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December 18, 2014 10 CFR 50.54(f)

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U. S. Nuclear Regulatory Commission
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Washington, DC 20555-0001

Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2
Renewed Facility Operating License Nos. DPR-71 and DPR-62
Docket Nos. 50-325 and 50-324
Expedited Seismic Evaluation Process Report in Response to 10 CFR 50.54(f) Request for Information Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident

References:

1. Nuclear Energy Institute Letter, "Proposed Path Forward for NTTF Recommendation 2.1: Seismic Reevaluations," dated April 9, 2013, ADAMS Accession Number ML13101A379.
2. Electric Power Research Institute (EPRI) Final Report 1025287, "Seismic Evaluation Guidance; Screening, Prioritization and Implementation Details (SPID) for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic," dated February 2013.
3. Electric Power Research Institute Technical Report 3002000704, "Seismic Evaluation Guidance; Augmented Approach for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic," dated May 2013.
4. NRC Letter, "Electric Power Research Institute Final Draft Report XXXXXX, "Seismic Evaluation Guidance: Augmented Approach for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic," as an Acceptable Alternative to the March 12, 2012, Information Request for Seismic Reevaluations," dated May 7, 2013, ADAMS Accession Number ML13106A331.
5. Brunswick Steam Electric Plant letter, "Seismic Hazard and Screening Report (CEUS Sites), Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Seismic Aspects of Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 31, 2014, ADAMS Accessions Number ML14106A461
6. NRC Letter, "Brunswick Steam Electric Plant, Units 1 and 2 - Screening and Prioritization Results of Information Provided Pursuant to Title 10 of the Code of Federal Regulations Part 50, Section 50.54(f), Seismic Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident (TAC Nos. MF3824 and MF3825)," dated September 17, 2014, ADAMS Accession Number ML14231A964.

On April 9, 2013, the Nuclear Energy Institute notified the NRC in Reference 1 that, in addition to using the methods described in Electric Power Research Institute (EPRI) Report

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1025287 (i.e., Reference 2), the industry planned "to augment that effort with a deterministic Expedited Seismic Evaluation to provide a timely demonstration of additional seismic margin and support near-term plant modifications to enhance safety." The augmented method described in Reference 3 was proposed by EPRI in May 2013, and was endorsed by the NRC on May 7, 2013, in Reference 4.

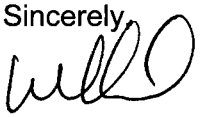
The augmented method proposed by EPRI included preparation and submittal of an Expedited Seismic Evaluation Process (ESEP) report to "provide additional seismic margin and expedite plant safety enhancements for certain core and containment cooling components while more detailed and comprehensive plant seismic risk evaluations are being performed." On March 31, 2014, Brunswick Steam Electric Plant (BSEP) stated in Reference 5 that the ESEP evaluation had been initiated and that BSEP Units 1 and 2 screened out for the seismic risk evaluation. The forthcoming ESEP report was acknowledged by the NRC on September 17, 2014, in Reference 6. The enclosed ESEP Report provides the required evaluation and is submitted in accordance with the schedule required by Reference 4.

This letter contains no new regulatory commitments.

If you have any questions regarding this report, please contact Mr. Lee Grzeck, Manager – Regulatory Affairs, at (910) 457-2487.

I declare under penalty of perjury that the foregoing is true and correct. Executed on December 18, 2014.

Sincerely,



William R. Gideon

SWR/swr

Enclosure:
Expedited Seismic Evaluation Process (ESEP) Report, Brunswick Steam Electric Plant Unit 1 and Unit 2, dated December 10, 2014

cc (with enclosure):

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Brunswick Steam Electric Plant, Unit Nos. 1 and 2
Renewed Facility Operating License Nos. DPR-71 and DPR-62
Docket Nos. 50-325 and 50-324

Expedited Seismic Evaluation Process (ESEP) Report

Total Pages in Enclosure: 47

EXPEDITED SEISMIC EVALUATION PROCESS (ESEP) REPORT

BRUNSWICK STEAM ELECTRIC PLANT UNIT 1 AND UNIT 2

December 10, 2014

EXPEDITED SEISMIC EVALUATION PROCESS REPORT

Table of Contents

Executive Summary

This report describes the Expedited Seismic Evaluation Process (ESEP) undertaken for the Brunswick Steam Electric Plant (BSEP) Units 1 and 2. The intent of the ESEP is to perform an interim action in response to the NRC's 50.54(f) letter [1] to demonstrate seismic margin through a review of a subset of the plant equipment that can be relied upon to protect the reactor core following beyond design basis seismic events. BSEP screens in for the ESEP because the Ground Motion Response Spectrum (GMRS) exceeds the Safe Shutdown Earthquake (SSE) for frequencies greater than 7 Hz.

The GMRS exceeds the BSEP SSE by more than two times, therefore the Review Level Ground Motion (RLGM) is taken at the ESEP specified maximum ratio of two times the SSE. The RLGM for the BSEP site is 0.32 PGA. The In-Structure Response Spectra (ISRS) for the ESEP were developed by linearly scaling the existing BSEP ISRS by the ESEP specified maximum ratio of two times the SSE.

BSEP performed a seismic margin assessment using the RLGM demand in accordance with the methodology of EPRI NP-6041-SL [7] for the ESEP. The major steps included equipment selection, screening, walkdowns, and Conservative Deterministic Failure Margin (CDFM) High Confidence Low Probability of Failure (HCLPF) calculations, when required. The screening process used the screening tables from Chapter 2 of EPRI NP-6041-SL [7]. The walkdowns were conducted by Seismic Qualification Utility Group (SQUG) qualified engineers and were documented on Screening Evaluation Work Sheets (SEWS) based on those contained in Appendix F of EPRI NP-6041-SL. Previous seismic walkdowns (Fukushima NTTF 2.3: Seismic, IPEEE, and USI A-46) were used to support the ESEP seismic evaluations.

No significant outliers or anchorage concerns were identified during the BSEP seismic walkdowns. Several block walls were identified in the proximity of Expedited Seismic Equipment List (ESEL) equipment. These block walls were assessed based on existing documentation to withstand the seismic loads resulting from the RLGM and either screened out or if necessary, a new HCLPF calculation was performed. Several ESEL items required HCLPF capacity calculations for anchorage. All of the ESEL items that required a HCLPF capacity calculation for anchorage were shown to have a HCLPF capacity greater than the RLGM. Some ESEL items were inaccessible but were determined to be seismically adequate for the RLGM based on past walkdown data, drawings and other documentation, and comparison to similar equipment that was accessible.

Based on the collective experience of the Seismic Review Team (SRT) in addition to existing and newly produced HCLPF calculations, all ESEL equipment capacities are determined to meet or exceed the RLGM demands. Therefore, no modifications are required for any of the items listed on the BSEP ESEL. No further walkdowns are planned for inaccessible items. In addition, per a letter from the NRC [27], BSEP screens out of performing a Seismic Risk Evaluation.

1.0 Purpose and Objective

Following the accident at the Fukushima Dai-ichi nuclear power plant resulting from the March 11, 2011, Great Tohoku Earthquake and subsequent tsunami, the Nuclear Regulatory Commission (NRC) established a Near Term Task Force (NTTF) to conduct a systematic review of NRC processes and regulations and to determine if the agency should make additional improvements to its regulatory system. The NTTF developed a set of recommendations intended to clarify and strengthen the regulatory framework for protection against natural phenomena. Subsequently, the NRC issued a 50.54(f) letter on March 12, 2012 [1], requesting information to assure that these recommendations are addressed by all U.S. nuclear power plants. The 50.54(f) letter requests that licensees and holders of construction permits under 10 CFR Part 50 reevaluate the seismic hazards at their sites against present-day NRC requirements and guidance. Depending on the comparison between the reevaluated seismic hazard and the current design basis, further risk assessment may be required. Assessment approaches acceptable to the staff include a seismic probabilistic risk assessment (SPRA), or a seismic margin assessment (SMA). Based upon the assessment results, the NRC staff will determine whether additional regulatory actions are necessary.

This report describes the Expedited Seismic Evaluation Process (ESEP) undertaken for the Brunswick Steam Electric Plant (BSEP). The intent of the ESEP is to perform an interim action in response to the NRC's 50.54(f) letter [1] to demonstrate seismic margin through a review of a subset of the plant equipment that can be relied upon to protect the reactor core following beyond design basis seismic events.

The ESEP is implemented using the methodologies in the NRC endorsed guidance in EPRI 3002000704, *Seismic Evaluation Guidance: Augmented Approach for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic* [2].

The objective of this report is to provide summary information describing the ESEP evaluations and results. The level of detail provided in the report is intended to enable NRC to understand the inputs used, the evaluations performed, and the decisions made as a result of the interim evaluations.

2.0 Brief Summary of the FLEX Seismic Implementation Strategies

The Brunswick Steam Electric Plant FLEX strategies for Reactor Core Cooling and Heat Removal, Reactor Inventory Control, and Containment Function are summarized below. This summary is derived from the Brunswick Nuclear Plant Overall Integrated Plan (OIP) in response to the March 12, 2012, Commission Order EA-12-049 [3].

Reactor core cooling and heat removal is achieved using the safety relief valves (SRVs) to reject decay heat to the suppression pool (refer to Figure 6 in Attachment C). Rejected reactor coolant will be replaced with water injected using the Reactor Core Isolation

Cooling (RCIC) system. The RCIC system will inject water from the suppression pool during Phase 1 response and from the Condensate Storage Tank (CST) during the Phase 2 response (refer to Figure 1 in Attachment C).

Reactor coolant inventory will be maintained using the RCIC system until decay heat has reduced reactor pressure below 50 psig. At or below this pressure, a portable FLEX pump will be used to continue water injection from the CST into the reactor vessel using a flow path via the Reactor Water Cleanup (RWCU) system into the "B" feed water injection line (refer to Figure 1 and Figure 3 in Attachment C). In the unlikely event this flow path is unavailable, an alternate flow path has been identified using the portable FLEX pump and the Residual Heat Removal (RHR) system (refer to Figure5 in Attachment C) using an existing integrated leak rate test line. Both flow paths require manual valve manipulation and temporary hoses to establish.

Primary Containment will be maintained by rejecting decay heat to the atmosphere using the Hardened Wetwell Vent (HWWV). Rejected heat will be transferred to the suppression pool via the SRVs. When the suppression pool begins to produce steam, the HWWV will be opened to relieve this steam to atmosphere (refer to Figure 6 in Attachment C). SRV and HWWV functionality will initially be maintained using the Backup Nitrogen System via installed nitrogen bottles. Additional capacity is being added through the addition of two nitrogen bottles (for a total of 12 per division). In the event sustained use of these systems results in depleting the nitrogen bottle supply, a portable FLEX air compressor will be installed to provide indefinite coping capability. To provide redundancy, primary and alternate connection points have been established for the air compressor connection (refer to Figure 4 in Attachment C).

In an Extended Loss of AC Power (ELAP), it is possible that the spent fuel pool (SFP) level may lower due to the loss of heat removal capability and the onset of boiling. Inventory loss will be compensated for by providing makeup capability using the portable FLEX pump with suction from the CST, discharging water through temporary hoses and an installed FLEX connection on the Residual Heat Removal System (refer to Figure 2 in Attachment C). To provide redundancy to this flow path, an alternate strategy has been created using temporary hose from the portable FLEX pump directly to the SFP. A method to provide SFP spray capability has also been created utilizing a portable FLEX pump, temporary hoses, and firefighting nozzles.

3.0 Equipment Selection Process and ESEL

The selection of equipment for the Expedited Seismic Equipment List (ESEL) followed the guidelines of EPRI 3002000704 [2]. The ESELs for Unit 1 and Unit 2 are documented in Attachment A of this document. Formal ESEL development is documented in BSEP EVAL EC 91485 [19].

3.1 Equipment Selection Process and ESEL

The selection of equipment to be included on the ESEL was based on installed plant equipment credited in the FLEX strategies during Phase 1, 2 and 3

mitigation of a Beyond Design Basis External Event (BDBEE), as outlined in the BSEP Overall Integrated Plan (OIP) in Response to the March 12, 2012, Commission Order EA-12-049 [3]. The OIP provides the BSEP FLEX mitigation strategy and serves as the basis for equipment selected for the ESEP.

The scope of "installed plant equipment" includes equipment relied upon for the FLEX strategies to sustain the critical functions of core cooling and containment integrity consistent with the BSEP OIP [3]. FLEX recovery actions are excluded from the ESEP scope per EPRI 3002000704 [2]. The overall list of planned FLEX modifications and the scope for consideration herein is limited to those required to support core cooling, reactor coolant inventory and subcriticality, and containment integrity functions. Portable and pre-staged FLEX equipment (not permanently installed) are excluded from the ESEL per EPRI 3002000704 [2].

The ESEL component selection followed the EPRI guidance outlined in Section 3.2 of EPRI 3002000704.

1. The scope of components is limited to that required to accomplish the core cooling and containment safety functions identified in Table 3-1 of EPRI 3002000704. The instrumentation monitoring requirements for core cooling/containment safety functions are limited to those outlined in the EPRI 3002000704 guidance, and are a subset of those outlined in the BSEP OIP [3].
2. The scope of components is limited to installed plant equipment, and FLEX connections necessary to implement the BSEP OIP [3] as described in Section 2.0.
3. The scope of components assumes the credited FLEX connection modifications are implemented, and are limited to those required to support a single FLEX success path (i.e., either "Primary" or "Back-up/Alternate").
4. The ESEL was developed based on the "Primary" FLEX success path identified in the BSEP OIP [3] and subsequent success path evolutions as detailed in EC 91485 [19]. No portions of the "Back-up/Alternate" FLEX success path were evaluated in lieu of the "Primary" success path in development of the ESEL.
5. Phase 3 coping strategies are included in the ESEP scope, whereas recovery strategies are excluded.
6. Structures, systems, and components excluded per the EPRI 3002000704 [2] guidance are:
    - Structures (e.g. containment, reactor building, control building, auxiliary building, etc.)
    - Piping, cabling, conduit, HVAC, and their supports.
    - Manual valves and rupture disks.
    - Power-operated valves not required to change state as part of the FLEX mitigation strategies.

- Nuclear steam supply system components (e.g. reactor pressure vessel and internals, reactor coolant pumps and seals, etc.)

Other notable plant equipment that screened out of the BSEP ESEL included DC Battery Room fans, RCIC turbine supply steam line drain pot drain line shutoff valves, and RCIC Steam Detection Isolation Signal Equipment as justified in BSEP EVAL EC 91485 [19].

3.1.1 ESEL Development

The ESEL was developed by reviewing the BSEP OIP [3] to determine the major equipment involved in the FLEX strategies. Further reviews of plant drawings (e.g., Process and Instrumentation Diagrams (P&IDs) and Electrical One Line Diagrams) were performed to identify the boundaries of the flowpaths to be used in the FLEX strategies and to identify specific components in the flowpaths needed to support implementation of the FLEX strategies. Boundaries were established at an electrical or mechanical isolation device (e.g., isolation amplifier, valve, etc.) in branch circuits / branch lines off the defined strategy electrical or fluid flowpath. P&IDs were the primary reference documents used to identify mechanical components and instrumentation. The flow paths used for FLEX strategies were selected and specific components were identified using detailed equipment and instrument drawings, piping isometrics, electrical schematics and one-line drawings, system descriptions, design basis documents, etc., as necessary.

3.1.2 Mechanical Equipment

Mechanical equipment that was identified as necessary to ensure the primary FLEX success path was added to the ESEL. P&IDs were reviewed to follow the flow paths associated with the primary FLEX success path to ensure all involved equipment was included on the ESEL.

The equipment chosen included valves, pumps, safety relief valves, drain pots, steam condensers, and others. The list did not include equipment such as manual valves, rupture disks, and pressure relief valves not operated as part of the FLEX strategy. Valves of the categories in Table 3.1 were examined, with some included in the ESEL as required by EPRI 3002000704 [2]:

Table 3-1. Valve Categories

Normal: **Open** – FLEX: **Open** Normal: **Closed** – FLEX: **Closed**	These valves do not need to change position after or during a BDB seismic event, but must maintain the pressure boundary (such as drain valves, or MOVs in the flow path that do not need to be repositioned). These valves need not be included in the ESEL.
Normal: **Open** – FLEX: **Closed** Normal: **Closed** – FLEX: **Open**	These valves DO need to change position after or during a BDB seismic event, and must maintain the FLEX Response Path. Motor Operated Valves of this sort must be included in the ESEL, while manual valves need not be included.
Normal: **N/A** – FLEX: **N/A**	These valves need to function during or after a BDB seismic event, but are passive mechanical devices (such as check valves). These valves need not be included in the ESEL.
Normal: **Closed** – FLEX: **Variable Position**	This equipment may be operated during or after a BDB seismic event, but do not need to be repositioned (such as SRVs). These valves must be included in the ESEL.

Equipment IDs for equipment associated with actuation of MOVs or air operated valves were not individually listed in the ESEL. The valve actuators were considered sub-components to be evaluated as part of the listed valve review.

3.1.3 Power Operated Valves

Page 3-3 of EPRI 3002000704 [2] notes that power operated valves not required to change state are excluded from the ESEL. Page 3-2 also notes that, "functional failure modes of electrical and mechanical portions of the installed Phase 1 equipment should be considered (e.g. RCIC/ Auxiliary Feedwater (AFW) trips)." To address this concern, the following guidance is applied in the BSEP ESEL for functional failure modes associated with power operated valves:

- Power operated valves that remain energized during the Extended Loss of all AC Power (ELAP) events (such as DC powered valves), were included on the ESEL.
- Power operated valves not required to change state as part of the FLEX mitigation strategies were not included on the ESEL. The seismic event also causes the ELAP event; therefore, the valves are incapable of spurious operation as they would be de-energized.
- Power operated valves not required to change state as part of the FLEX mitigation strategies during Phase 1, and are re-energized and operated during subsequent Phase 2 and 3 strategies, were not evaluated for spurious valve operation as the seismic event that caused the ELAP has passed before the valves are re-powered.

