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10 CFR 50.54(f)

FLL-14-036

December 17, 2014

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

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Renewed Facility Operating License Nos. DPR-53 and DPR-69
NRC Docket Nos. 50-317 and 50-318

Subject: Exelon Generation Company, LLC Expedited Seismic Evaluation Process Report (CEUS Sites), Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident

References:

1. NRC 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, dated March 12, 2012

2. Nuclear Energy Institute Letter to US NRC, Proposed Path Forward for NTTF Recommendation 2.1: Seismic Reevaluations dated April 9, 2013, ADAMS Accession No. ML13101A379

3. US NRC Letter to Nuclear Energy Institute, Electric Power Research Institute Report 3002000704, "Seismic Evaluation Guidance: Augmented Approach for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic", dated May 7, 2013, ADAMS Accession No. ML13106A331

4. US 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, ADAMS Accession No. ML14111A147

5. 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

A010
NRR

scope relay review in accordance with the schedule provided in the October 3, 2013 letter from the NEI to the NRC (Reference 7). This commitment was based on the NRC screening CCNPP "Out" based on the adequacy of its IEEEE submittal. In Reference 4, the NRC has screened CCNPP "In", based on its unfavorable judgment of the CCNPP IPEEE adequacy. EGC considers it appropriate to retract its commitment to perform the full scope relay chatter review made in Reference 6.

This letter contains no new regulatory commitments. If you have any questions regarding this submittal, please contact Mr. Douglas E. Lauver, Regulatory Assurance Manager, at (410) 495-5219.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 17th day of December 2014.

Respectfully,

Mary G. Korsnick

MGK/GGM

Enclosure: Calvert Cliffs Nuclear Power Plant, Units 1 and 2, Expedited Seismic Evaluation Process (ESEP) Report

cc: Director, Office of Nuclear Reactor Regulation
NRC Project Manager, Calvert Cliffs
NRC Regional Administrator, Region I
NRC Resident Inspector, Calvert Cliffs
S. Gray, MD-DNR

**Enclosure**

# Calvert Cliffs Nuclear Power Plant, Units 1 and 2

# Expedited Seismic Evaluation Process (ESEP) Report

**EXPEDITED SEISMIC EVALUATION PROCESS (ESEP) REPORT IN RESPONSE TO THE 50.54(f) INFORMATION REQUEST REGARDING FUKUSHIMA NEAR-TERM TASK FORCE RECOMMENDATION 2.1: SEISMIC**

**for the**

***CALVERT CLIFFS NUCLEAR POWER PLANT UNITS 1 AND 2***
***1650 Calvert Cliffs Parkway***
***Lusby, MD, 20657***
***Facility Operating License No.* DPR-53 and DPR-69**
**NRC Docket No. 50-317 and 50-318**

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Report Number: 14Q4242-RPT-004, Rev. 2

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Document Type: Report          Report Number: 14Q4238-RPT-004

| |
|---|
| Project Name: Exelon ESEP for Calvert Cliffs |
| Job No.: 14Q4242 |
| Client: Exelon. |

This document has been prepared in accordance with the S&A Quality Assurance Program Manual, Revision _17_ and project requirements:

| Rev. 0 | |
|---|---|
| Prepared by: Samer El-Bahey, Ph.D | Date: 12/3/2014 |
| Reviewed by: A. Karavoussianis | Date: 12/3/2014 |
| Approved by: A. Karavoussianis | Date: 12/3/2014 |

Revision Record:

| Revision No. | Prepared by/ Date | Reviewed by/ Date | Approved by/ Date | Description of Revision |
|---|---|---|---|---|
| 1 | Samer El-Bahey, Ph.D 12/5/2014 | A. Karavoussianis 12/5/2014 | A. Karavoussianis 12/5/2014 | Incorporate Client's editorial comments |
| 2 | Samer El-Bahey, Ph.D 12/9/2014 | A. Karavoussianis 12/9/2014 | A. Karavoussianis 12/9/2014 | Incorporate Client's editorial comments |

| | | |
|---|---|---|
| Stevenson & Associates | DOCUMENT APPROVAL SHEET | CONTRACT NO. 14Q4242 |

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# 1 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 (Ref. 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 Calvert Cliffs Nuclear Power Plant (CCNPP). The intent of the ESEP is to perform an interim action in response to the NRC's 50.54(f) letter (Ref. 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 and containment 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 (Ref. 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.

