrete foundation and walls exposed to ground water, 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 Fire Protection Building's below grade concrete foundation and walls have a maximum water to cementitious materials ratio of 0.45.

Conventional Seismic

Table 2.4-21— {Fire Protection Building Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}

(Page 1 of 2)

Conventional Seismic

Conventional Seismic

	Commitment Wording	Inspection, Test, or Analysis	Acceptance Criteria
1	a. The Fire Protection Building Ventilation System equipment identified as ~~Seismic Category II-SSE~~ in the part (e) analysis can withstand seismic design basis loads without loss of function.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the Fire Protection Building Ventilation System equipment, identified as ~~Seismic Category II-SSE~~ 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 Fire Protection Building Ventilation System equipment identified as ~~Seismic Category II-SSE~~ in the part (e) analysis can withstand seismic design basis loads without loss of function.
	b. The Fire Protection Building Ventilation System equipment are designated ~~Seismic Category II-SSE~~ 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 as-built ~~Seismic Category II-SSE~~ Fire Protection 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 IISSE Fire Protection 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).
	c. Portions of the UHS Fire Protection Building System piping and ducting identified as Seismic Category I identified 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 identified 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 Fire Protection Building System piping and ducting identified as Seismic Category I identified in the part (e) analysis can withstand seismic design basis loads without loss of safety function.
	d. Portions of the UHS Fire Protection Building System piping and ducting identified as Seismic Category I identified in the part (e) analysis can withstand seismic design basis loads without loss of safety function.		d. Inspection reports exist and conclude that the as-built Seismic Category I UHS Fire Protection Building 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).
	e. The Fire Protection Building Ventilation System equipment, piping, and ducting identified as ~~Seismic Category II-SSE~~ can withstand seismic design basis loads without loss of function.		e. A report exists indicating the ~~Category II-SSE~~ equipment, piping, and ducting of the Fire Protection Building Ventilation System.

Table 2.4-21— {Fire Protection Building Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria}
(Page 2 of 2)

	Commitment Wording	Inspection, Test, or Analysis	Acceptance Criteria
		d. Inspections will be performed of the Seismic Category I UHS Fire Protection Building 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).	
		e. An analysis to identify the ~~Category II-SSE~~ equipment, piping, and ducting of the Fire Protection Building Ventilation System will be performed.	
2	The Fire Protection Building Ventilation System maintains the environment of the Fire Protection Building within the most limiting operating requirements for the diesel driven fire pumps, and its supporting equipment.	Tests, analyses, or a combination of tests and analyses will be performed.	The as-built Fire Protection Building Ventilation System maintains the temperature within a range that supports operation of the diesel driven fire pumps, and its supporting equipment.
3	The Fire Protection Building Ventilation System starts upon receipt of a simulated automatic initiation signal.	A test of the as-built system will be conducted by supplying a simulated automatic signal to the system.	The as-built Fire Protection Building Ventilation System starts upon receipt of a simulated automatic initiation signal.

either Conventional Seismic or Seismic Category II

Table 2.4-24—{ n System Inspections, Tests, Analyses, and Acceptance Criteria}
(Page 1 of 4)

	Commitment Wording	Inspection, Test, or Analysisign	Acceptance Criteria
1	The fire protection storage tanks are in close proximity to the fire protection building.	An inspection of the as-built location of the tanks will be conducted.	An inspection report exists that verifies the as-built fire protection storage tanks are located within 50 ft of the as-built Fire Protection Building, as measured from the closest outside surfaces of the structures.
2	a. The Fire Water Distribution System equipment identified as ~~Seismic Category II-SSE~~ in the part (e) analysis can withstand seismic design basis loads without loss of safety function. b. The Fire Water Distribution System equipment are designated ~~Seismic Category II-SSE~~ in the part (e) analysis, and can withstand seismic design basis loads without loss of the safety function. c. Portions of the Fire Water Distribution System piping identified as ~~Seismic Category II-SSE~~ in the part (e) analysis 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 Fire Water Distribution System equipment identified in the part (e) analysis using analytical assumptions, or under conditions which bound the ~~Seismic Category II-SSE~~ design requirements. b. Inspections will be performed of the ~~Seismic Category II-SSE~~ Fire Water Distribution System equipment identified in the part (e) analysis, including anchorage, and deviations from the approved design will be analyzed for design basis loads, and will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Fire Water Distribution System equipment identified in the part (e) analysis ~~as Seismic Category II-SSE~~ can withstand seismic design basis loads without loss of safety function. b. Inspection reports exist which reconcile deviations during construction and conclude that the as-built ~~Seismic Category II-SSE~~ Fire Water Distribution System equipment identified in the part (e) analysis, including anchorage, conforms to the approved design, and can withstand seismic design basis loads without loss of safety function. c. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Fire Water Distribution System piping identified ~~as Seismic Category II-SSE~~ in the part (e) analysis can withstand seismic design basis loads without loss of safety function.