3.1.4 Piping Connections

Item 2 in Section 3.1 above notes that the scope of equipment in the ESEL includes "... FLEX connections necessary to implement the BSEP OIP [3] as described in Section 2." Item 3 in Section 3.1 also notes that, "The scope of components assumes the credited FLEX connection modifications are

implemented, and are limited to those required to support a single FLEX success path (i.e., either "Primary" or "Back-up/Alternate")."

Item 6 in Section 3.1 above further explains that "Piping, cabling, conduit, HVAC, and their supports" are excluded from the ESEL scope in accordance with EPRI 3002000704 [2].

Therefore, piping and pipe support connections are excluded from the scope of the ESEP evaluation. However, any active valves in the connection flow paths are included in the ESEL.

3.1.5 Electrical Equipment

Electrical equipment was selected based on both the mechanical and electrical components necessary to implement the primary FLEX success paths. Drawings were reviewed to ensure all intermediate components were included. This intermediate equipment included components associated with RCIC logic and ADS logic for relays that could lock-out/seal-in. All relays that were examined were determined to not lock-out or seal-in, and as such, were not included as components in the ESEL. All mechanical equipment, as discussed above in Section 3.1.2, was reviewed to ensure motive power for any equipment was included in the electrical equipment portions of the ESEL.

The equipment chosen consisted of electrical cabinets, switchgears, batteries, and battery chargers. The scope of the equipment does not include support items such as cables, cable trays, or conduit as discussed in Section 3.1 Item 6 above.

3.1.6 Critical Instruments

Actions specified in plant procedures/guidance for loss of AC power are predicated on the use of instrumentation and controls powered by station batteries. A set of key reactor/containment indications necessary to support FLEX primary success path implementation was defined for the BSEP OIP [3] and provided in Table 3-2:

Table 3-2. Key Reactor/Containment Parameters

Key Reactor/Containment Parameter
RPV Level
RPV Pressure
Drywell Pressure
Suppression Pool Temperature
Suppression Pool Level

A number of redundant "critical instruments" (available with a loss of all AC power and UPS de-energized) were listed in the BSEP OIP [3]. For purposes of the ESEL, this list of "critical" instruments" was reduced to one indication instrument loop per key parameter as permitted per EPRI 3002000704 [2]. In

addition to including indicators on the final ESEL, supporting indication instrument loop components were added as well. These included pressure/level/temperature transmitters, transmitter racks, indicator panels, and instrument loop power components such as inverters/power supplies/master trip units.

3.1.7 RCIC Isolation Equipment

Having any inadvertent RCIC isolation signals could prevent the RCIC system from starting up or accomplishing its objective of providing vessel inventory makeup. Since both divisions of RCIC isolation signals could impair RCIC system operation, the division signals from both divisions were accounted for in the ESEL. Isolation equipment included in the list includes Pressure Switches, Panels, Instrument Racks, Inverters, Power Supplies, Signal Converters, Electronic Trip Units, and Trip Calibration Cabinets. Isolation signals associated with the following (Table 3-3) were accounted for:

Table 3-3. Isolation Signals

Isolation Signals	
Turbine Exhaust Diaphragm High Pressure	Manual Isolation
Steam Line High Differential Pressure Or Instant Line Break	Steam Line High Differential Pressure or Instant Line Break
Steam Supply Pressure Low	Steam Supply Pressure Low
Isolation Signal Sealed In	Turbine Exhaust Diaphragm High Pressure
	Isolation Signal Seal-In

3.1.8 Pull Boxes

Pull boxes were deemed unnecessary to add to the ESELs as these components provide completely passive locations for pulling or installing cables. No breaks or connections in the cabling are included in pull boxes. Pull boxes were considered part of conduit and cabling, which are excluded in accordance with EPRI 3002000704 [2].

3.1.9 Termination Cabinets

Termination cabinets, including cabinets necessary for FLEX Phase 2 and Phase 3 connections, provide consolidated locations for permanently connecting multiple cables. The termination cabinets and the internal connections provide a completely passive function; however, the cabinets are included in the ESEL to ensure industry knowledge on panel/anchorage failure vulnerabilities is addressed.

3.1.10 Critical Instrumentation Indicators

Critical indicators and recorders are typically physically located on panels/cabinets and are included as separate components; however, seismic evaluation of the instrument indication may be included in the panel/cabinet seismic evaluation (rule-of-the-box).

3.2 Justification for Use of Equipment That Is Not The Primary Means for FLEX Implementation

All equipment necessary to fulfill the primary FLEX success path for BSEP has been accounted for in the ESEL.

The complete combined ESEL for Unit 1 and Unit 2 are presented in Attachment A. Formal ESEL development is documented in BSEP EVAL EC 91485 [19].

4.0 Ground Motion Response Spectrum (GMRS)

4.1 Plot of GMRS Submitted by BSEP

The GMRS for the BSEP site, as reported in [4] for 5% damping, is provided as Figure 4-1 and Table 4-1. The site control point elevation was taken to be the bottom of the reactor building basemat at elevation -28.33 ft.

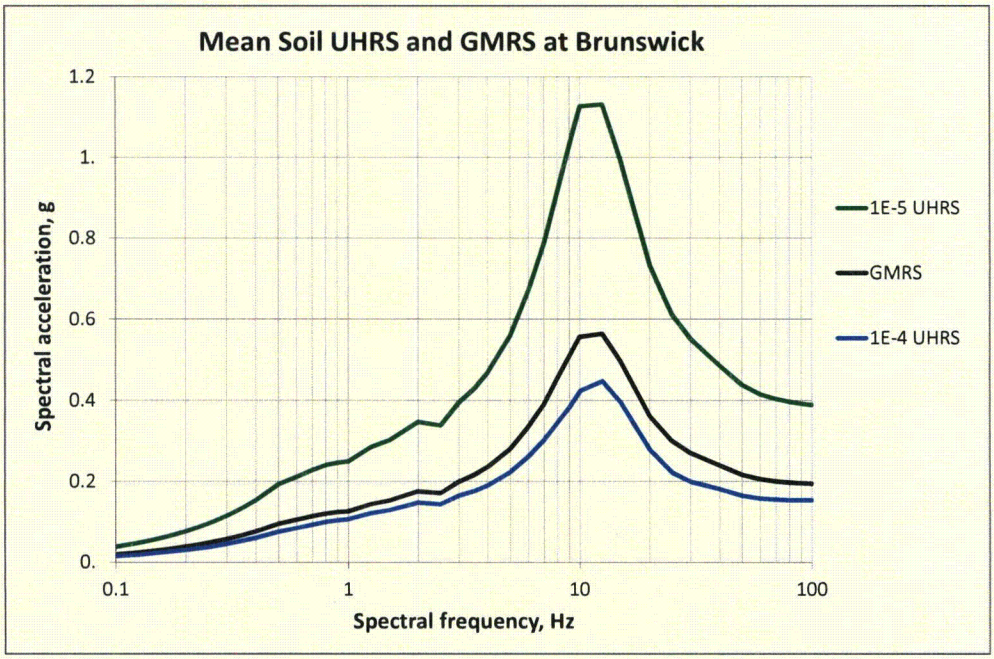

Figure 4-1. UHRS for 1E-4 and 1E-5 and GMRS at control point for BSEP (5%-damped response spectra).

Table 4-1. Tabulated BSEP GMRS

Frequency (Hz)	Acceleration (g)
0.100	0.01920
0.125	0.02390
0.150	0.02870
0.200	0.03830
0.250	0.04790
0.300	0.05750

Table 4-1. Tabulated BSEP GMRS

Frequency (Hz)	Acceleration (g)
0.350	0.06700
0.400	0.07660
0.500	0.09580
0.600	0.10500
0.700	0.11400
0.800	0.12100
0.900	0.12400
1.000	0.12600
1.250	0.14400
1.500	0.15200
2.000	0.17500
2.500	0.17100
3.000	0.19900
3.500	0.21600
4.000	0.23500
5.000	0.27900
6.000	0.33400
7.000	0.39000
8.000	0.45300
9.000	0.50700
10.000	0.55500
12.500	0.56300
15.000	0.49400
20.000	0.36200
25.000	0.29900
30.000	0.26900
35.000	0.25300
40.000	0.23800
50.000	0.21600
60.000	0.20500
70.000	0.20000
80.000	0.19700
90.000	0.19500
100.000	0.19400

4.2 Comparison to Safe Shutdown Earthquake (SSE)

The site GMRS and the BSEP 5% damped horizontal SSE (as reported in [4]) are shown in Figure 4-2. In approximately the 7 to 10 Hz range of the response spectrum the GMRS exceeds the SSE by a factor of approximately 2.19 at 10 Hz. The tabulated SSE values are provided in Table 5-1

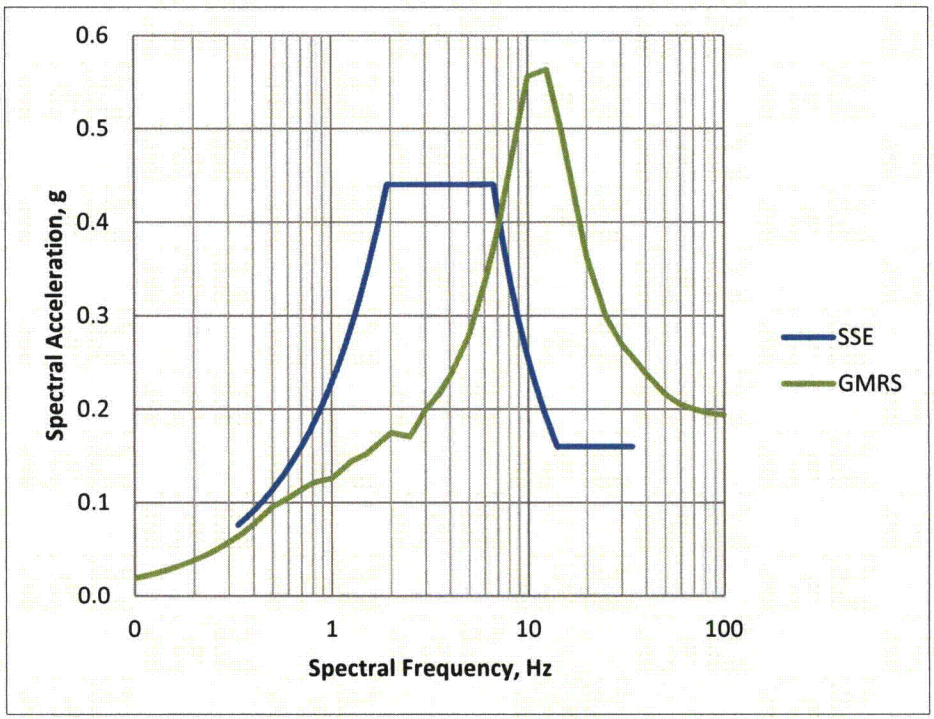

Figure 4-2. BSEP GMRS and 5% Damped Horizontal SSE Comparison

5.0 Review Level Ground Motion (RLGM)

5.1 Description of RLGM Selected

Since the greatest ratio of the GMRS to the SSE in the 1 to 10 Hz range is 2.19 at 10 Hz, the BSEP RLGM is taken at the ESEP specified maximum ratio of two times the SSE per Section 4 of EPRI 3002000704 [2]. The RGLM in terms of peak ground acceleration (PGA) at 5% spectral damping for the BSEP site is 0.32g. The tabulated RLGM is provided in Table 5-1. The RLGM and GMRS are shown graphically in Figure 5-1.

Table 5-1. Tabulated BSEP RLGM & SSE

Frequency (Hz)	RLGM Acceleration (g)	SSE Acceleration (g)
0.333	0.152	0.076
0.354	0.161	0.081
0.389	0.178	0.089
0.428	0.195	0.098
0.471	0.215	0.107
0.518	0.236	0.118
0.569	0.260	0.13
0.626	0.286	0.143
0.689	0.314	0.157
0.757	0.346	0.173
0.833	0.381	0.19
0.916	0.419	0.209
1.007	0.460	0.23
1.108	0.506	0.253
1.218	0.557	0.279
1.34	0.613	0.306
1.474	0.674	0.337
1.621	0.741	0.371
1.783	0.816	0.408
1.923	0.880	0.44
1.96	0.880	0.44
2.156	0.880	0.44
2.371	0.880	0.44
2.608	0.880	0.44
2.868	0.880	0.44
3.154	0.880	0.44
3.469	0.880	0.44
3.815	0.880	0.44
4.195	0.880	0.44
4.614	0.880	0.44
5.074	0.880	0.44
5.581	0.880	0.44
6.138	0.880	0.44
6.667	0.880	0.44
6.75	0.865	0.433
7.423	0.761	0.38

Table 5-1. Tabulated BSEP RLGM & SSE

Frequency (Hz)	RLGM Acceleration (g)	SSE Acceleration (g)
8.164	0.669	0.335
8.979	0.588	0.294
9.875	0.517	0.259
10.86	0.455	0.227
11.943	0.400	0.2
13.135	0.352	0.176
14.085	0.320	0.16
14.446	0.320	0.16
15.887	0.320	0.16
17.472	0.320	0.16
19.215	0.320	0.16
21.133	0.320	0.16
23.241	0.320	0.16
25.56	0.320	0.16
28.111	0.320	0.16
30.915	0.320	0.16
34	0.320	0.16

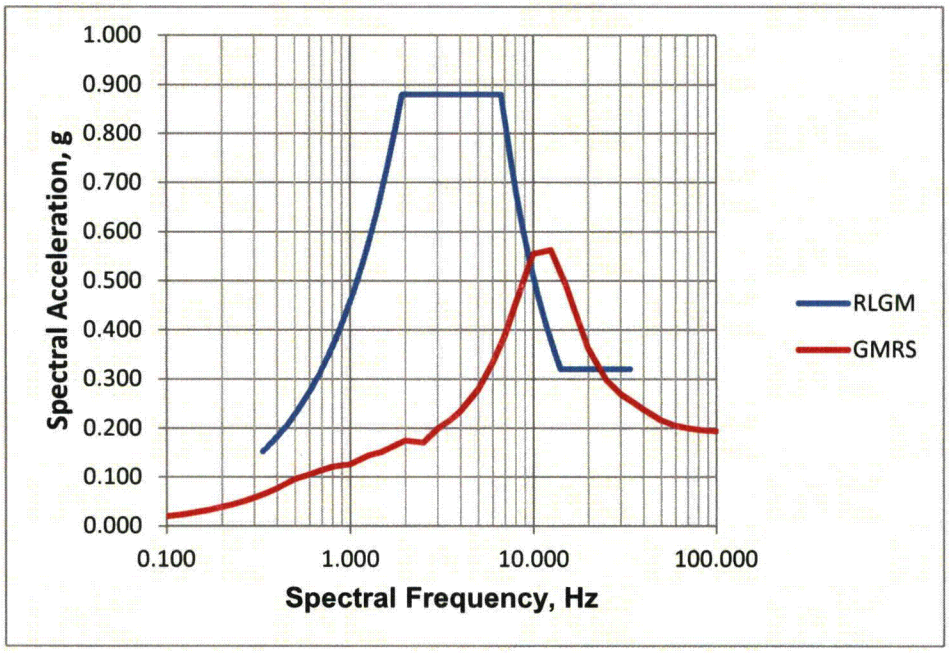

Figure 5-1. BSEP RLGM and GMRS

5.2 Method to Estimate In-Structure Response Spectra (ISRS)

The ISRS for the ESEP were developed by linearly scaling the existing BSEP ISRS by the ESEP specified maximum ratio of two times the SSE. For the Containment, the A-46 response spectra were used in place of the design basis SSE spectra. For Control Building and Diesel Generator Buildings, the original design basis SSE spectra are used. There are no ESEL components in other Seismic Class I structures.

6.0 Seismic Margin Evaluation Approach

It is necessary to demonstrate that ESEL items have sufficient seismic capacity to meet or exceed the demand characterized by the RLGM. The seismic capacity is characterized as the PGA for which there is a high confidence of a low probability of failure (HCLPF). The PGA is associated with a specific spectral shape, in this case the 5%-damped RLGM spectral shape. The HCLPF capacity must be equal to or greater than the RLGM PGA. The criteria for seismic capacity determination are given in Section 5 of EPRI 3002000704 [2].

There are two basic approaches for developing HCLPF capacities:

1. Deterministic approach using the conservative deterministic failure margin (CDFM) methodology of EPRI NP-6041-SL, A Methodology for Assessment of Nuclear Power Plant Seismic Margin (Revision 1) [7].
2. Probabilistic approach using the fragility analysis methodology of EPRI TR-103959, Methodology for Developing Seismic Fragilities [8].

6.1 Summary of Methodologies used

BSEP performed a seismic margin assessment using the RLGM demand in accordance with the methodology of EPRI NP-6041-SL [7] for the ESEP. The major steps included screening, walkdowns, and CDFM HCLPF calculations, when required. The screening process used the screening tables from Chapter 2 of EPRI NP-6041-SL [7]. The walkdowns were conducted by engineers trained to the SQUG Walkdown Screening and Seismic Evaluation Training Course and were documented on Screening Evaluation Work Sheets (SEWS) based on those contained in Appendix F of EPRI NP-6041-SL. Anchorage capacity calculations used the CDFM criteria from EPRI NP-6041-SL. Seismic demand was the RLGM equal to two times the BSEP SSE (and corresponding ISRS) anchored to 0.32 PGA.