Per Reference 22, a brief summary of the FLEX seismic implementation strategies and the equipment selection process and Expedited Seismic Equipment List (ESEL) are provided in Sections 2 and 3.

## 2 BRIEF SUMMARY OF THE FLEX SEISMIC IMPLEMENTATION STRATEGIES

The Calvert Cliffs FLEX response strategies for Reactor Core Cooling and Heat Removal, Reactor Inventory Control/Long-term Subcriticality , Core Cooling and Heat Removal (Modes 5 and 6), Containment Function and Spent Fuel Pool Control are summarized below. This summary is derived from the Overall Integrated Plan (OIP) in Response to the March 12, 2012, Commission Order EA-12-049 (Ref. 3) .

Flex Phase 1, first six hours, strategy relies on installed plant equipment. Reactor core cooling, and heat removal is achieved via steam release from the Steam Generators (SGs) with SG makeup from the Turbine Driven Auxiliary Feedwater Pump (TDAFWP) during FLEX Phase 1 with suction from the fully protected #12 Condensate Storage Tank. RCS heat removal is controlled through local manual operation of the Atmospheric Dump Valves (ADV's) and local control of the TDAFW pumps. RCS Cooldown to 350°F/250psia with a corresponding Steam Generator pressure of approximately 120psia is the initial goal. Reactor Inventory control relies on allowing the Safety Injection Tanks to discharge into the Reactor Coolant System (RCS) if needed.

In Mode 5 or 6 if the steam generators are unavailable RCS inventory can be maintained by gravity feed of the Refueling Water Tank (RWT) or by use of portable flex pumps aligned to injection points to the RCS.

Key reactor parameters are obtained via DC powered instrumentation. A DC load stripping strategy is employed to extend battery life.

No specific Containment control is required in Phase 1 as both temperature and pressure stay within design limit for the first 72 hours of the event. Key Containment Parameters are obtained from DC powered instrumentation.

No specific Spent Fuel Pool level control is required in Phase 1 as both temperature and level stay within design limit for the first 65 hours of the event (assuming the worst case heat load). Spent Fuel Pool level is obtained from the new wide range Spent Fuel Pool level instrumentation installed under Commission Order EA-12-051.

Flex Phase 2, hour 6 to 24, strategy relies on installed plant equipment and FLEX portable equipment. If the Steam Generators (SGs) are available reactor core cooling and heat removal are achieved via steam release from the SGs via local manual operation of the ADVs and with SG makeup from the Turbine Driven Auxiliary Feedwater Pump (TDAFWP) during FLEX Phase 2 with suction from the fully protected #12 Condensate Storage Tank. FLEX Portable pumps are used to replenish the #12 CST. The Phase 2 alternate strategy includes SG cooling water make-up via a FLEX portable pump, with suction from an alternate water sources such as any other surviving CST, Fire Protection System water storage tanks, Well Water System or the Chesapeake Bay as a last resort. Reactor inventory control and heat removal is accomplished by SIT tank injection. One FLEX portable 500KW 480VAC diesel generator per unit is installed and connected to a 480 VAC Load Center. This repowered Load Center will provide power to battery chargers, SIT tank MOVs, and a charging pump for inventory restoration. An alternate inventory control method is with a FLEX portable pump connected to the HPSI piping via the FLEX mechanical connections located in the Auxiliary Building. Boration for shutdown margin is not needed for up to 32 hours, however, shutdown margin is maintained by use of boric acid storage tanks with subsequent RCS injection using the Charging Pumps or a FLEX portable pump.

In Mode 5 or 6 if the steam generators are unavailable RCS inventory can be maintained by gravity feed of the RWT or by use of portable flex pumps aligned to injection points to the RCS.

Key reactor parameters are obtained via DC powered instrumentation or use of a 100KW 480 VAC generator powering a reactor MCC and the inverters backup bus. (This is the alternate strategy to load center repower)

No specific Containment control is required in Phase 2 as both temperature and pressure stay within design limit for the first 72 hours of the event. Key Containment Parameters are obtained from DC powered instrumentation.