Table 2.4-24— {Fire Water Distribution System Inspections, Tests, Analyses, and Acceptance Criteria}
(Page 2 of 4)

either Conventional Seismic or Seismic Category II

Commitment Wording	Inspection, Test, or Analysisign	Acceptance Criteria
d. Portions of the Fire Water Distribution System piping identified as Seismic Category II-SSE 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 identified as Seismic Category II-SSE in the part (e) analysis using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.	d. Inspection reports exist which reconcile deviations during construction and conclude that the as-built Seismic Category II-SSE Fire Water Distribution System piping identified in the part (e) analysis, including anchorage, conforms to the approved design, and can withstand seismic design basis loads without loss of safety function.
e. The Fire Water Distribution System equipment and piping identified as Seismic Category II-SSE can withstand seismic design basis loads without loss of safety function.	d. Inspections will be performed of the Seismic Category II-SSE Fire Water Distribution System piping identified in the part (e) analysis, including anchorage, and deviations from the approved design will be analyzed for design basis loads, and will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	e. A report exists indicating the Category II-SSE equipment and piping of the Fire Water Distribution System.
	e. An analysis to identify the Category II-SSE equipment and piping of the Fire Water Distribution System will be performed.	

Table 2.4-24— {Fire Water Distribution System Inspections, Tests, Analyses, and Acceptance Criteria}
(Page 3 of 4)

	Commitment Wording	Inspection, Test, or Analysisign	Acceptance Criteria
3	a. The Fire Water Distribution 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-~~SSE~~ in the part (e) 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 Fire Water Distribution System equipment identified in the part (e) analysis using analytical assumptions, or under conditions, which bound the Seismic Category II-~~SSE~~ 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 Fire Water Distribution System equipment identified as Seismic Category II-~~SSE~~ in the part (e) analysis can withstand seismic design basis loads without impacting the capability of equipment designated Seismic Category I from performing its safety function.
	b. The Fire Water Distribution 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-~~SSE~~ in the part (e) 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~~ Fire Water Distribution System equipment identified in the part (e) analysis, including anchorage, and deviations from the approved design will be analyzed for design basis loads, and will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	b. Inspection reports exist which reconcile deviations during construction and conclude that the as-built Seismic Category II-~~SSE~~ Fire Water Distribution System equipment identified in the part (e) analysis, conforms to the approved design, and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.
	c. Fire Water Distribution 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-~~SSE~~ in the part (e) analysis, and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.		c. Seismic qualification reports (SQDP, EQDP, or analyses) exist and concludes that the as-designed Fire Water Distribution System piping identified as Seismic Category II-~~SSE~~ in the part (e) analysis 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— {Fire Water Distribution System Inspections, Tests, Analyses, and Acceptance Criteria}
(Page 4 of 4)

	Commitment Wording	Inspection, Test, or Analysisisign	Acceptance Criteria
	d. Fire Water Distribution 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~~-SSE~~ in the part (e) analysis, 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~~-SSE~~ in the part (e) analysis using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.	d. Inspection reports exist which reconcile deviations during construction and conclude that the as-built Seismic Category II~~-SSE~~ Fire Water Distribution System piping identified in the part (e) analysis, conforms to the approved design, and can withstand seismic design basis loads without impacting the capability of equipment designated as Seismic Category I from performing its safety function.
	e. The Fire Water Distribution System equipment and piping that could impact the capability of Seismic Category I structures, systems, or components to perform its safety function are designated as 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.	d. Inspections will be performed of the as-built Seismic Category II~~-SSE~~ Fire Water Distribution System piping identified in the part (e) analysis, including anchorage, and deviations from the approved design will be analyzed for design basis loads, and will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses). e. An analysis to identify the Category II~~-SSE~~ equipment and piping of the Fire Water Distribution System will be performed.	e. A report exists indicating the Category II~~-SSE~~ equipment and piping of the Fire Water Distribution System.
4	The Fire Water Distribution System utilizing the diesel driven fire pumps can be initiated manually.	Tests of the as-built system will be conducted.	Fire Water Distribution System utilizing the diesel driven fire pumps starts upon receipt of a manual initiation signal.

Table 2.4-25— {Fire Suppression Systems Inspections, Tests, Analyses, and Acceptance Criteria}
(Page 1 of 4)

	Commitment Wording	Inspection, Test, 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. 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. 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.	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. 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). c. An analysis to identify the Category II-~~SSE~~ components of the Standpipe and Hose Station for the UHS Makeup Water Intake Structure will be performed.	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. 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). c. A report exists indicating the Category II-~~SSE~~ components of the Standpipe and Hose Station for the UHS Makeup Water Intake Structure.

Table 2.4-25— {Fire Suppression Systems Inspections, Tests, Analyses, and Acceptance Criteria}
(Page 2 of 4)

	Commitment Wording	Inspection, Test, or Analysis	Acceptance Criteria
2	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 impacting the capability of equipment designated as Seismic Category I from performing its safety function. 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. 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.	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. 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). c. An analysis to identify the Category II-SSE components of the Standpipe and Hose Station for the UHS Makeup Water Intake Structure will be performed.	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. 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). c. A report exists indicating the Category II-SSE components of the Standpipe and Hose Station for the UHS Makeup Water Intake Structure.