6.2 HCLPF Screening Process

The SMA was performed using a RLGM equal to two times the SSE for the ESEP, which was anchored to 0.32g PGA. Any components whose SMA-based HCLPF capacity exceeds the RLGM can be screened out from HCLPF calculations. The screening tables in EPRI NP-6041-SL [7] are based on ground peak spectral accelerations of 0.8g and 1.2g. The RLGM for the BSEP site results in a ground peak spectral acceleration between these values. Therefore, the 0.8 – 1.2g column of Table 2.4 of EPRI NP-6041-SL [7] is relevant for applying seismic screening criteria for plant equipment listed on the ESEL. It should be noted however that the GMRS peak spectral acceleration is less than 0.6g, which would allow for screening based on the lowest level requirements from EPRI NP-6041-SL if the GMRS were used. The anchorage capacity calculations were based on SSE floor response spectra scaled to the RLGM of two times the BSEP SSE. Equipment for which the screening caveats were met and for which the anchorage capacity exceeded the RLGM seismic demand of two times the BSEP SSE can be screened out from ESEP seismic capacity determination because the HCLPF capacity exceeds the RLGM.

The combined Unit 1 and Unit 2 BSEP ESEL contains 238 items. Of these, 52 are valves, both power-operated and safety relief valves. In accordance with Table 2-4 of EPRI NP-6041-SL [7], active valves may be assigned a functional capacity of 1.2g peak spectral acceleration without any review other than recommended evaluations for motor operated valves (MOVs) on piping with a diameter of 2 inches or less, and anchorage is not a failure mode. Therefore, valves on the ESEL may be screened out from ESEP seismic capacity determination, subject to the caveat regarding MOVs on piping 2 inches or less in diameter, for which the Seismic Review Team (SRT) reviewed individually.

The non-valve components in the ESEL are generally screened based on the SMA results. If the SMA showed that the component met the EPRI NP-6041-SL screening caveats and the CDFM capacity exceeded the RLGM demand, the component can be screened out from the ESEP capacity determination. Per EPRI

3002000704 [2] and EPRI NP-6041-SL [7], equipment more than 40 ft above effective grade were evaluated considering in-structure demands and guidance in EPRI 1019200 [26].

6.3 Seismic Walkdown Approach

6.3.1 Walkdown Approach

Walkdowns were performed in accordance with the criteria provided in Section 5 of EPRI 3002000704 [2], which refers to EPRI NP-6041-SL [7] for the Seismic Margin Assessment process. Pages 2-26 through 2-30 of EPRI NP-6041-SL [7] describe the seismic walkdown criteria, including the following key criteria.

"The SRT [Seismic Review Team] should "walk by" 100% of all components which are reasonably accessible and in non-radioactive or low radioactive environments. Seismic capability assessment of components which are inaccessible, in high-radioactive environments, or possibly within contaminated containment, will have to rely more on alternate means such as photographic inspection, more reliance on seismic reanalysis, and possibly, smaller inspection teams and more hurried inspections. A 100% "walk by" does not mean complete inspection of each component, nor does it mean requiring an electrician or other technician to de-energize and open cabinets or panels for detailed inspection of all components. This walkdown is not intended to be a QA or QC review or a review of the adequacy of the component at the SSE level.

If the SRT has a reasonable basis for assuming that the group of components are similar and are similarly anchored, then it is only necessary to inspect one component out of this group. The "similarity-basis" should be developed before the walkdown during the seismic capability preparatory work (Step 3) by reference to drawings, calculations or specifications. The one component of each type which is selected should be thoroughly inspected which probably does mean de-energizing and opening cabinets or panels for this very limited sample. Generally, a spare representative component can be found so as to enable the inspection to be performed while the plant is in operation. At least for the one component of each type which is selected, anchorage should be thoroughly inspected.

The walkdown procedure should be performed in an ad hoc manner. For each class of components the SRT should look closely at the first items and compare the field configurations with the construction drawings and/or specifications. If a one-to-one correspondence is found, then subsequent items do not have to be inspected in as great a detail. Ultimately the walkdown becomes a "walk by" of the component class as the SRT becomes confident that the construction pattern is typical. This procedure for inspection should be repeated for each component class; although, during the actual walkdown the SRT may be inspecting several classes of components in

parallel. If serious exceptions to the drawings or questionable construction practices are found then the system or component class must be inspected in closer detail until the systematic deficiency is defined.

The 100% "walk by" is to look for outliers, lack of similarity, anchorage which is different from that shown on drawings or prescribed in criteria for that component, potential SI [Seismic Interaction[1]] problems, situations that are at odds with the team members' past experience, and any other areas of serious seismic concern. If any such concerns surface, then the limited sample size of one component of each type for thorough inspection will have to be increased. The increase in sample size that should be inspected will depend upon the number of outliers and different anchorages, etc., which are observed. It is up to the SRT to ultimately select the sample size since they are the ones who are responsible for the seismic adequacy of all elements which they screen from the margin review. Appendix D gives guidance for sampling selection."

For BSEP, the decision to perform a walk by versus detailed walkdown was based on a pre-screening of the available documentation for each of the components listed in the ESEL. ESEL items were pre-screened out of a detailed walkdown based on previous walkdown data and existing calculations showing a seismic capacity greater than the RGLM. Items that were pre-screened out of a detailed walkdown were scheduled for a walk by. For items not pre-screened for a walk by, a detailed walkdown was performed. Any additional items that were added to the ESEL during the ongoing ESEP evaluation phase were identified for a detailed walkdown.

6.3.2 Application of Previous Walkdown Information

Previous seismic walkdowns (including results and findings) were used to support the ESEP seismic evaluations. Some of the components on the ESEL were included in the NTTF 2.3 seismic walkdowns [17 & 18]. Those walkdowns were well documented and recent enough that they did not need to be repeated for the ESEP. However for BSEP, if the ESEL item was readily accessible, a walk by or detailed walkdown was performed regardless of whether a walkdown was performed for the NTTF 2.3 seismic evaluations.

Several ESEL items were previously walked down during the BSEP Seismic IPEEE program [9] and for Unresolved Safety Issue (USI) A-46 [25]. Those walkdown results were reviewed and the following steps were taken to confirm that the previous walkdown conclusions remained valid.

- A walk by (if accessible) was performed to confirm that the equipment material condition and configuration is consistent with the walkdown

[1] EPRI 3002000704 [2] page 5-4 limits the ESEP seismic interaction reviews to "nearby block walls" and "piping attached to tanks" which are reviewed "to address the possibility of failures due to differential displacements."

conclusions and that no new significant interactions related to block walls or piping attached to tanks exist[1].

- If the ESEL item was screened out based on the previous walkdown, that screening evaluation was reviewed and reconfirmed for the ESEP.

6.3.3 Significant Walkdown Findings

Consistent with the guidance from NP-6041-SL [7], no significant outliers or anchorage concerns were identified during the BSEP seismic walkdowns. The following findings were noted during the walkdowns.

- Several block walls were identified in the proximity of ESEL equipment. These block walls were assessed for their structural adequacy based on existing documentation to withstand the seismic loads resulting from the RLGM. If necessary a new HCLPF calculation was performed. For any cases where the block wall represented the HCLPF failure mode for an ESEL item, it is noted in the tabulated HCLPF values described in Section 6.6. HCLPF capacities for block walls were determined in accordance with EPRI NP-6041-SL, Appendix R [7]. All block walls requiring a HCLPF calculation were shown to have a HCLPF capacity greater than the RLGM. No modifications for these walls are required.
- Several ESEL items required HCLPF capacity calculations for anchorage. All of the ESEL items that required a HCLPF capacity calculation for anchorage were shown to have a HCLPF capacity greater than the RLGM. No modifications for these items are required.

6.4 HCLPF Calculation Process

ESEL items at BSEP were evaluated using the criteria in EPRI NP-6041-SL [7]. Those evaluations included the following steps:

- Performing detailed seismic capability walkdowns for equipment not included in previous seismic walkdowns (USI A-46, IPEEE, and NTTF 2.3) to evaluate the equipment installed plant conditions
- Performing screening evaluations using the screening tables in EPRI NP-6041-SL as described in Section 6.2 and
- Performing HCLPF calculations considering various failure modes that include both structural failure modes (e.g. anchorage, load path etc.) and functional failure modes. Typically functional failure modes were screened using Table 2-4 of EPRI NP-6041-SL [7].

All HCLPF calculations were performed using the CDFM methodology of EPRI NP-6041-SL [7] and are documented in Reference [10]. Each calculation evaluates the demand and capacity of the equipment's (or nearby masonry walls) critical failure modes and derives a HCLPF capacity from the results of the evaluation.

6.5 Functional Evaluations of Relays

There are no relays on the BSEP ESEL, refer to Section 3.1.5 of this document.

6.6 Tabulated ESEL HCLPF Values (Including Key Failure Modes)

Tabulated ESEL HCLPF values are provided in Attachment B for BSEP Unit 1 and Unit 2. The following notes apply to the information in the tables.

- For items screened out using EPRI NP-6041-SL [7] screening tables, the screening level can be provided as >RLGM and the failure mode can be listed as "Screened", (unless the controlling HCLPF value is governed by anchorage).
- For items where anchorage controls the HCLPF value, the HCLPF value is listed in the table and the failure mode is noted as "anchorage."
- For items where nearby masonry walls control the HCLPF value, the HCLPF value of the wall is listed in the table and the failure mode is noted as "masonry wall".

7.0 Inaccessible Items

7.1 Identification of ESEL items inaccessible for walkdowns

7.1.1 SRVs and Accumulators

All of the Safety Relief Valves (SRVs) and Accumulators in the BSEP Drywell were inaccessible during the ESEP walkdowns. These items were inaccessible due to the fact that the SRVs and Accumulators were located in a high radiation area, even during an outage. However, two of the SRVs for Unit 2 (2-B21-F031C and 2-B21-F013G) and one of the SRVs for Unit 1 (1-B21-F013J) were walked down during the NTTF 2.3 Seismic Walkdowns [17,18]. The SRT reviewed the data from the NTTF 2.3 Seismic Walkdowns and IPEEE/A-46 walkdowns in the 1990s. The majority of the SRVs and Accumulators were screened from further review by the IPEEE SRT. The few issues that were noted by the IPEEE/A-46 SRT were resolved [25].

In addition, EPRI NP-6041-SL [7] Table 2.4 recommends evaluations for equipment mounted at elevations greater than 40 ft above the effective grade if the horizontal floor spectrum exceeds 2g. The PSA for the RLGM ISRS at elevation 55 ft and below for the BSEP Drywell are less than 2g. Furthermore, EPRI NP-6041-SL [7] Table 2-4 recommends evaluations for motor operated valves on piping lines less than 2 inches in diameter. The SRVs in the BSEP Drywell consist of a 6" inlet and a 10" outlet.

Lastly, the SRVs are subject to regular maintenance and testing as documented in BSEP procedures.

Based on the above discussion, the ESEP SRT judged the SRVs and Accumulators to be adequate for the RLGM and no further walkdowns for these items have been planned.

7.1.2 Motor Control Centers (MCCs) and Distribution Panels

A number of MCCs (1-1CB, 1-XDB, 2-2CB, and 2-XDB) and Distribution Panels (1-1B-250VDC, 2-2B-250VDC, 1-3B, and 2-4B) were externally inspected but were not opened due to being in an energized state. Each of these items were included in the IPEEE/A-46 walkdowns. The ESEP SRT reviewed the IPEEE/A-46 walkdown data, other documentation, and referenced calculations. The concerns and resolutions for problems identified by the IPEEE/A-46 SRT were reviewed. The ESEP SRT made determinations relative to the seismic capacity versus RLGM demand based on the past walkdown documentation and calculations. A HCLPF calculation was performed for MCCs 1-XDB and 2-XDB [23]. Based on the existing documentation and the HCLPF calculations, the SRT judged the MCCs and Distribution Panels to have sufficient capacity for the RLGM. No further walkdowns for these items are planned.

7.1.3 Torus Temperature Elements

One temperature element in the Reactor Building for each Unit (1-CAC-TE-778-6 and 2-CAC-TE-778-6) was unavailable at the time the walkdowns were completed. EPRI NP-6041-SL states that items that are inaccessible, in high radioactive environments or possibly within contaminated areas, will have to rely on alternate means such as photographic inspection, more reliance on seismic reanalysis, and possibly smaller inspection teams and more hurried inspections. The SRT judged the temperature elements to be seismically adequate with rugged supports based on review of the items installation drawings and specifications. No further walkdowns for these items are planned.

7.1.4 Switchgear Transformers

The panels for 1-E6 and 2-E8 were not removed since the items were energized. The transformers for these items were recently replaced. The SRT judged the switchgear equipment adequate for the RLGM based on an evaluation of previous walkdowns, inspections, engineering change packages, and calculations. The calculations reviewed were for similar cabinets at the DGB 50' elevation since 1-E6 and 2-E8 could not be opened. No further walkdowns are planned for these items.

7.2 Planned Walkdown / Evaluation Schedule / Close Out

No further walkdowns for the inaccessible items in Section 7.1 of this report are planned based on the justifications provided.

8.0 ESEP Conclusions and Results

8.1 Supporting Information

BSEP has performed the ESEP as an interim action in response to the NRC's 50.54(f) letter [1]. The ESEP was performed using the methodologies in the NRC endorsed guidance in EPRI 3002000704 [2].

The ESEP provides an important demonstration of seismic margin and expedites plant safety enhancements through evaluations of plant equipment that can be relied upon to protect the reactor core following beyond design basis seismic events.

The ESEP is part of the overall BSEP response to the NRC's 50.54(f) letter [1]. On March 12, 2014, NEI submitted to the NRC results of a study [12] of seismic core damage risk estimates based on updated seismic hazard information as it applies to operating nuclear reactors in the Central and Eastern United States (CEUS). The study concluded that "site-specific seismic hazards show that there [...] has not been an overall increase in seismic risk for the fleet of U.S. plants" based on the re-evaluated seismic hazards. As such, the "current seismic design of operating reactors continues to provide a safety margin to withstand potential earthquakes exceeding the seismic design basis."

The NRC's May 9, 2014 NTTF 2.1 Screening and Prioritization letter [14] concluded that the "fleetwide seismic risk estimates are consistent with the approach and results used in the GI-199 safety/risk assessment." The letter also stated that "As a result, the staff has confirmed that the conclusions reached in GI-199 safety/risk assessment remain valid and that the plants can continue to operate while additional evaluations are conducted."

An assessment of the change in seismic risk for BSEP was included in the fleet risk evaluation submitted in the March 12, 2014 NEI letter [12] therefore, the conclusions in the NRC's May 9 letter [14] also apply to BSEP.

In addition, the March 12, 2014 NEI letter [12] provided an attached "Perspectives on the Seismic Capacity of Operating Plants," which (1) assessed a number of qualitative reasons why the design of SSCs inherently contain margin beyond their design level, (2) discussed industrial seismic experience databases of performance of industry facility components similar to nuclear SSCs, and (3) discussed earthquake experience at operating plants.

The fleet of currently operating nuclear power plants was designed using conservative practices, such that the plants have significant margin to withstand large ground motions safely. This has been borne out for those plants that have actually experienced significant earthquakes. The seismic design process has inherent (and intentional) conservatisms that result in significant seismic margins within structures, systems and components (SSCs). These conservatisms are reflected in several key aspects of the seismic design process, including:

- Safety factors applied in design calculations
- Damping values used in dynamic analysis of SSCs
- Bounding synthetic time histories for in-structure response spectra calculations
- Broadening criteria for in-structure response spectra
- Response spectra enveloping criteria typically used in SSC analysis and testing applications
- Response spectra based frequency domain analysis rather than explicit time history based time domain analysis
- Bounding requirements in codes and standards
- Use of minimum strength requirements of structural components (concrete and steel)
- Bounding testing requirements, and
- Ductile behavior of the primary materials (that is, not crediting the additional capacity of materials such as steel and reinforced concrete beyond the essentially elastic range, etc.).

These design practices combine to result in margins such that the SSCs will continue to fulfill their functions at ground motions well above the SSE. The equipment items on the BSEP ESEL have sufficient design margin to withstand a RLGM of two times the SSE based on the results of the ESEP evaluations.

In addition, per a letter from the NRC [27], BSEP screens out of performing a Seismic Risk Evaluation.

8.2 Identification of Planned Modifications

Based on the collective experience of the SRT in addition to existing and newly produced HCLPF calculations, all ESEL equipment capacities are determined to meet or exceed the RLGM demands. Therefore, no modifications are required for any of the items listed on the BSEP ESEL.

8.3 Modification Implementation Schedule

As noted in Section 8.2, there are no modifications for BSEP as a result of the ESEP.

8.4 Summary of Planned Actions

There are no planned actions for the BSEP site as a result of the ESEP.

9.0 References

1) NRC (E Leeds and M Johnson) Letter to All Power Reactor Licensees et al., "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3 and 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident," March 12, 2012.

2) Seismic Evaluation Guidance: Augmented Approach for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1 – Seismic. EPRI, Palo Alto, CA: May 2013. 3002000704.

3) BSEP Overall Integrated Plan (OIP) in Response to the March 12, 2012, Commission Order EA-12-049.

4) Seismic Hazard and Screening Report for Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2 (Serial: BSEP 14-0028), dated March 31, 2014.

5) Not used.

6) Not used.

7) A Methodology for Assessment of Nuclear Power Plant Seismic Margin, Rev. 1, August 1991, Electric Power Research Institute, Palo Alto, CA. EPRI NP 6041-SL.

8) Methodology for Developing Seismic Fragilities, EPRI, Palo Alto, CA. June 1994, TR-103959.

9) Carolina Power and Light (CP&L), "Brunswick Nuclear Plant Individual Plant Examination for External Events Submittal," June 1995.

10) BSEP EVAL EC 91884, Fukushima NTTF 2.1 Reevaluations: Brunswick Expedited Seismic Evaluations (ESEP), Revision 0.

11) Not used.

12) Nuclear Energy Institute (NEI), A. Pietrangelo, Letter to D. Skeen of the USNRC, "Seismic Core Damage Risk Estimates Using the Updated Seismic Hazards for the Operating Nuclear Plants in the Central and Eastern United States", March 12, 2014.

13) Not used.

14) NRC (E Leeds) Letter to All Power Reactor Licensees et al., "Screening and Prioritization Results Regarding Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Seismic Hazard Re-Evaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident," May 9, 2014.