No specific Spent Fuel Pool level control is required in Phase 2 as both temperature and level stay within design limit for the first 65 hours of the event. Spent Fuel Pool level is obtained from the new wide range Spent Fuel Pool level instrumentation installed under Commission Order EA-12-051.

Flex Phase 3, greater than 24 hours, strategy relies on installed plant equipment, FLEX portable equipment, and off-site equipment from the National SAFER Response Center (NSRC). Reactor core cooling and heat removal are accomplished by continued use of the Phase 2 Strategies. Restoration of these 4KV buses allows for restoration of more 480V busses for further redundancy. Key reactor parameters are obtained via DC powered instrumentation or use of a vital AC instrumentation supported by portable FLEX or NSRC generators.

No specific Containment control is required in Phase 3 as both temperature and pressure stay within design limit for the first 72 hours of the event.

Key containment parameters are obtained via DC powered instrumentation or use of a vital AC instrumentation supported by portable FLEX generators.

Spent Fuel Pool makeup is provided using either FLEX or NSRC portable pumps attached to exiting piping via flex mechanical connections. Spent Fuel level is obtained from the new wide range Spent Fuel Pool level instrumentation installed under Commission Order EA-12-051.

Table 2-1: CCNPP Phase 1 FLEX Strategy Summary

| | Safety Function | Primary Method | Alternate Method |
|---|---|---|---|
| Core Cooling | Reactor Core Cooling & Heat Removal | •TDAFW pumps with suction from CST<br>•Steam SGs via local manual ADV<br>•RCS cooldown to 350°F / 250psia SG 120psia | •Use standby TDAFW pump – if needed<br>•Set up FLEX portable AFW pumps such that final suction and discharge connections can be accomplished in < 1 hour. |
| Core Cooling | RCS Inventory Control & Heat Removal, | •Allow SITs to inject into RCS if needed upon completion of cooldown to 350°F / 250psia<br>•W/O SGs – RWT gravity feed | •W/O SGs – Use of FLEX Portable Pumps to provide RCS makeup and injection flow |
| Core Cooling | Key Reactor Parameters | •Temperature, pressure, level (RCS, SG, SIT)<br>•Use existing battery powered indication<br>•Extend coping with deep DC load stripping | |
| Containment | Containment Pressure Control & Remove Heat | •None required – pressure and temperature below limits for 72 hours | •None required – pressure and temperature below limits for 72 hours |
| Containment | Key Containment Parameters | •Temperature and pressure indication powered via vital buses | •Temperature and pressure indication powered via vital buses |
| SFP Cooling | Spent Fuel Cooling | •None required until T+65 hours (worst case) | •None required until T+65 hours |
| SFP Cooling | SFP Parameter | •SFP Wide Range Level Indicator | •SFP Wide Range Level Indicator |

Table 2-2: CCNPP Phase 2 FLEX Strategy Summary

| Safety Function | | Primary Method | Alternate Method |
|---|---|---|---|
| Core Cooling | Reactor Core Cooling & Heat Removal (S/D Mode with Steam Generators Available) | •TDAFW pumps with suction from CST<br>•Steam SGs via local manual ADV<br>•Replenish CST with FLEX portable pump | •Use standby TDAFW pump – if needed<br>•Move available tank fluid with FLEX portable pump to S/G<br>•Obtain water from Chesapeake Bay |
| Core Cooling | RCS Inventory Control & Heat Removal, (Shutdown Modes with Steam Generators Not Available) | •SITs inject into RCS (If needed) after cooldown to 350°F / 250psia<br>•Repower SIT MOVs via vital 480VAC MCCs powered by FLEX portable 480V DG<br>•Repower a Charging pump via vital 480VAC Load Center powered by FLEX 480V DG<br>•W/O SGs – RWT gravity feed | •Move RWT fluid with FLEX portable pump to HPSI headers – use boric acid batching tanks to provide Boric Acid |
| Core Cooling | Key Reactor Parameters | •500KW 480VAC FLEX generator repower one Vital Load center to repower battery charger | •100KW 480VAC FLEX generator repower one MCC feeding Inverter backup bus and SIT MOVs |
| Containment | Containment Pressure Control & Remove Heat | •None required – pressure and temperature below limits for 72 hours | •None required – pressure and temperature below limits for 72 hours |
| Containment | Key Containment Parameters | •Temperature and pressure indication powered via vital buses | •Temperature and pressure indication powered via vital buses |
| SFP Cooling | Spent Fuel Cooling | •None required until T+65 hours | •None required until T+65 hours |
| SFP Cooling | SFP Parameter | •SFP Wide Range Level Indicator | •SFP Wide Range Level Indicator |

Table 2-3: CCNPP Phase 3 FLEX Strategy Summary

| Safety Function | | Primary Method | Alternate Method |
|---|---|---|---|
| Core Cooling | Reactor Core Cooling & Heat Removal (S/D Mode with Steam Generators Available) | •TDAFW pumps with suction from CST<br>•Steam SGs via local manual ADV<br>•Replenish CST with FLEX portable pump | •Use standby TDAFW pump – if needed<br>•Move available tank fluid with FLEX portable pump to S/G<br>•Obtain water from Chesapeake Bay |
| Core Cooling | RCS Inventory Control & Heat Removal, (Shutdown Modes with Steam Generators Not Available) | •SITs inject into RCS (if needed) after cooldown to 350°F / 250psia<br>•Repower SIT MOVs via vital 480VAC MCCs powered by FLEX portable 480V DG<br>•Repower a Charging pump via vital 480VAC Load Center powered by FLEX 480V DG<br>•W/O SGs – RWT gravity feed | •Move RWT fluid with FLEX portable pump to HPSI headers – use boric acid batching tanks to provide Boric Acid |
| Core Cooling | Key Reactor Parameters | •500KW 480VAC FLEX generator repower one Vital Load center to repower battery charger | •100KW 480VAC FLEX generator repower one MCC feeding Inverter backup bus and SIT MOVs |
| Containment | Containment Pressure Control & Remove Heat | •None required – pressure and temperature below limits for 72 hours | •None required – pressure and temperature below limits for 72 hours |
| Containment | Key Containment Parameters | •Temperature and pressure indication powered via vital buses | •Temperature and pressure indication powered via vital buses |
| SFP Cooling | Spent Fuel Cooling | •None required until T+65 hours | •None required until T+65 hours |
| SFP Cooling | SFP Parameter | •SFP Wide Range Level Indicator | •SFP Wide Range Level Indicator |

# 3 EQUIPMENT SELECTION PROCESS AND ESEL

The selection of equipment for the ESEL followed the guidelines of EPRI 3002000704 (Ref. 2). The ESELs for Unit 1 and Unit 2 are presented in Attachments A and B, respectively.

## 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 Calvert Cliffs Overall Integrated Plan (OIP)(Ref.3), and August 2013(Ref.4a), February 2014 (Ref. 4b), and August 2014 (Ref. 4c) six month updates, in Response to the March 12, 2012, Commission Order EA-12-049 (Ref. 3). The OIP provides the Calvert Cliffs 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 Calvert Cliffs OIP (Ref. 3). FLEX recovery actions are excluded from the ESEP scope per EPRI 3002000704 (Ref. 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 sub-criticality, and containment integrity functions. Portable and pre-staged FLEX equipment (not permanently installed) are excluded from the ESEL per EPRI 3002000704 (Ref. 2).

The ESEL component selection followed the EPRI guidance outlined in Section 3.2 of EPRI 3002000704 (Ref. 2).

1. The scope of components is limited to that required to accomplish the core cooling and containment safety functions identified in Table 3-2 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 Calvert Cliffs OIP (Ref. 3).
2. The scope of components is limited to installed plant equipment, and FLEX connections necessary to implement the Calvert Cliffs OIP (Ref. 3) as described in Section 2.
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 "Primary" FLEX success path is to be specified. Selection of the "Back-up/Alternate" FLEX success path must be justified.
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 (Ref. 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.)

7. For cases in which neither train was specified as a primary or back-up strategy, then only one train component (generally 'A' train) is included in the ESEL.