15) Seismic Evaluation Guidance: Screening, Prioritization and Implementation Details (SPID) for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic. EPRI, Palo Alto, CA: February 2013. 1025287.

16) Not used.

17) BSEP EVAL EC 87912, Fukushima 2.3 Seismic Inspection Documentation – BNP Unit 2, Revision 3.

18) BSEP EVAL EC 87913, Fukushima 2.3 Seismic Inspection Documentation – BNP Unit 1, Revision 4.

19) BSEP EVAL EC 91485, Brunswick Expedited Seismic Equipment List, Revision 2.

20) Not used.

21) Not used.

22) Not used.

23) Not used.

24) Not used.

25) Carolina Power and Light (CP&L), Transmittal Letter No. BSEP 98-0145 to the USNRC from J.S. Keenan, "Brunswick Steam Electric Plant, Unit Nos. 1 and 2 Docket Nos. 50-325 and 50-324/License Nos. DPR-71 and DPR-62 Generic Letter 87-02, 'Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors, USI A-46'," September 11, 1998.

26) Seismic Fragility Applications Guide Update. EPRI, Palo Alto, CA: December 2009. 1019200.

27) NRC (D. H. Dorman) Letter to Brunswick Steam Electric Plant (G. Hamrick), "Brunswick Steam Electric Plant, Units 1 and 2 – Screening and Prioritization Results of Information Provided Pursuant to Title 10 of the *Code of Federal Regulations* Part 50, Section 50.54(f), Seismic Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (TAC NOS. MF3824 and MF3825)," September 17, 2014.

Attachment A

BSEP Unit 1 and Unit 2 Combined ESEL

ESEL Item #	Equipment ID	Description	Equipment Normal State	Equipment Desired State	Notes / Comments
0001	1-E6	480V Unit Substation E6	Available	Available	
0002	1-1CB	MCC 1CB Div II	Available	Available	
0003	1-1B-250VDC	125/250V DC Distribution Panel 1B	Available	Available	
0004	1-3B	125VDC Distribution Panel 3B	Available	Available	
0005	1-1XDB	250V DC MCC 1XDB	Available	Available	
0006	1-1B-1-125VDC-CHRGR	125V DC Battery Charger 1B-1	Available	Available	
0007	1-1B-2-125VDC-CHRGR	125V DC Battery Charger 1B-2	Available	Available	
0008	1-1B-1-125VDC-BAT	250V DC Battery Rack 1B-1	Available	Available	
0009	1-1B-2-125VDC-BAT	250V DC Battery Rack 1B-2	Available	Available	
0010	2-E8	480V Unit Substation E8	Available	Available	
0011	2-2CB	480V MCC 2CB	Available	Available	
0012	2-2B-250VDC	125/250V DC Distribution Panel 2B	Available	Available	
0013	2-4B	125 VDC Distribution Panel 4B	Available	Available	
0014	2-2XDB	250V DC MCC 2XDB	Available	Available	
0015	2-2B-1-125VDC-CHRGR	125V DC Battery Charger 2B-1	Available	Available	
0016	2-2B-2-125VDC-CHRGR	125V DC Battery Charger 2B-2	Available	Available	
0017	2-2B-1-125VDC-BAT	250V DC Battery Rack 2B-1	Available	Available	
0018	2-2B-2-125VDC-BAT	250V DC Battery Rack 2B-2	Available	Available	
0019	1-E51-F010	RCIC CONDENSATE STORAGE TANK SUCTION VALVE	OPEN	CLOSED	
0020	1-H21-P017	RCIC INSTRUMENT RACK	N/A	N/A	Contains 1-E51-FT-N003, 1-E51-PSH-N012B, 1-E51-PSH-N012D
0021	1-E51-F031	RCIC SUPPRESSION POOL SUCTION VALVE	CLOSED	OPEN	
0022	1-E51-F029	RCIC SUPPRESSION POOL SUCTION VALVE TO THE RCIC PUMP	CLOSED	OPEN	
0023	1-E51-F013	RCIC INJECTION VALVE	CLOSED	OPEN	
0024	1-E51-F046	RCIC COOLING WATER SUPPLY VALVE	CLOSED	OPEN	
0025	1-E51-C001	RCIC PUMP	OFF	ON	
0026	1-E51-C002-BAROM-COND	RCIC BAROMETRIC CONDENSER	N/A	N/A	
0027	1-E51-C002-VAC-TK	RCIC BAROMETRIC CONDENSER VACUUM TANK	N/A	N/A	
0028	1-E51-C002-VAC-PMP	RCIC TURBINE VACUUM PUMP	N/A	N/A	
0029	1-E51-C002-COND-PMP	CONDENSATE PUMP	OFF	ON	
0030	1-E51-F019	RCIC MIN FLOW BYPASS TO SUPPRESSION POOL VALVE	CLOSED	OPEN	
0031	1-E51-C002-LUBE-OIL-CLR	RCIC TURBINE LUBE OIL COOLER	N/A	N/A	
0032	1-E51-F045	RCIC TURBINE STEAM SUPPLY VALVE	CLOSED	OPEN	
0033	1-E51-V8	RCIC TURBINE TRIP AND THROTTLE VALVE	OPEN	OPEN	
0034	1-E51-V9	RCIC TURBINE GOVENOR VALVE	OPEN	VARIES (THROTTLED)	
0035	1-E51-C002	RCIC PUMP TURBINE DRIVE	OFF	ON	
0036	1-E51-STM-EXH-DRN-POT	RCIC EXHAUST DRAIN POT	N/A	N/A	
0037	1-E51-D004	RCIC EXHUAST DRAIN POT DRAIN LINE TRAP	N/A	N/A	
0038	1-H21-P038	RCIC LEAK DET SYS B INSTRUMENT RACK	N/A	N/A	Contains 1-E51-PDT-N018, 1-E51-PS-N019B, 1-E51-PS-N019D
0039	1-H21-P035	RCIC LEAK DETECTION INSTRUMENT RACK	N/A	N/A	Contains 1-E51-PDT-N017, 1-E51-PS-N019A, and 1-E51-PS-N019C
0040	1-E51-STM-SUPP-DRN-POT	RCIC STM SUPPLY DRAIN POT	N/A	N/A	

ESEL Item #	Equipment ID	Description	Equipment Normal State	Equipment Desired State	Notes / Comments
0041	1-E51-F025	RCIC TURB SUP STM LN DRAIN POT DRN LN... INBD SHUTOFF VALVE	OPEN	OPEN	
0042	2-E51-F010	RCIC CONDENSATE STORAGE TANK SUCTION VALVE	OPEN	CLOSED	
0043	2-H21-P017	RCIC INSTRUMENT RACK	N/A	N/A	Contains 2-E51-FT-N003, 2-E51-PSH-N012B, and 2-E51-PSH-N012D
0044	2-E51-F031	RCIC SUPPRESSION POOL SUCTION VALVE	CLOSED	OPEN	
0045	2-E51-F029	RCIC SUPPRESSION POOL SUCTION VALVE TO THE RCIC PUMP	CLOSED	OPEN	
0046	2-E51-C001	RCIC PUMP	OFF	ON	
0047	2-E51-F013	RCIC INJECTION VALVE	CLOSED	OPEN	
0048	2-E51-F046	RCIC COOLING WATER SUPPLY VALVE	CLOSED	OPEN	
0049	2-E51-C002-BAROM-COND	RCIC BAROMETRIC CONDENSER	N/A	N/A	
0050	2-E51-C002-VAC-TK	RCIC BAROMETRIC CONDENSER VACUUM TANK	N/A	N/A	
0051	2-E51-C002-COND-PMP	RCIC CONDENSATE PUMP	N/A	N/A	
0052	2-E51-F019	RCIC MIN FLOW BYPASS TO SUPPRESSION POOL VALVE	CLOSED	OPEN	
0053	2-E51-C002-VAC-PMP	VACUUM PUMP	N/A	N/A	
0054	2-E51-C002-LUBE-OIL-CLR	RCIC TURBINE LUBE OIL COOLER	N/A	N/A	
0055	2-E51-F045	RCIC TURBINE STEAM SUPPLY VALVE	CLOSED	OPEN	
0056	2-E51-V8	RCIC TURBINE TRIP AND THROTTLE VALVE	OPEN	OPEN	
0057	2-E51-V9	RCIC TURBINE GOVERNOR VALVE	OPEN	VARIES (THROTTLED)	
0058	2-E51-C002	RCIC PUMP TURBINE DRIVE	OFF	ON	
0059	2-E51-STM-EXH-DRN-POT	RCIC EXHAUST DRAIN POT	N/A	N/A	
0060	2-E51-D004	RCIC EXHUAST DRAIN POT DRAIN LINE TRAP	N/A	N/A	
0061	2-H21-P038	RCIC LEAK DETECTION INSTRUMENT RACK B	N/A	N/A	Contains 2-E51-PS-N019B, 2-E51-PS-N019D, and 2-E51-PDT-N018
0062	2-H21-P035	RCIC LEAK DETECTION INSTRUMENT RACK	N/A	N/A	Contains 2-E51-PDT-N017, 2-E51-PS-N019A, and 2-E51-PS-N019C
0063	2-E51-STM-SUPP-DRN-POT	RCIC STM SUPPLY DRAIN POT	N/A	N/A	
0064	2-E51-F025	RCIC SUPP DRAIN POT INBD ISOLATION VLV ESR 98-00330	OPEN	OPEN	
0065	1-B21-F013A	PRIMARY STEAM LINE 'A' SAFETY RELIEF VALVE	CLOSED	VARIES	
0066	1-B21-F013B	PRIMARY STEAM LINE 'A' SAFETY RELIEF VALVE	CLOSED	VARIES	
0067	1-B21-F013C	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	
0068	1-B21-F013D	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	
0069	1-B21-F013E	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	
0070	1-B21-F013F	PRIMARY STEAM LINE 'C' SAFETY RELIEF VALVE	CLOSED	VARIES	
0071	1-B21-F013G	PRIMARY STEAM LINE 'C' SAFETY RELIEF VALVE	CLOSED	VARIES	
0072	1-B21-F013H	PRIMARY STEAM LINE 'D' SAFETY RELIEF VALVE	CLOSED	VARIES	
0073	1-B21-F013J	PRIMARY STEAM LINE 'D' SAFETY RELIEF VALVE	CLOSED	VARIES	
0074	1-B21-F013K	PRIMARY STEAM LINE 'C' SAFETY RELIEF VALVE	CLOSED	VARIES	
0075	1-B21-F013L	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	
0076	1-B21-A003A	AIR ACCUMULATOR FOR B21-F013A	N/A	N/A	
0077	1-B21-A003B	AIR ACCUMULATOR FOR B21-F013B	N/A	N/A	
0078	1-B21-A003C	AIR ACCUMULATOR FOR B21-F013C	N/A	N/A	
0079	1-B21-A003D	AIR ACCUMULATOR FOR B21-F013D	N/A	N/A	
0080	1-B21-A003E	AIR ACCUMULATOR FOR B21-F013E	N/A	N/A	

ESEL Item #	Equipment ID	Description	Equipment Normal State	Equipment Desired State	Notes / Comments
0081	1-B21-A003F	AIR ACCUMULATOR FOR B21-F013F	N/A	N/A	
0082	1-B21-A003G	AIR ACCUMULATOR FOR B21-F013G	N/A	N/A	
0083	1-B21-A003H	AIR ACCUMULATOR FOR B21-F013H	N/A	N/A	
0084	1-B21-A003J	AIR ACCUMULATOR FOR B21-F013J	N/A	N/A	
0085	1-B21-A003K	AIR ACCUMULATOR FOR B21-F013K	N/A	N/A	
0086	1-B21-A003L	AIR ACCUMULATOR FOR B21-F013L	N/A	N/A	
0087	2-B21-F013A	PRIMARY STEAM LINE 'A' SAFETY RELIEF VALVE	CLOSED	VARIES	
0088	2-B21-F013B	PRIMARY STEAM LINE 'A' SAFETY RELIEF VALVE	CLOSED	VARIES	
0089	2-B21-F013C	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	
0090	2-B21-F013D	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	
0091	2-B21-F013E	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	
0092	2-B21-F013F	PRIMARY STEAM LINE 'C' SAFETY RELIEF VALVE	CLOSED	VARIES	
0093	2-B21-F013G	PRIMARY STEAM LINE 'C' SAFETY RELIEF VALVE	CLOSED	VARIES	
0094	2-B21-F013H	PRIMARY STEAM LINE 'D' SAFETY RELIEF VALVE	CLOSED	VARIES	
0095	2-B21-F013J	PRIMARY STEAM LINE'D' SAFETY RELIEF VALVE	CLOSED	VARIES	
0096	2-B21-F013K	PRIMARY STEAM LINE 'C' SAFETY RELIEF VALVE	CLOSED	VARIES	
0097	2-B21-F013L	PRIMARY STEAM LINE 'A' SAFETY RELIEF VALVE	CLOSED	VARIES	
0098	2-B21-A003A	AIR ACCUMULATOR FOR B21-F013A	N/A	N/A	
0099	2-B21-A003B	AIR ACCUMULATOR FOR B21-F013B	N/A	N/A	
0100	2-B21-A003C	AIR ACCUMULATOR FOR B21-F013C	N/A	N/A	
0101	2-B21-A003D	AIR ACCUMULATOR FOR B21-F013D	N/A	N/A	
0102	2-B21-A003E	AIR ACCUMULATOR FOR B21-F013E	N/A	N/A	
0103	2-B21-A003F	AIR ACCUMULATOR FOR B21-F013F	N/A	N/A	
0104	2-B21-A003G	AIR ACCUMULATOR FOR B21-F013G	N/A	N/A	
0105	2-B21-A003H	AIR ACCUMULATOR FOR B21-F013H	N/A	N/A	
0106	2-B21-A003J	AIR ACCUMULATOR FOR B21-F013J	N/A	N/A	
0107	2-B21-A003K	AIR ACCUMULATOR FOR B21-F013K	N/A	N/A	
0108	2-B21-A003L	AIR ACCUMULATOR FOR B21-F013L	N/A	N/A	
0109	1-RNA-SV-5481	Division II RNA N2 BackUp Supply Solenoid Valve	Closed	Open	
0110	1-RNA-DIV-II-N2-TANKS	Division II N2 BackUp Bottle Rack	N/A	N/A	
0111	1-RNA-A004E	Air Accumulator for Valve CAC-V7	N/A	N/A	
0112	1-CAC-SV-V7	Suppression pool purge Exhuast Valve Pilot Solenoid	Closed	Varies	
0113	1-CAC-V7	Inboard Suppression Pool Purge Exhaust Valve	Closed	Varies	
0114	1-CAC-SV-V216	Hardened Wetwell Vent Line Isolation Valve Solenoid Valve	Closed	Varies	
0115	1-CAC-V216	Hardened Wetwell Vent Line Isolation Valve	Closed	Varies	
0116	2-RNA-SV-5481	Division II RNA N2 BackUp Supply Solenoid Valve	Closed	Open	
0117	2-RNA-DIV-II-N2-TANKS	Division II N2 BackUp Bottle Rack	N/A	N/A	
0118	2-RNA-A004E	Air Accumulator for Valve CAC-V7	N/A	N/A	
0119	2-CAC-SV-V7	Suppression pool purge Exhuast Valve Pilot Solenoid	Closed	Varies	
0120	2-CAC-V7	Inboard Suppression Pool Purge Exhaust Valve	Closed	Varies	
0121	2-CAC-SV-V216	Hardened Wetwell Vent Line Isolation Valve Solenoid Valve	Closed	Varies	
0122	2-CAC-V216	Hardened Wetwell Vent Outboard Line Isolation Valve	Closed	Varies	
0123	1-E51-FIC-R600	RCIC DISCH FLO IND CONTROLLER... WITH E51-FI-R600-001 FOR FLOW IN	Available	Available	Contained in 1-H12-P601