3.1.1 ESEL Development

The ESEL was developed by reviewing the OIP (Ref. 3) to determine the major equipment involved in the FLEX strategies. The bases for the Calvert OIP are the actions identified in the following site procedures:

EOP-7- 1 Calvert Cliffs Nuclear Plant Power Plant Technical Procedure Unit One EOP-7 Station Blackout Revision 17

EOP-7- 2 Calvert Cliffs Nuclear Plant Power Plant Technical Procedure Unit Two EOP-7 Station Blackout Revision 17

EOP-7-TB Calvert Cliffs Nuclear Plant Power Plant Station Blackout EOP-7 Technical Basis Revision 21

Action Value Basis Documents - Various

These procedures have been in place for several years and contain guidance of how to cope with an extended loss of offsite power. EOP-07 is part of Operations training and been used in multiple simulator scenarios and drills. The Technical basis provides the background and supporting engineering. When instrumentation or parameter decision points are identified in the Technical Basis a supporting engineering document, Action Value Basis Document (AVBD), is created. This document is produced by engineering and it identifies the appropriate instrumentation and associated instrument qualifications i.e. EQ, Seismic, PAM1, PAM 2. Engineering standard ES-011 provides an explanation of these various classifications. As an example PAM1 means an instrument is 1E powered and will be available as long as DC power, Station Batteries, are available. These documents are also used to identify specific parameter values where action needs to be taken and the basis for that value. As an example, AVBD EOP -09.02 identifies the level at which the AFW pump suction needs to transferred to an alternate source and the basis for that level.

The referenced AVBD's were used to identify the instruments selected for the ESEL. The items on the ESEL include the transmitter in the field as well as the various panels containing the necessary indications. Only one channel of instruments was evaluated as defined on page 3-3 of EPRI 3002000704 (Ref 2).

As these procedures are all approved and have an engineering basis they were used in conjunction with the OIP to generate the ESEL. It was not necessary to retrace these previously engineered actions through the P&ID's and logic diagrams as they have all been previously verified.

Connection points identified in the OIP for Phase 2 and 3 actions were included in the ESEL. At Calvert the electrical connections are being made via connection device (modified breaker) which will be placed in a spare cubicle, during Phase 2 or 3, on the designated load centers. All of these load centers are included in the ESEL as well as downstream load centers needed to perform Phase 2 and 3 FLEX activities. These components were verified by review of the plants single line electrical drawings.

Major mechanical, electrical, components, flowpaths and valves identified in the ESEL are the same as those identified in the EOP and the OIP. The ESEL used the guidance as outlined in EPRI 3002000704 (Ref. 2) and the appropriate exemptions as discussed below.

### 3.1.2 Power Operated Valves

Page 3-3 of EPRI 3002000704 (Ref. 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/AFW trips)." To address this concern, the following guidance is applied in the Calvert Cliffs 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.

### 3.1.3 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 (Ref. 2).

### 3.1.4 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.

### 3.1.5 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).

### 3.1.6 Phase 2 and Phase 3 Piping Connections

Item 2 in Section 2.1 above notes that the scope of equipment in the ESEL includes "... FLEX connections necessary to implement the Calvert Cliffs OIP (Ref. 3) as described in Section 2." Item 3 in Section 2.1 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 2.1 above goes on to explain that "Piping, cabling, conduit, HVAC, and their supports" are excluded from the ESEL scope in accordance with EPRI 3002000704 (Ref. 2). Therefore, piping and pipe supports associated with FLEX Phase 2 and Phase 3 connections are excluded from the scope of the ESEP evaluation. However, any active valves in FLEX Phase 2 and Phase 3 connection flow path are included in the ESEL.

## 3.2 Justification for use of Equipment that is not the primary means for FLEX implementation

No alternate equipment is used to support the "Primary Means" for Flex implementation.

# 4 GROUND MOTION RESPONSE SPECTRUM (GMRS)

## 4.1 Plot of GMRS Submitted by the Licensee

In accordance with Section 2.4.2 of the SPID (Ref. 14), the licensing design basis definition of the SSE control point for CCNPP is used for comparison to the GMRS. March submittal report (Ref. 6) lists the Calvert Cliffs SSE PGA to be 0.15g.