ESEL Item #	Equipment ID	Description	Equipment Normal State	Equipment Desired State	Notes / Comments
0124	1-IR-RB-4	REMOTE SHUTDOWN PANEL	Available	Available	Contains 1-B21-ES-5508, 1-B21-ES-4051, 1-CAC-TR-778, 1-B21-LI-R604-BX, 1-CAC-PI-3341, and 1-CAC-LI-3342
0125	1-E51-FT-N003	RCIC DISCHARGE FLOW TRANSMITTER ...PM 84-154	Available	Available	Contained in 1-H21-P017
0126	1-H12-P621	RHR A RELAY VERTICAL BOARD .	Available	Available	
0127	1-E51-ES-K603	POWER SUPPLY FOR E51-FIC-R600. .	Available	Available	Contained in 1-H12-P601
0128	1-E51-ES-K603-1	INPUT FILTER FOR INVERTER E51-ES-... ...K603	Available	Available	Contained in 1-H12-P601
0129	1-H12-P601	ENGINEERED SAFEGUARDS VERTICAL BOARD .	Available	Available	Contains 1-E51-ES-K603, 1-E51-ES-K603-1, 1-E51-FIC-R600, and 1-B21-PI-R605B.
0130	1-E51-C002-ES-K604	DC-DC PWR SUPPLY FOR EGM CTRL... BOX E51-C002-EGM	Available	Available	
0131	1-1B-125VDC	DIESEL GEN BLDG 125VDC DIST PNL 1B. .	Available	Available	
0132	2-E51-FIC-R600	RCIC DISCH FLO IND CONTROLLER... WITH E51-FI-R600-001 FOR FLOW IN	Available	Available	Contained in 2-H12-P601
0133	2-E51-C002-ES-K604	DC-DC PWR SUPPLY FOR EGM CTRL... BOX E51-C002-EGM	Available	Available	
0134	2-IR-RB-4	REMOTE SHUTDOWN PANEL	Available	Available	Contains 2-B21-ES-4051, 2-B21-ES-5508, 2-CAC-TR-778, 2-B21-LI-R604-BX, 2-CAC-PI-3341, and 2-CAC-LI-3342
0135	2-E51-FT-N003	RCIC DISCHARGE FLOW TRANSMITTER ...PM 84-154	Available	Available	Contained in 2-H21-P017
0136	2-H12-P621	RCIC VERTICAL BOARD .	Available	Available	
0137	2-E51-ES-K603	POWER SUPPLY FOR E51-FIC-R600. .	Available	Available	Contained in 2-H12-P601
0138	2-E51-ES-K603-1	PWR SUPPLY FILTER FOR E51-ES-K603 .	Available	Available	Contained in 2-H12-P601
0139	2-H12-P601	ENGINEERED SAFEGUARDS VERTICAL BOARD .	Available	Available	Contains 2-E51-ES-K603, 2-E51-ES-K603-1, 2-E51-FIC-R600, 2-B21-PI-R605B
0140	2-2B-125VDC	DIESEL GEN BLDG 125VDC DIST PANEL .	Available	Available	
0141	1-B21-NVT-1-A	B21-PS-1A DC Inverter	Available	Available	Contained in 1-XU-63
0142	1-B21-PS-1-A	ECCS DIV 1 Trip Calibr Cab Pwr Supply	Available	Available	Contained in 1-XU-63
0143	1-XU-63	Trip Calibration Cabinet-ECCS Division 1	Available	Available	Contains 1-B21-PS-1-A, 1-B21-LTM-N031A-1, 1-B21-LTM-N031C-1, 1-E51-PDTM-N017-1, 1-E51-PDTS-N017-2, and 1-B21-NVT-1-A
0144	1-E51-PDTM-N017-1	E51-PDT-N017 MASTER TRIP UNIT. .	Available	Available	Contained in 1-XU-63
0145	1-E51-PDT-N017	RCIC STEAM LINE HI FLOW DIFF SWITCH .	Available	Available	Contained in 1-H21-P035
0146	1-E51-PDTS-N017-2	E51-PDT-N017 SLAVE TRIP UNIT. .	Available	Available	Contained in 1-XU-63
0147	1-H12-P617	RHR A RELAY VERTICAL BOARD .	Available	Available	
0148	1-E51-PS-N019A	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	Contained in 1-H21-P035
0149	1-E51-PS-N019C	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	Contained in 1-H21-P035
0150	1-E51-PSH-N012A	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	Contained in 1-H21-P037
0151	1-E51-PSH-N012C	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	Contained in 1-H21-P037
0152	1-H21-P037	RCIC LEAK DET SYS A INSTRUMENT RACK .	Available	Available	Contains 1-E51-PSH-N012A and 1-E51-PSH-N012C
0153	1-B21-LTM-N031A-1	B-21-LT-N031A Master Trip Unit	Available	Available	Contained in 1-XU-63
0154	1-B21-LTM-N031B-1	B-21-LT-N031B Master Trip Unit	Available	Available	Contained in 1-XU-64
0155	1-B21-LTM-N031C-1	B-21-LT-N031C Master Trip Unit	Available	Available	Contained in 1-XU-63
0156	1-B21-LTM-N031D-1	B-21-LT-N031D Master Trip Unit	Available	Available	Contained in 1-XU-64
0157	1-B21-LT-N031A	REACTOR VESSEL LOW WATER LEVEL XMTR .	Available	Available	Located on rack 1-H12-P004

ESEL Item #	Equipment ID	Description	Equipment Normal State	Equipment Desired State	Notes / Comments
0158	1-B21-LT-N031B	REACTOR VESSEL LOW WATER LEVEL XMTR .	Available	Available	Contained in 1-H21-P005
0159	1-B21-LT-N031C	REACTOR VESSEL LOW WATER LEVEL XMTR .	Available	Available	Located on rack 1-H12-P004
0160	1-B21-LT-N031D	REACTOR VESSEL LOW WATER LEVEL XMTR .	Available	Available	Contained in 1-H21-P005
0161	1-B21-NVT-1-B	B21-PS-1B DC Inverter	Available	Available	Contained in 1-XU-64
0162	1-B21-PS-1-B	ECCS DIV 2 Trip Calibr Cab Power Supply	Available	Available	Contained in 1-XU-64
0163	1-XU-64	Trip Calibration Cabinet-ECCS Division 2	Available	Available	Contains 1-B21-PS-1-B, 1-B21-LTM-N031B-1, 1-B21-LTM-N031D-1, 1-E51-PDTM-N018-1, 1-E51-PDTS-N018-2, 1-B21-NVT-1-B, and 1-B21-PTM-N045D
0164	1-E51-PDTM-N018-1	E51-PDT-N018 MASTER TRIP UNIT. .	Available	Available	Contained in 1-XU-64
0165	1-E51-PDT-N018	RCIC STEAM LINE HI FLOW DIFF PRESS.. TRANSMITTER	Available	Available	Contained in 1-H21-P038
0166	1-E51-PDTS-N018-2	E51-PDT-N018 SLAVE TRIP UNIT. .	Available	Available	Contained in 1-XU-64
0167	1-E51-PS-N019B	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	Contained in 1-H21-P038
0168	1-E51-PS-N019D	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	Contained in 1-H21-P038
0169	1-E51-PSH-N012B	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	Contained in 1-H21-P017
0170	1-E51-PSH-N012D	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	Contained in 1-H21-P017
0171	2-B21-NVT-1-A	B21-PS-1-A DC INVERTER .	Available	Available	Contained in 2-XU-63
0172	2-B21-PS-1-A	ECCS DIV 1 TRIP CALIBR CAB PWR SUPPLY .	Available	Available	Contained in 2-XU-63
0173	2-XU-63	TRIP CALIBRATION CABINET-ECCS DIVISION I .	Available	Available	Contains 2-B21-PS-1-A, 2-E51-PDTM-N017-1, 2-E51-PDTS-N017-2, 2-B21-LTM-N031A-1, 2-B21-LTM-N031C-1, and 2-B21-NVT-1-A
0174	2-E51-PDTM-N017-1	E51-PDT-N017 MASTER TRIP UNIT. .	Available	Available	Contained in 2-XU-63
0175	2-E51-PDT-N017	RCIC STEAM LINE HI FLOW DIFF PRESS.. TRANSMITTER	Available	Available	Contained in 2-H21-P035
0176	2-E51-PDTS-N017-2	E51-PDT-N017 SLAVE TRIP UNIT. .	Available	Available	Contained in 2-XU-63
0177	2-E51-PS-N019A	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	Contained in 2-H21-P035
0178	2-E51-PS-N019C	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	Contained in 2-H21-P035
0179	2-E51-PSH-N012A	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	Contained in 2-H21-P037
0180	2-E51-PSH-N012C	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	Contained in 2-H21-P037
0181	2-H21-P037	RCIC LEAK DET SYS A INSTRUMENT RACK .	Available	Available	Contains 2-E51-PSH-N012A and 2-E51-PSH-N012C
0182	2-B21-LTM-N031A-1	B21-LT-N031A MASTER TRIP UNIT .	Available	Available	Contained in 2-XU-63
0183	2-B21-LTM-N031B-1	B21-LT-N031B MASTER TRIP UNIT .	Available	Available	Contained in 2-XU-64
0184	2-B21-LTM-N031C-1	B21-LT-N031C MASTER TRIP UNIT .	Available	Available	Contained in 2-XU-63
0185	2-B21-LTM-N031D-1	B21-LT-N031D MASTER TRIP UNIT .	Available	Available	Contained in 2-XU-64
0186	2-B21-LT-N031A	REACTOR VESSEL LOW WATER LEVEL XMTR .	Available	Available	Contained in 2-H21-P004
0187	2-B21-LT-N031B	REACTOR VESSEL LOW WATER LEVEL XMTR ..	Available	Available	Contained in 2-H21-P005
0188	2-B21-LT-N031C	REACTOR VESSEL LOW WATER LEVEL XMTR .	Available	Available	Contained in 2-H21-P004
0189	2-B21-LT-N031D	REACTOR VESSEL LOW WATER LEVEL XMTR ..	Available	Available	Contained in 2-H21-P005
0190	2-B21-NVT-1-B	B21-PS-1-B DC INVERTER .	Available	Available	Contained in 2-XU-64
0191	2-B21-PS-1-B	ECCS DIV 2 TRIP CALIB CAB POWER SUPPLY .	Available	Available	Contained in 2-XU-64

ESEL Item #	Equipment ID	Description	Equipment Normal State	Equipment Desired State	Notes / Comments
0192	2-XU-64	TRIP CALIBRATION CABINET-ECCS DIVISION II .	Available	Available	Contains 2-B21-PS-1-B, 2-E51-PDTM-N018-1, 2-E51-PDTS-N018-2, 2-B21-LTM-N031B-1, 2-B21-LTM-N031D-1, 2-B21-NVT-1-B, and 2-B21-PTM-N045D
0193	2-E51-PDTM-N018-1	E51-PDT-N018 MASTER TRIP UNIT. .	Available	Available	Contained in 2-XU-64
0194	2-E51-PDT-N018	RCIC STEAM LINE HI FLOW DIFF PRESS.. TRANSMITTER	Available	Available	Contained in 2-H21-P038
0195	2-E51-PDTS-N018-2	E51-PDT-N018 SLAVE TRIP UNIT. .	Available	Available	Contained in 2-XU-64
0196	2-E51-PS-N019B	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	Contained in 2-H21-P038
0197	2-E51-PS-N019D	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	Contained in 2-H21-P038
0198	2-E51-PSH-N012B	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	Contained in 2-H21-P017
0199	2-E51-PSH-N012D	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	Contained in 2-H21-P017
0200	1-B21-LI-R604-BX	REMOTE REACTOR WATER LEVEL IND	Available	Available	Located inside 1-IR-RB-4
0201	1-B21-LT-N026B	REACTOR VESSEL WATER LEVEL XMTR	Available	Available	Contained in 1-H21-P005
0202	1-H21-P005	RX PROT & NSS SYSTEM INSTRUMENT RACK	Available	Available	Contains 1-B21-LT-N031B, 1-B21-LT-N031D, and 1-B21-LT-N026B
0203	1-B21-ES-5508	125VDC-120VAC INVERTER TO B21-ES-4051	Available	Available	Contained in 1-IR-RB-4
0204	1-B21-ES-4051	E11-FT-3338 & B21-LT-N017D-3 CKTS ... AND OTHER ASCA INSTRUMENTS	Available	Available	Contained in 1-IR-RB-4
0205	1-B21-PI-R605B	REACTOR VESSEL PRESSURE INDICATOR	Available	Available	Located inside 1-H12-P601
0206	1-B21-PT-N045D	REACTOR VESSEL HI PRESS TRANSMITTER	Available	Available	Contained in 1-H21-P005-002
0207	1-B21-PTM-N045D	B21-PT-N045D MASTER TRIP UNIT	Available	Available	Contained in 1-XU-64
0208	1-H21-P005-002	REACTOR PROTECTION RACK	Available	Available	Contains 1-B21-PT-N045D
0209	1-CAC-PI-3341	DRYWELL PRESSURE INDICATOR	Available	Available	Located inside 1-IR-RB-4
0210	1-CAC-PT-3341	DRYWELL PRESSURE TRANSMITTER	Available	Available	
0211	1-CAC-TR-778	CAC TORUS/DRYWELL TEMPERATURE RECORDER	Available	Available	Located inside 1-IR-RB-4
0212	1-CAC-TE-778-6	TORUS WATER TEMPERATURE ELEMENT	Available	Available	
0213	1-CAC-LI-3342	SUPPRESSION POOL LEVEL INDICATOR	Available	Available	Located inside 1-IR-RB-4
0214	1-CAC-LT-3342	SUPPRESSION POOL LEVEL TRANSMITTER	Available	Available	Contained in 1-H21-P022-01
0215	1-H21-P022-01	F-25001	Available	Available	Contains 1-CAC-LT-3342
0216	2-B21-LI-R604-BX	FOR RPV WATER LEVEL INDICATION... ...AT THE REMOTE SHUTDOWN PANEL	Available	Available	Located inside 2-IR-RB-4
0217	2-B21-LT-N026B	REACTOR WATER LEVEL XMTR PM 84-038	Available	Available	Contained in 2-H21-P005
0218	2-H21-P005	RX PROT & NSS SYSTEM INSTRUMENT RACK	Available	Available	Contains 2-B21-LT-N026B, 2-B21-LT-N031B, and 2-B21-LT-N031D
0219	2-B21-ES-5508	INVERTER TO B21-ES-4051, E51-FY-3408 & E51-FIC-3325.	Available	Available	Contained in 2-IR-RB-4
0220	2-B21-ES-4051	POWER SUPPLY FOR VARIOUS ASCA INSTR	Available	Available	Contained in 2-IR-RB-4
0221	2-B21-PI-R605B	REACTOR VESSEL PRESSURE INDICATOR	Available	Available	Located inside 2-H12-P601
0222	2-B21-PT-N045D	REACTOR HIGH PRESSURE TRANSMITTER	Available	Available	Contained in 2-H21-P005-002
0223	2-B21-PTM-N045D	B21-PT-N045D MASTER TRIP UNIT	Available	Available	Contained in 2-XU-64
0224	2-H21-P005-002	REACTOR PROTECTION RACK	Available	Available	Contains 2-B21-PT-N045D
0225	2-CAC-PI-3341	DRYWELL PRESSURE INDICATOR	Available	Available	Located inside 2-IR-RB-4
0226	2-CAC-PT-3341	DRYWELL PRESSURE TRANSMITTER	Available	Available	
0227	2-CAC-TR-778	CAC TORUS/DRYWELL TEMPERATURE RECORDER	Available	Available	Located inside 2-IR-RB-4
0228	2-CAC-TE-778-6	TORUS WATER TEMPERATURE ELEMENT	Available	Available	
0229	2-CAC-LI-3342	SUPPRESSION POOL LEVEL INDICATOR	Available	Available	Located inside 2-IR-RB-4

ESEL Item #	Equipment ID	Description	Equipment Normal State	Equipment Desired State	Notes / Comments
0230	2-CAC-LT-3342	SUPPRESSION POOL LEVEL TRANSMITTER	Available	Available	Contained in 2-H21-P023-02
0231	2-H21-P023-02	CAC INSTRUMENT RACK	Available	Available	Contains 2-CAC-LT-3342
0232	Node L6A (Unit 1)	Transfer switch between MCC 1XB/MCC 1CB and 1B-1 Battery Charger	Available	Available	
0233	Node L6B (Unit 1)	Transfer switch between MCC 1XB/MCC 1CB and 1B-2 Battery Charger	Available	Available	
0234	Node L6A (Unit 2)	Transfer switch between MCC 2XD/MCC 2CB and 2B-1 Battery Charger	Available	Available	
0235	Node L6B (Unit 2)	Transfer switch between MCC 2XD/MCC 2CB and 2B-2 Battery Charger	Available	Available	
0236	2-H12-P617	RHR A RELAY VERTICAL BOARD .	Available	Available	
0237	1-H21-P004	RX PROTECTION & NSSS INSTR RACK.	Available	Available	Contains 1-B21-LT-N031A and 1-B21-LT-N031C
0238	2-H21-P004	RX PROTECTION & NSSS INSTR RACK.	Available	Available	Contains 2-B21-LT-N031A and 2-B21-LT-N031C

Attachment B

ESEP HCLPF Values and Failure Modes Tabulation, BSEP Units 1 and 2

ESEL Item #	Equipment ID	Description	Equipment Normal State	Equipment Desired State	*Host*	Failure Mode	HCLPF Capacity (PGA)
1	1-E6	480V Unit Substation E6	Available	Available	-	Screened	>RLGM
2	1-1CB	MCC 1CB Div II	Available	Available	-	Screened	>RLGM
3	1-1B-250VDC	125/250V DC Distribution Panel 1B	Available	Available	-	Screened	>RLGM
4	1-3B	125VDC Distribution Panel 3B	Available	Available	-	Screened	>RLGM
5	1-1XDB	250V DC MCC 1XDB	Available	Available	-	ANCHORAGE	0.45g
6	1-1B-1-125VDC-CHRGR	125V DC Battery Charger 1B-1	Available	Available	-	ANCHORAGE	0.59g
7	1-1B-2-125VDC-CHRGR	125V DC Battery Charger 1B-2	Available	Available	-	ANCHORAGE	0.59g
8	1-1B-1-125VDC-BAT	250V DC Battery Rack 1B-1	Available	Available	-	ANCHORAGE	0.35g
9	1-1B-2-125VDC-BAT	250V DC Battery Rack 1B-2	Available	Available	-	ANCHORAGE	0.35g
10	2-E8	480V Unit Substation E8	Available	Available	-	Screened	>RLGM
11	2-2CB	480V MCC 2CB	Available	Available	-	Screened	>RLGM
12	2-2B-250VDC	125/250V DC Distribution Panel 2B	Available	Available	-	Screened	>RLGM
13	2-4B	125 VDC Distribution Panel 4B	Available	Available	-	Screened	>RLGM
14	2-2XDB	250V DC MCC 2XDB	Available	Available	-	ANCHORAGE	0.45g
15	2-2B-1-125VDC-CHRGR	125V DC Battery Charger 2B-1	Available	Available	-	ANCHORAGE	0.59g
16	2-2B-2-125VDC-CHRGR	125V DC Battery Charger 2B-2	Available	Available	-	ANCHORAGE	0.59g
17	2-2B-1-125VDC-BAT	250V DC Battery Rack 2B-1	Available	Available	-	ANCHORAGE	0.35g
18	2-2B-2-125VDC-BAT	250V DC Battery Rack 2B-2	Available	Available	-	ANCHORAGE	0.35g
19	1-E51-F010	RCIC CONDENSATE STORAGE TANK SUCTION VALVE	OPEN	CLOSED	-	Screened	>RLGM
20	1-H21-P017	RCIC INSTRUMENT RACK	N/A	N/A	-	Screened	>RLGM
21	1-E51-F031	RCIC SUPPRESSION POOL SUCTION VALVE	CLOSED	OPEN	-	Screened	>RLGM
22	1-E51-F029	RCIC SUPPRESSION POOL SUCTION VALVE TO THE RCIC PUMP	CLOSED	OPEN	-	Screened	>RLGM
23	1-E51-F013	RCIC INJECTION VALVE	CLOSED	OPEN	-	Screened	>RLGM
24	1-E51-F046	RCIC COOLING WATER SUPPLY VALVE	CLOSED	OPEN	-	Screened	>RLGM
25	1-E51-C001	RCIC PUMP	OFF	ON	-	Screened	>RLGM
26	1-E51-C002-BAROM-COND	RCIC BAROMETRIC CONDENSER	N/A	N/A	-	Screened	>RLGM
27	1-E51-C002-VAC-TK	RCIC BAROMETRIC CONDENSER VACUUM TANK	N/A	N/A	-	Screened	>RLGM
28	1-E51-C002-VAC-PMP	RCIC TURBINE VACUUM PUMP	N/A	N/A	-	Screened	>RLGM
29	1-E51-C002-COND-PMP	CONDENSATE PUMP	OFF	ON	-	Screened	>RLGM
30	1-E51-F019	RCIC MIN FLOW BYPASS TO SUPPRESSION POOL VALVE	CLOSED	OPEN	-	Screened	>RLGM
31	1-E51-C002-LUBE-OIL-CLR	RCIC TURBINE LUBE OIL COOLER	N/A	N/A	-	Screened	>RLGM
32	1-E51-F045	RCIC TURBINE STEAM SUPPLY VALVE	CLOSED	OPEN	-	Screened	>RLGM
33	1-E51-V8	RCIC TURBINE TRIP AND THROTTLE VALVE	OPEN	OPEN	-	Screened	>RLGM
34	1-E51-V9	RCIC TURBINE GOVENOR VALVE	OPEN	VARIES (THROTTLED)	-	Screened	>RLGM
35	1-E51-C002	RCIC PUMP TURBINE DRIVE	OFF	ON	-	Screened	>RLGM
36	1-E51-STM-EXH-DRN-POT	RCIC EXHAUST DRAIN POT	N/A	N/A	-	Screened	>RLGM
37	1-E51-D004	RCIC EXHUAST DRAIN POT DRAIN LINE TRAP	N/A	N/A	-	Screened	>RLGM
38	1-H21-P038	RCIC LEAK DET SYS B INSTRUMENT RACK	N/A	N/A	-	Screened	>RLGM
39	1-H21-P035	RCIC LEAK DETECTION INSTRUMENT RACK	N/A	N/A	-	Screened	>RLGM
40	1-E51-STM-SUPP-DRN-POT	RCIC STM SUPPLY DRAIN POT	N/A	N/A	-	Screened	>RLGM
41	1-E51-F025	RCIC TURB SUP STM LN DRAIN POT DRN LN... INBD SHUTOFF VALVE	OPEN	OPEN	-	Screened	>RLGM
42	2-E51-F010	RCIC CONDENSATE STORAGE TANK SUCTION VALVE	OPEN	CLOSED	-	Screened	>RLGM
43	2-H21-P017	RCIC INSTRUMENT RACK	N/A	N/A	-	Screened	>RLGM
44	2-E51-F031	RCIC SUPPRESSION POOL SUCTION VALVE	CLOSED	OPEN	-	Screened	>RLGM
45	2-E51-F029	RCIC SUPPRESSION POOL SUCTION VALVE TO THE RCIC PUMP	CLOSED	OPEN	-	Screened	>RLGM
46	2-E51-C001	RCIC PUMP	OFF	ON	-	Screened	>RLGM
47	2-E51-F013	RCIC INJECTION VALVE	CLOSED	OPEN	-	Screened	>RLGM
48	2-E51-F046	RCIC COOLING WATER SUPPLY VALVE	CLOSED	OPEN	-	Screened	>RLGM
49	2-E51-C002-BAROM-COND	RCIC BAROMETRIC CONDENSER	N/A	N/A	-	Screened	>RLGM
50	2-E51-C002-VAC-TK	RCIC BAROMETRIC CONDENSER VACUUM TANK	N/A	N/A	-	Screened	>RLGM
51	2-E51-C002-COND-PMP	RCIC CONDENSATE PUMP	N/A	N/A	-	Screened	>RLGM
52	2-E51-F019	RCIC MIN FLOW BYPASS TO SUPPRESSION POOL VALVE	CLOSED	OPEN	-	Screened	>RLGM
53	2-E51-C002-VAC-PMP	VACUUM PUMP	N/A	N/A	-	Screened	>RLGM
54	2-E51-C002-LUBE-OIL-CLR	RCIC TURBINE LUBE OIL COOLER	N/A	N/A	-	Screened	>RLGM
55	2-E51-F045	RCIC TURBINE STEAM SUPPLY VALVE	CLOSED	OPEN	-	Screened	>RLGM

ESEL Item #	Equipment ID	Description	Equipment Normal State	Equipment Desired State	*Host*	Failure Mode	HCLPF Capacity (PGA)
56	2-E51-V8	RCIC TURBINE TRIP AND THROTTLE VALVE	OPEN	OPEN	-	Screened	>RLGM
57	2-E51-V9	RCIC TURBINE GOVERNOR VALVE	OPEN	VARIES (THROTTLED)	-	Screened	>RLGM
58	2-E51-C002	RCIC PUMP TURBINE DRIVE	OFF	ON	-	Screened	>RLGM
59	2-E51-STM-EXH-DRN-POT	RCIC EXHAUST DRAIN POT	N/A	N/A	-	Screened	>RLGM
60	2-E51-D004	RCIC EXHUAST DRAIN POT DRAIN LINE TRAP	N/A	N/A	-	Screened	>RLGM
61	2-H21-P038	RCIC LEAK DETECTION INSTRUMENT RACK B	N/A	N/A	-	Screened	>RLGM
62	2-H21-P035	RCIC LEAK DETECTION INSTRUMENT RACK	N/A	N/A	-	Screened	>RLGM
63	2-E51-STM-SUPP-DRN-POT	RCIC STM SUPPLY DRAIN POT	N/A	N/A	-	Screened	>RLGM
64	2-E51-F025	RCIC SUPP DRAIN POT INBD ISOLATION VLV ESR 98-00330	OPEN	OPEN	-	Screened	>RLGM
65	1-B21-F013A	PRIMARY STEAM LINE 'A' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
66	1-B21-F013B	PRIMARY STEAM LINE 'A' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
67	1-B21-F013C	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
68	1-B21-F013D	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
69	1-B21-F013E	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
70	1-B21-F013F	PRIMARY STEAM LINE 'C' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
71	1-B21-F013G	PRIMARY STEAM LINE 'C' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
72	1-B21-F013H	PRIMARY STEAM LINE 'D' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
73	1-B21-F013J	PRIMARY STEAM LINE 'D' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
74	1-B21-F013K	PRIMARY STEAM LINE 'C' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
75	1-B21-F013L	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
76	1-B21-A003A	AIR ACCUMULATOR FOR B21-F013A	N/A	N/A	-	Screened	>RLGM
77	1-B21-A003B	AIR ACCUMULATOR FOR B21-F013B	N/A	N/A	-	Screened	>RLGM
78	1-B21-A003C	AIR ACCUMULATOR FOR B21-F013C	N/A	N/A	-	Screened	>RLGM
79	1-B21-A003D	AIR ACCUMULATOR FOR B21-F013D	N/A	N/A	-	Screened	>RLGM
80	1-B21-A003E	AIR ACCUMULATOR FOR B21-F013E	N/A	N/A	-	Screened	>RLGM
81	1-B21-A003F	AIR ACCUMULATOR FOR B21-F013F	N/A	N/A	-	Screened	>RLGM
82	1-B21-A003G	AIR ACCUMULATOR FOR B21-F013G	N/A	N/A	-	Screened	>RLGM
83	1-B21-A003H	AIR ACCUMULATOR FOR B21-F013H	N/A	N/A	-	Screened	>RLGM
84	1-B21-A003J	AIR ACCUMULATOR FOR B21-F013J	N/A	N/A	-	Screened	>RLGM
85	1-B21-A003K	AIR ACCUMULATOR FOR B21-F013K	N/A	N/A	-	Screened	>RLGM
86	1-B21-A003L	AIR ACCUMULATOR FOR B21-F013L	N/A	N/A	-	Screened	>RLGM
87	2-B21-F013A	PRIMARY STEAM LINE 'A' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
88	2-B21-F013B	PRIMARY STEAM LINE 'A' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
89	2-B21-F013C	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
90	2-B21-F013D	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
91	2-B21-F013E	PRIMARY STEAM LINE 'B' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
92	2-B21-F013F	PRIMARY STEAM LINE 'C' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
93	2-B21-F013G	PRIMARY STEAM LINE 'C' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
94	2-B21-F013H	PRIMARY STEAM LINE 'D' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
95	2-B21-F013J	PRIMARY STEAM LINE'D' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
96	2-B21-F013K	PRIMARY STEAM LINE 'C' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
97	2-B21-F013L	PRIMARY STEAM LINE 'A' SAFETY RELIEF VALVE	CLOSED	VARIES	-	Screened	>RLGM
98	2-B21-A003A	AIR ACCUMULATOR FOR B21-F013A	N/A	N/A	-	Screened	>RLGM
99	2-B21-A003B	AIR ACCUMULATOR FOR B21-F013B	N/A	N/A	-	Screened	>RLGM
100	2-B21-A003C	AIR ACCUMULATOR FOR B21-F013C	N/A	N/A	-	Screened	>RLGM
101	2-B21-A003D	AIR ACCUMULATOR FOR B21-F013D	N/A	N/A	-	Screened	>RLGM
102	2-B21-A003E	AIR ACCUMULATOR FOR B21-F013E	N/A	N/A	-	Screened	>RLGM
103	2-B21-A003F	AIR ACCUMULATOR FOR B21-F013F	N/A	N/A	-	Screened	>RLGM
104	2-B21-A003G	AIR ACCUMULATOR FOR B21-F013G	N/A	N/A	-	Screened	>RLGM
105	2-B21-A003H	AIR ACCUMULATOR FOR B21-F013H	N/A	N/A	-	Screened	>RLGM
106	2-B21-A003J	AIR ACCUMULATOR FOR B21-F013J	N/A	N/A	-	Screened	>RLGM
107	2-B21-A003K	AIR ACCUMULATOR FOR B21-F013K	N/A	N/A	-	Screened	>RLGM
108	2-B21-A003L	AIR ACCUMULATOR FOR B21-F013L	N/A	N/A	-	Screened	>RLGM
109	1-RNA-SV-5481	Division II RNA N2 BackUp Supply Solenoid Valve	Closed	Open	-	Screened	>RLGM
110	1-RNA-DIV-II-N2-TANKS	Division II N2 BackUp Bottle Rack	N/A	N/A	-	Screened	>RLGM

ESEL Item #	Equipment ID	Description	Equipment Normal State	Equipment Desired State	Host	Failure Mode	HCLPF Capacity (PGA)
111	1-RNA-A004E	Air Accumulator for Valve CAC-V7	N/A	N/A	-	Screened	>RLGM
112	1-CAC-SV-V7	Suppression pool purge Exhuast Valve Pilot Solenoid	Closed	Varies	-	Screened	>RLGM
113	1-CAC-V7	Inboard Suppression Pool Purge Exhaust Valve	Closed	Varies	-	Screened	>RLGM
114	1-CAC-SV-V216	Hardened Wetwell Vent Line Isolation Valve Solenoid Valve	Closed	Varies	-	Screened	>RLGM
115	1-CAC-V216	Hardened Wetwell Vent Line Isolation Valve	Closed	Varies	-	Screened	>RLGM
116	2-RNA-SV-5481	Division II RNA N2 BackUp Supply Solenoid Valve	Closed	Open	-	Screened	>RLGM
117	2-RNA-DIV-II-N2-TANKS	Division II N2 BackUp Bottle Rack	N/A	N/A	-	Screened	>RLGM
118	2-RNA-A004E	Air Accumulator for Valve CAC-V7	N/A	N/A	-	Screened	>RLGM
119	2-CAC-SV-V7	Suppression pool purge Exhuast Valve Pilot Solenoid	Closed	Varies	-	Screened	>RLGM
120	2-CAC-V7	Inboard Suppression Pool Purge Exhaust Valve	Closed	Varies	-	Screened	>RLGM
121	2-CAC-SV-V216	Hardened Wetwell Vent Line Isolation Valve Solenoid Valve	Closed	Varies	-	Screened	>RLGM
122	2-CAC-V216	Hardened Wetwell Vent Outboard Line Isolation Valve	Closed	Varies	-	Screened	>RLGM
123	1-E51-FIC-R600	RCIC DISCH FLO IND CONTROLLER... WITH E51-FI-R600-001 FOR FLOW IN	Available	Available	*1-H12-P601*	HOST ANCHORAGE	0.48g
124	1-IR-RB-4	REMOTE SHUTDOWN PANEL	Available	Available	-	ANCHORAGE	0.38g
125	1-E51-FT-N003	RCIC DISCHARGE FLOW TRANSMITTER ...PM 84-154	Available	Available	*1-H21-P017*	Screened	>RLGM
126	1-H12-P621	RHR A RELAY VERTICAL BOARD .	Available	Available	-	Screened	>RLGM
127	1-E51-ES-K603	POWER SUPPLY FOR E51-FIC-R600. .	Available	Available	*1-H12-P601*	HOST ANCHORAGE	0.48g
128	1-E51-ES-K603-1	INPUT FILTER FOR INVERTER E51-ES-... ...K603	Available	Available	*1-H12-P601*	HOST ANCHORAGE	0.48g
129	1-H12-P601	ENGINEERED SAFEGUARDS VERTICAL BOARD .	Available	Available	-	ANCHORAGE	0.48g
130	1-E51-C002-ES-K604	DC-DC PWR SUPPLY FOR EGM CTRL... BOX E51-C002-EGM	Available	Available	-	Screened	
131	1-1B-125VDC	DIESEL GEN BLDG 125VDC DIST PNL 1B. .	Available	Available	-	Masonry Wall	0.37g
132	2-E51-FIC-R600	RCIC DISCH FLO IND CONTROLLER... WITH E51-FI-R600-001 FOR FLOW IN	Available	Available	*2-H12-P601*	HOST ANCHORAGE	0.48g
133	2-E51-C002-ES-K604	DC-DC PWR SUPPLY FOR EGM CTRL... BOX E51-C002-EGM	Available	Available	-	Screened	
134	2-IR-RB-4	REMOTE SHUTDOWN PANEL	Available	Available	-	ANCHORAGE	0.38g
135	2-E51-FT-N003	RCIC DISCHARGE FLOW TRANSMITTER ...PM 84-154	Available	Available	*2-H21-P017*	Screened	>RLGM
136	2-H12-P621	RCIC VERTICAL BOARD .	Available	Available	-	Screened	>RLGM
137	2-E51-ES-K603	POWER SUPPLY FOR E51-FIC-R600. .	Available	Available	*2-H12-P601*	HOST ANCHORAGE	0.48g
138	2-E51-ES-K603-1	PWR SUPPLY FILTER FOR E51-ES-K603 .	Available	Available	*2-H12-P601*	HOST ANCHORAGE	0.48g
139	2-H12-P601	ENGINEERED SAFEGUARDS VERTICAL BOARD .	Available	Available	-	ANCHORAGE	0.48g
140	2-2B-125VDC	DIESEL GEN BLDG 125VDC DIST PANEL .	Available	Available	-	Screened	>RLGM
141	1-B21-NVT-1-A	B21-PS-1A DC Inverter	Available	Available	*1-XU-63*	Masonry Wall	0.56g
142	1-B21-PS-1-A	ECCS DIV 1 Trip Calibr Cab Pwr Supply	Available	Available	*1-XU-63*	Masonry Wall	0.56g
143	1-XU-63	Trip Calibration Cabinet-ECCS Division 1	Available	Available	-	Masonry Wall	0.56g
144	1-E51-PDTM-N017-1	E51-PDT-N017 MASTER TRIP UNIT. .	Available	Available	*1-XU-63*	Masonry Wall	0.56g
145	1-E51-PDT-N017	RCIC STEAM LINE HI FLOW DIFF SWITCH .	Available	Available	*1-H21-P035*	Screened	>RLGM
146	1-E51-PDTS-N017-2	E51-PDT-N017 SLAVE TRIP UNIT. .	Available	Available	*1-XU-63*	Masonry Wall	0.56g
147	1-H12-P617	RHR A RELAY VERTICAL BOARD .	Available	Available	-	Screened	>RLGM
148	1-E51-PS-N019A	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	*1-H21-P035*	Screened	>RLGM
149	1-E51-PS-N019C	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	*1-H21-P035*	Screened	>RLGM
150	1-E51-PSH-N012A	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	*1-H21-P037*	Screened	>RLGM
151	1-E51-PSH-N012C	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	*1-H21-P037*	Screened	>RLGM
152	1-H21-P037	RCIC LEAK DET SYS A INSTRUMENT RACK .	Available	Available	-	Screened	>RLGM
153	1-B21-LTM-N031A-1	B-21-LT-N031A Master Trip Unit	Available	Available	*1-XU-63*	Masonry Wall	0.56g
154	1-B21-LTM-N031B-1	B-21-LT-N031B Master Trip Unit	Available	Available	*1-XU-64*	Masonry Wall	0.56g
155	1-B21-LTM-N031C-1	B-21-LT-N031C Master Trip Unit	Available	Available	*1-XU-63*	Masonry Wall	0.56g
156	1-B21-LTM-N031D-1	B-21-LT-N031D Master Trip Unit	Available	Available	*1-XU-64*	Masonry Wall	0.56g
157	1-B21-LT-N031A	REACTOR VESSEL LOW WATER LEVEL XMTR .	Available	Available	*1-H21-P004*	HOST ANCHORAGE	0.37g
158	1-B21-LT-N031B	REACTOR VESSEL LOW WATER LEVEL XMTR .	Available	Available	*1-H21-P005*	HOST ANCHORAGE	0.37g
159	1-B21-LT-N031C	REACTOR VESSEL LOW WATER LEVEL XMTR .	Available	Available	*1-H21-P004*	HOST ANCHORAGE	0.37g
160	1-B21-LT-N031D	REACTOR VESSEL LOW WATER LEVEL XMTR .	Available	Available	*1-H21-P005*	HOST ANCHORAGE	0.37g
161	1-B21-NVT-1-B	B21-PS-1B DC Inverter	Available	Available	*1-XU-64*	Masonry Wall	0.56g
162	1-B21-PS-1-B	ECCS DIV 2 Trip Calibr Cab Power Supply	Available	Available	*1-XU-64*	Masonry Wall	0.56g
163	1-XU-64	Trip Calibration Cabinet-ECCS Division 2	Available	Available	-	Masonry Wall	0.56g
164	1-E51-PDTM-N018-1	E51-PDT-N018 MASTER TRIP UNIT. .	Available	Available	*1-XU-64*	Masonry Wall	0.56g
165	1-E51-PDT-N018	RCIC STEAM LINE HI FLOW DIFF PRESS.. TRANSMITTER	Available	Available	*1-H21-P038*	Screened	>RLGM

ESEL Item #	Equipment ID	Description	Equipment Normal State	Equipment Desired State	*Host*	Failure Mode	HCLPF Capacity (PGA)
166	1-E51-PDTS-N018-2	E51-PDT-N017 SLAVE TRIP UNIT. .	Available	Available	*1-XU-64*	Masonry Wall	0.56g
167	1-E51-PS-N019B	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	*1-H21-P038*	Screened	>RLGM
168	1-E51-PS-N019D	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	*1-H21-P038*	Screened	>RLGM
169	1-E51-PSH-N012B	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	*1-H21-P017*	Screened	>RLGM
170	1-E51-PSH-N012D	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	*1-H21-P017*	Screened	>RLGM
171	2-B21-NVT-1-A	B21-PS-1-A DC INVERTER .	Available	Available	*2-XU-63*	Screened	>RLGM
172	2-B21-PS-1-A	ECCS DIV 1 TRIP CALIBR CAB PWR SUPPLY .	Available	Available	*2-XU-63*	Screened	>RLGM
173	2-XU-63	TRIP CALIBRATION CABINET-ECCS DIVISION I .	Available	Available	-	Screened	>RLGM
174	2-E51-PDTM-N017-1	E51-PDT-N017 MASTER TRIP UNIT. .	Available	Available	*2-XU-63*	Screened	>RLGM
175	2-E51-PDT-N017	RCIC STEAM LINE HI FLOW DIFF PRESS.. TRANSMITTER	Available	Available	*2-H21-P035*	Screened	>RLGM
176	2-E51-PDTS-N017-2	E51-PDT-N017 SLAVE TRIP UNIT. .	Available	Available	*2-XU-63*	Screened	>RLGM
177	2-E51-PS-N019A	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	*2-H21-P035*	Screened	>RLGM
178	2-E51-PS-N019C	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	*2-H21-P035*	Screened	>RLGM
179	2-E51-PSH-N012A	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	*2-H21-P037*	Screened	>RLGM
180	2-E51-PSH-N012C	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	*2-H21-P037*	Screened	>RLGM
181	2-H21-P037	RCIC LEAK DET SYS A INSTRUMENT RACK .	Available	Available	-	Screened	>RLGM
182	2-B21-LTM-N031A-1	B21-LT-N031A MASTER TRIP UNIT .	Available	Available	*2-XU-63*	Screened	>RLGM
183	2-B21-LTM-N031B-1	B21-LT-N031B MASTER TRIP UNIT .	Available	Available	*2-XU-64*	Screened	>RLGM
184	2-B21-LTM-N031C-1	B21-LT-N031C MASTER TRIP UNIT .	Available	Available	*2-XU-63*	Screened	>RLGM
185	2-B21-LTM-N031D-1	B21-LT-N031D MASTER TRIP UNIT .	Available	Available	*2-XU-64*	Screened	>RLGM
186	2-B21-LT-N031A	REACTOR VESSEL LOW WATER LEVEL XMTR .	Available	Available	*2-H21-P004*	HOST ANCHORAGE	0.37g
187	2-B21-LT-N031B	REACTOR VESSEL LOW WATER LEVEL XMTR ..	Available	Available	*2-H21-P005*	HOST ANCHORAGE	0.37g
188	2-B21-LT-N031C	REACTOR VESSEL LOW WATER LEVEL XMTR .	Available	Available	*2-H21-P004*	HOST ANCHORAGE	0.37g
189	2-B21-LT-N031D	REACTOR VESSEL LOW WATER LEVEL XMTR ..	Available	Available	*2-H21-P005*	HOST ANCHORAGE	0.37g
190	2-B21-NVT-1-B	B21-PS-1-B DC INVERTER .	Available	Available	*2-XU-64*	Screened	>RLGM
191	2-B21-PS-1-B	ECCS DIV 2 TRIP CALIB CAB POWER SUPPLY .	Available	Available	*2-XU-64*	Screened	>RLGM
192	2-XU-64	TRIP CALIBRATION CABINET-ECCS DIVISION II .	Available	Available	-	Screened	>RLGM
193	2-E51-PDTM-N018-1	E51-PDT-N018 MASTER TRIP UNIT. .	Available	Available	*2-XU-64*	Screened	>RLGM
194	2-E51-PDT-N018	RCIC STEAM LINE HI FLOW DIFF PRESS.. TRANSMITTER	Available	Available	*2-H21-P038*	Screened	>RLGM
195	2-E51-PDTS-N018-2	E51-PDT-N018 SLAVE TRIP UNIT. .	Available	Available	*2-XU-64*	Screened	>RLGM
196	2-E51-PS-N019B	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	*2-H21-P038*	Screened	>RLGM
197	2-E51-PS-N019D	RCIC TURB STEAM SUPPLY LOW PRESS SW ...PM 84-184	Available	Available	*2-H21-P038*	Screened	>RLGM
198	2-E51-PSH-N012B	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	*2-H21-P017*	Screened	>RLGM
199	2-E51-PSH-N012D	RCIC TURB EXH DIAPHRAGM HI PRESS SW ...PM 84-184	Available	Available	*2-H21-P017*	Screened	>RLGM
200	1-B21-LI-R604-BX	REMOTE REACTOR WATER LEVEL IND	Available	Available	*1-IR-RB-4*	HOST ANCHORAGE	0.38g
201	1-B21-LT-N026B	REACTOR VESSEL WATER LEVEL XMTR	Available	Available	*1-H21-P005*	HOST ANCHORAGE	0.37g
202	1-H21-P005	RX PROT & NSS SYSTEM INSTRUMENT RACK	Available	Available	-	ANCHORAGE	0.37g
203	1-B21-ES-5508	125VDC-120VAC INVERTER TO B21-ES-4051	Available	Available	*1-IR-RB-4*	HOST ANCHORAGE	0.38g
204	1-B21-ES-4051	E11-FT-3338 & B21-LT-N017D-3 CKTS ... AND OTHER ASCA INSTRUMENTS	Available	Available	*1-IR-RB-4*	HOST ANCHORAGE	0.38g
205	1-B21-PI-R605B	REACTOR VESSEL PRESSURE INDICATOR	Available	Available	*1-H12-P601*	HOST ANCHORAGE	0.48g
206	1-B21-PT-N045D	REACTOR VESSEL HI PRESS TRANSMITTER	Available	Available	*1-H21-P005-002*	HOST ANCHORAGE	0.37g
207	1-B21-PTM-N045D	B21-PT-N045D MASTER TRIP UNIT	Available	Available	*1-XU-64*	Masonry Wall	0.56g
208	1-H21-P005-002	REACTOR PROTECTION RACK	Available	Available	-	ANCHORAGE	0.37g
209	1-CAC-PI-3341	DRYWELL PRESSURE INDICATOR	Available	Available	*1-IR-RB-4*	HOST ANCHORAGE	0.38g
210	1-CAC-PT-3341	DRYWELL PRESSURE TRANSMITTER	Available	Available	-	Screened	>RLGM
211	1-CAC-TR-778	CAC TORUS/DRYWELL TEMPERATURE RECORDER	Available	Available	*1-IR-RB-4*	HOST ANCHORAGE	0.38g
212	1-CAC-TE-778-6	TORUS WATER TEMPERATURE ELEMENT	Available	Available	-	Screened	>RLGM
213	1-CAC-LI-3342	SUPPRESSION POOL LEVEL INDICATOR	Available	Available	*1-IR-RB-4*	HOST ANCHORAGE	0.38g
214	1-CAC-LT-3342	SUPPRESSION POOL LEVEL TRANSMITTER	Available	Available	*1-H21-P022-01*	Screened	>RLGM
215	1-H21-P022-01	SOUTH RHR INSTRUMENT SUPPORT RACK	Available	Available	-	Screened	>RLGM
216	2-B21-LI-R604-BX	FOR RPV WATER LEVEL INDICATION... ...AT THE REMOTE SHUTDOWN PANEL	Available	Available	*2-IR-RB-4*	HOST ANCHORAGE	0.38g
217	2-B21-LT-N026B	REACTOR WATER LEVEL XMTR PM 84-038	Available	Available	*2-H21-P005*	HOST ANCHORAGE	0.37g
218	2-H21-P005	RX PROT & NSS SYSTEM INSTRUMENT RACK	Available	Available	-	ANCHORAGE	0.37g
219	2-B21-ES-5508	INVERTER TO B21-ES-4051, E51-FY-3408 & E51-FIC-3325.	Available	Available	*2-IR-RB-4*	HOST ANCHORAGE	0.38g
220	2-B21-ES-4051	POWER SUPPLY FOR VARIOUS ASCA INSTR	Available	Available	*2-IR-RB-4*	HOST ANCHORAGE	0.38g

ESEL Item #	Equipment ID	Description	Equipment Normal State	Equipment Desired State	*Host*	Failure Mode	HCLPF Capacity (PGA)
221	2-B21-PI-R605B	REACTOR VESSEL PRESSURE INDICATOR	Available	Available	*2-H21-P601*	HOST ANCHORAGE	0.48g
222	2-B21-PT-N045D	REACTOR HIGH PRESSURE TRANSMITTER	Available	Available	*2-H21-P005-002*	HOST ANCHORAGE	0.37g
223	2-B21-PTM-N045D	B21-PT-N045D MASTER TRIP UNIT	Available	Available	*2-XU-64*	Screened	>RLGM
224	2-H21-P005-002	REACTOR PROTECTION RACK	Available	Available	-	ANCHORAGE	0.37g
225	2-CAC-PI-3341	DRYWELL PRESSURE INDICATOR	Available	Available	*2-IR-RB-4*	HOST ANCHORAGE	0.38g
226	2-CAC-PT-3341	DRYWELL PRESSURE TRANSMITTER	Available	Available	-	Screened	>RLGM
227	2-CAC-TR-778	CAC TORUS/DRYWELL TEMPERATURE RECORDER	Available	Available	*2-IR-RB-4*	HOST ANCHORAGE	0.38g
228	2-CAC-TE-778-6	TORUS WATER TEMPERATURE ELEMENT	Available	Available	-	Screened	>RLGM
229	2-CAC-LI-3342	SUPPRESSION POOL LEVEL INDICATOR	Available	Available	*2-IR-RB-4*	HOST ANCHORAGE	0.38g
230	2-CAC-LT-3342	SUPPRESSION POOL LEVEL TRANSMITTER	Available	Available	*2-H21-P023-02*	Screened	>RLGM
231	2-H21-P023-02	CAC INSTRUMENT RACK	Available	Available	-	Screened	>RLGM
232	Node L6A (Unit 1)	Transfer switch between MCC 1XB/MCC 1CB and 1B-1 Battery Charger	Available	Available	-	Screened	>RLGM
233	Node L6B (Unit 1)	Transfer switch between MCC 1XB/MCC 1CB and 1B-2 Battery Charger	Available	Available	-	Screened	>RLGM
234	Node L6A (Unit 2)	Transfer switch between MCC 2XD/MCC 2CB and 2B-1 Battery Charger	Available	Available	-	Screened	>RLGM
235	Node L6B (Unit 2)	Transfer switch between MCC 2XD/MCC 2CB and 2B-2 Battery Charger	Available	Available	-	Screened	>RLGM
236	2-H12-P617	RHR A RELAY VERTICAL BOARD .	Available	Available	-	Screened	>RLGM
237	1-H21-P004	RX PROTECTION & NSSS INSTR RACK.	Available	Available	-	ANCHORAGE	0.37g
238	2-H21-P004	RX PROTECTION & NSSS INSTR RACK.	Available	Available	-	ANCHORAGE	0.37g

Attachment C

Summary of FLEX Seismic Implementation Strategies Figures

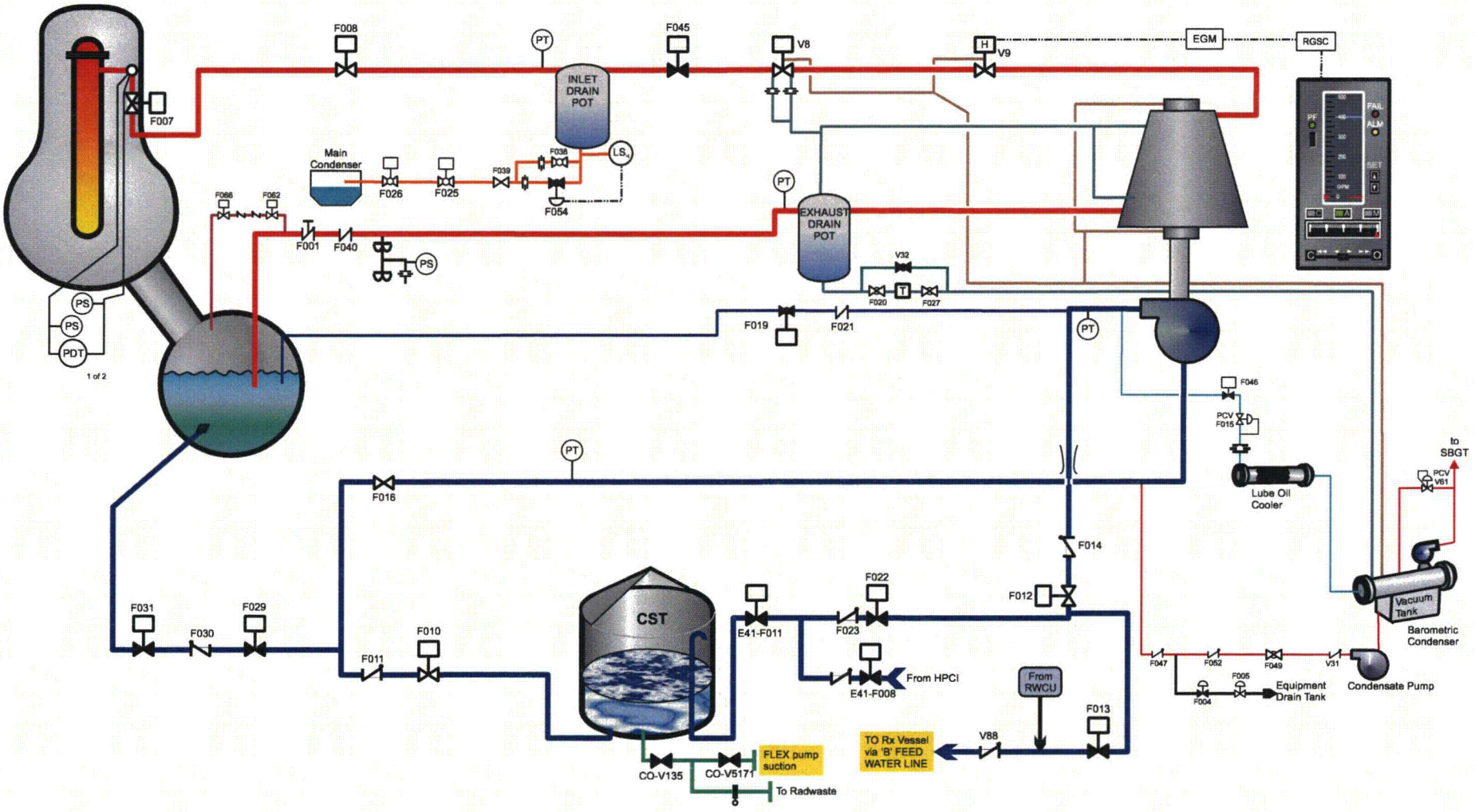

Figure 1
Reactor Core Isolation Cooling

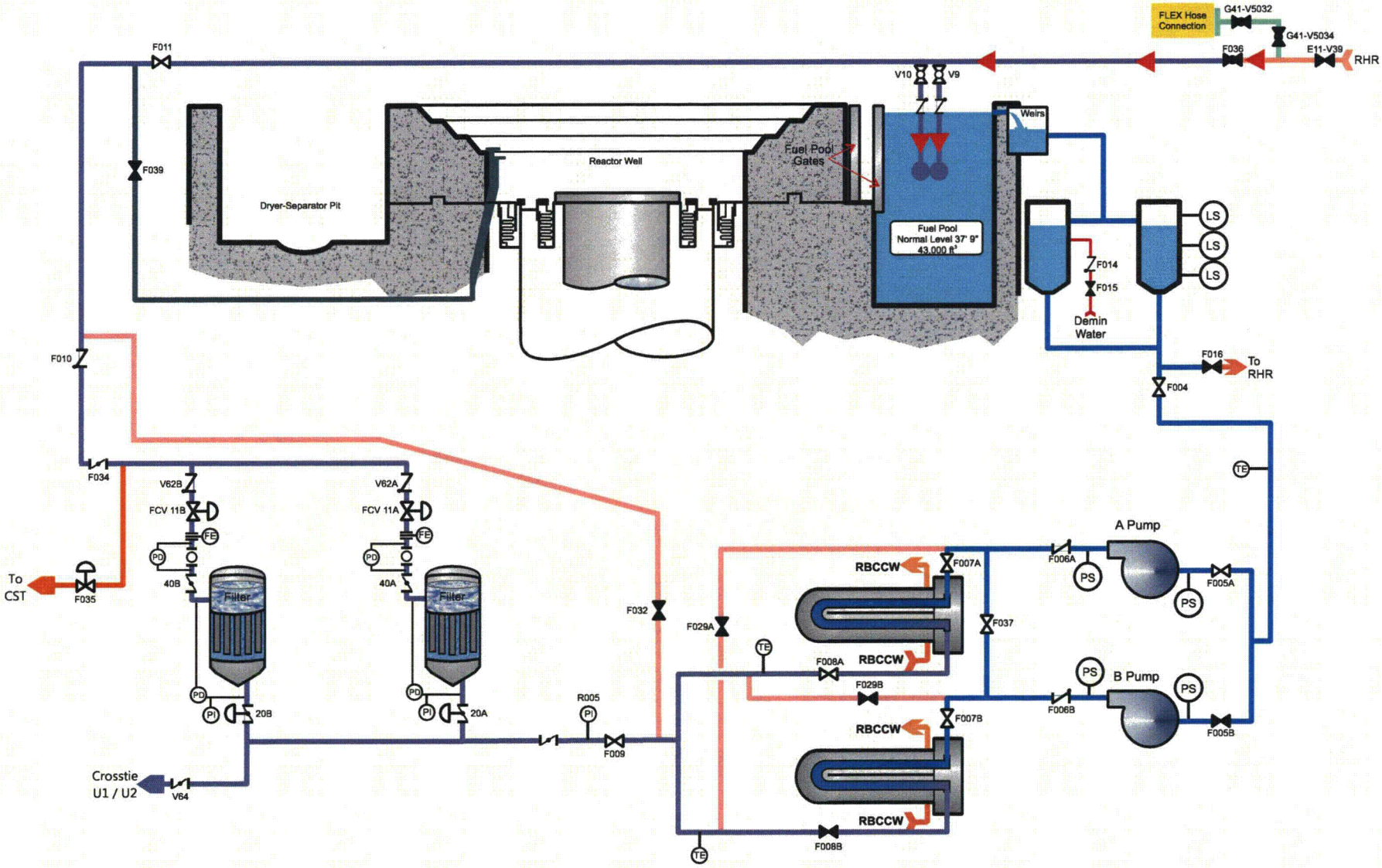

Figure 2
Fuel Pool Cooling

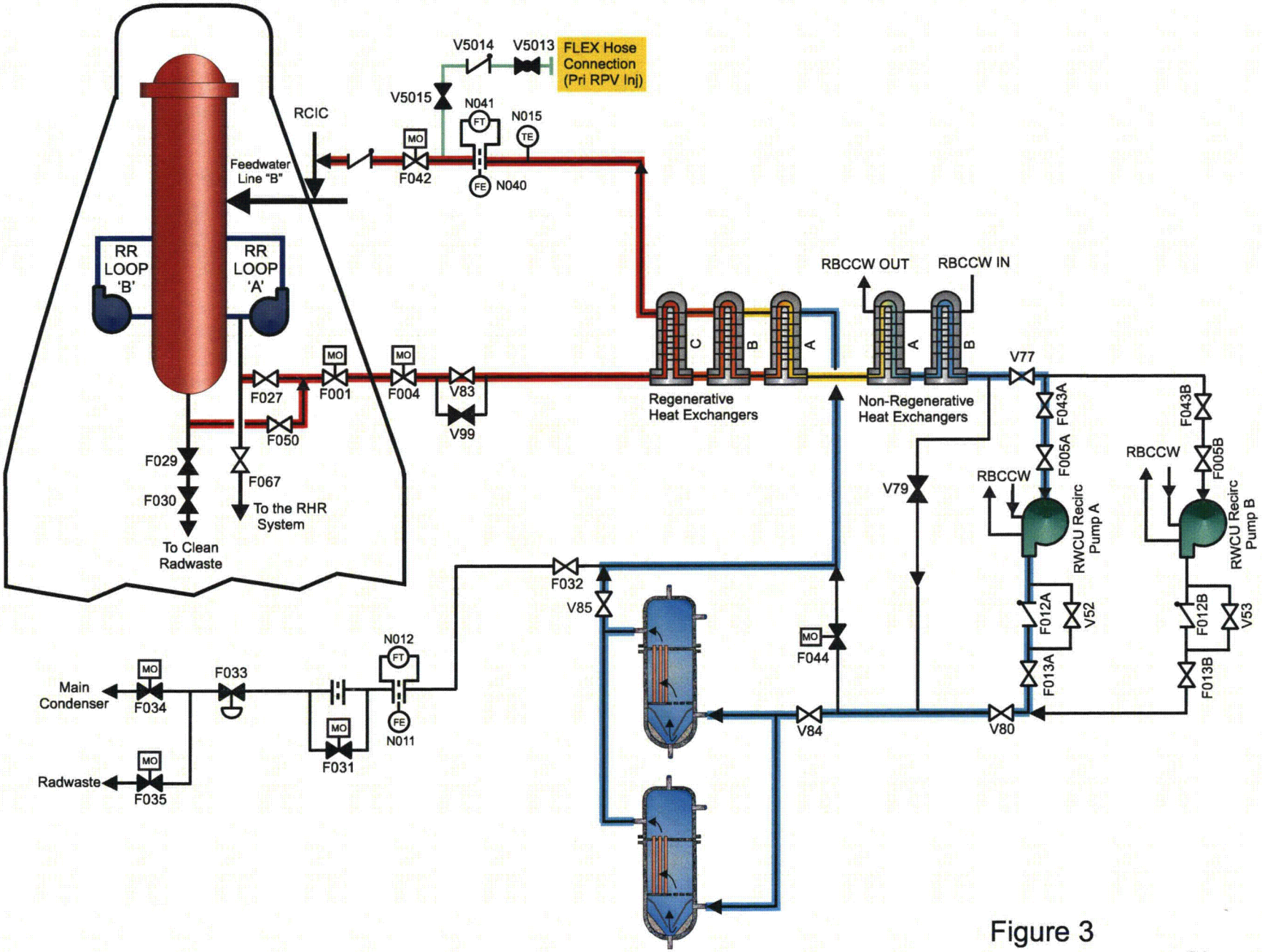

Figure 3
Reactor Water Cleanup

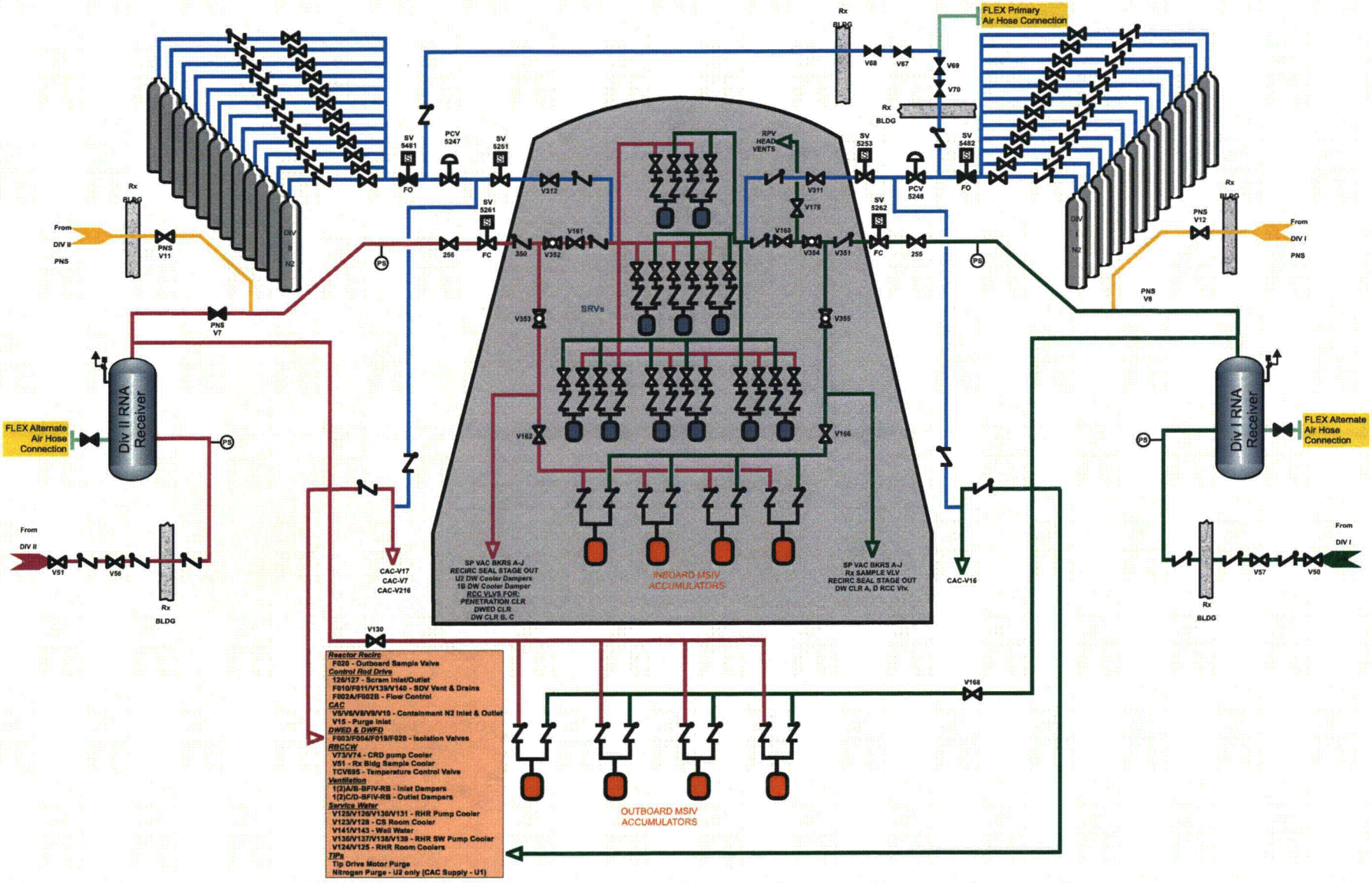

Figure 4
IAN / RNA / Backup Nitrogen

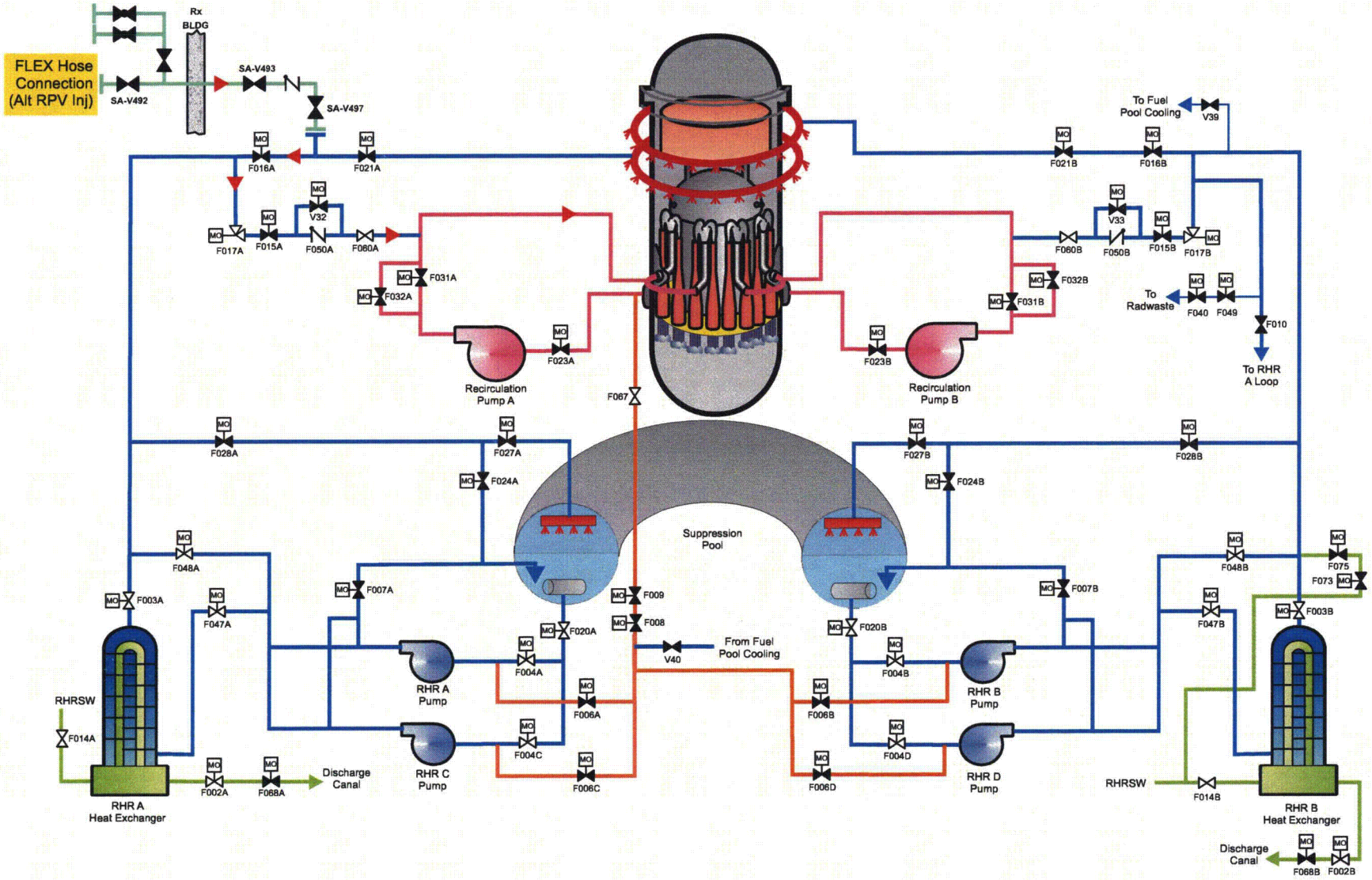

Figure 5
Residual Heat Removal

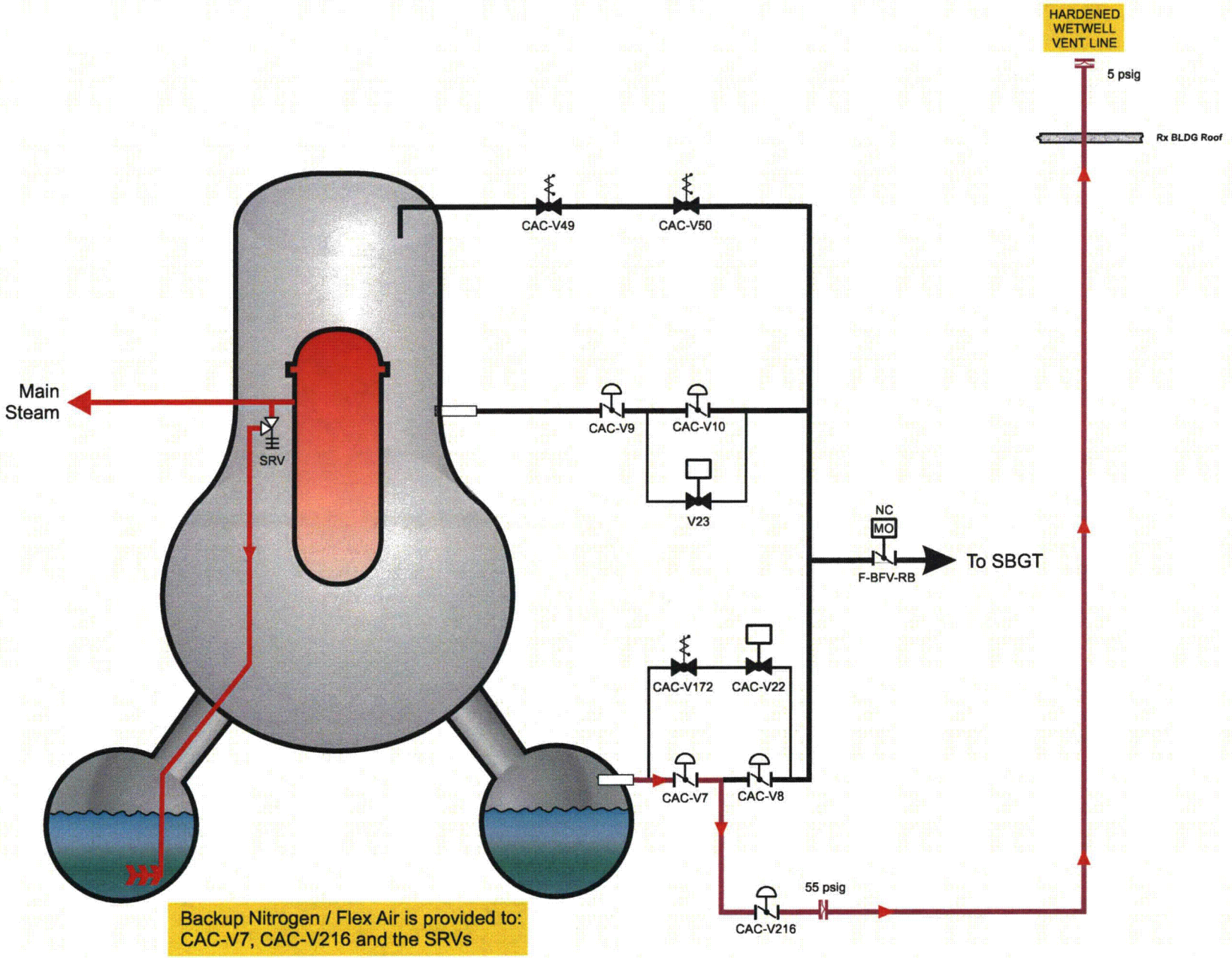

Figure 6
Hardened Wetwell Vent