The GMRS per the March submittal report (Ref. 6) is tabulated and graphed below:

**Table 4.1-1 Calvert Cliffs GMRS (5% Damping)**

| Freq. (Hz) | GMRS (unscaled, g) | Freq. (Hz) | GMRS (unscaled, g) |
|---|---|---|---|
| 100 | 0.112 | 3.5 | 0.176 |
| 90 | 0.115 | 3 | 0.164 |
| 80 | 0.119 | 2.5 | 0.148 |
| 70 | 0.124 | 2 | 0.143 |
| 60 | 0.13 | 1.5 | 0.128 |
| 50 | 0.138 | 1.25 | 0.117 |
| 40 | 0.149 | 1 | 0.097 |
| 35 | 0.157 | 0.9 | 0.087 |
| 30 | 0.168 | 0.8 | 0.0827 |
| 25 | 0.185 | 0.7 | 0.0795 |
| 20 | 0.18 | 0.6 | 0.065 |
| 15 | 0.182 | 0.5 | 0.0568 |
| 12.5 | 0.188 | 0.4 | 0.0454 |
| 10 | 0.188 | 0.35 | 0.0398 |
| 9 | 0.194 | 0.3 | 0.0341 |
| 8 | 0.2 | 0.25 | 0.0284 |
| 7 | 0.204 | 0.2 | 0.0227 |
| 6 | 0.203 | 0.15 | 0.017 |
| 5 | 0.2 | 0.125 | 0.0142 |
| 4 | 0.185 | 0.1 | 0.0114 |

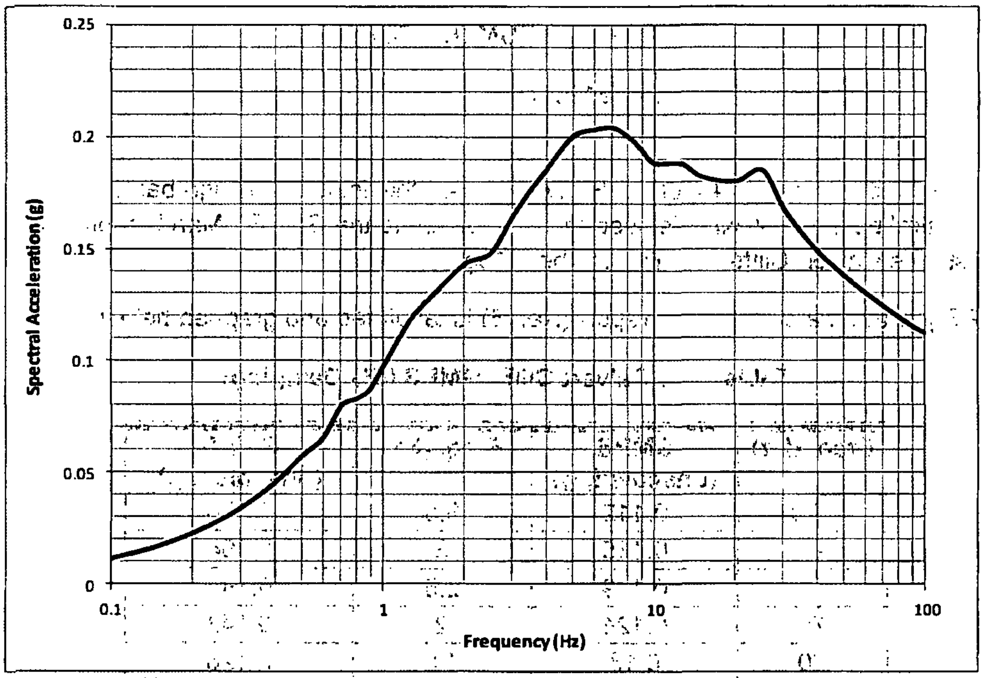


**Figure 4.1-1 Calvert Cliffs GMRS (5% Damping)**

## 4.2 Comparison to SSE

As identified in the March submittal report (Ref. 6), the GMRS exceeds the SSE in the 1-10 Hz range as shown in the table and graph below:

**Table 4.2-1 Calvert GMRS vs. SSE (5% Damping)**

| Freq. (Hz) | SSE (g) | GMRS (g) |
|---|---|---|
| 10 | 0.16 | 0.188 |
| 9 | 0.168 | 0.194 |
| 8 | 0.179 | 0.2 |
| 7 | 0.188 | 0.204 |
| 6 | 0.197 | 0.203 |
| 5 | 0.212 | 0.2 |
| 4 | 0.222 | 0.185 |
| 3.5 | 0.226 | 0.176 |
| 3 | 0.226 | 0.164 |
| 2.5 | 0.217 | 0.148 |
| 2 | 0.198 | 0.143 |
| 1.5 | 0.166 | 0.128 |
| 1.25 | 0.145 | 0.117 |
| 1 | 0.123 | 0.097 |
| 0.9 | 0.112 | 0.087 |
| 0.8 | 0.104 | 0.0827 |
| 0.7 | 0.095 | 0.0795 |
| 0.6 | 0.085 | 0.065 |
| 0.5 | 0.074 | 0.0568 |
| 0.4 | 0.063 | 0.0454 |
| 0.35 | 0.057 | 0.0398 |
| 0.3 | 0.049 | 0.0341 |
| 0.25 | 0.041 | 0.0284 |
| 0.2 | 0.029 | 0.0227 |
| 0.15 | 0.018 | 0.017 |
| 0.125 | 0.012 | 0.0142 |
| 0.1 | 0.008 | 0.0114 |

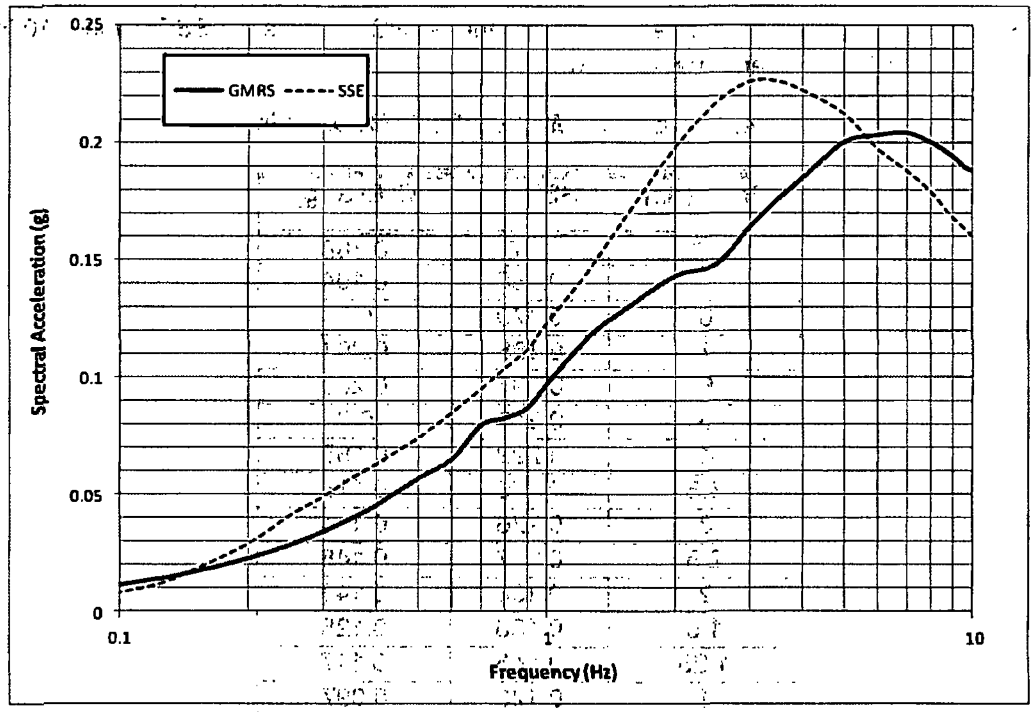


**Figure 4.2-1 Calvert Cliffs GMRS vs. SSE (5% Damping)**

# 5 REVIEW LEVEL GROUND MOTION (RLGM)

## 5.1 Description of RLGM Selected

The RLGM for Calvert Cliffs was determined in accordance with Section 4 of EPRI 30020000704 (Ref. 2), and Generation of Scaled In-Structure Response Spectra for CCNPP (Ref. 21) as being derived by linearly scaling the SSE by the maximum ratio of the GMRS/SSE between the 1 and 10 hertz range.

The ratio between the GMRS and SSE at 5% damping is tabulated below.

**Table 5.1-1 Ratio between GMRS and SSE (5% Damping)**

| Freq. (Hz) | SSE (g) | GMRS (g) | GMRS/SSE |
|---|---|---|---|
| 10 | 0.160 | 0.188 | 1.17 |
| 9 | 0.168 | 0.194 | 1.15 |
| 8 | 0.179 | 0.200 | 1.12 |
| 7 | 0.188 | 0.204 | 1.09 |
| 6 | 0.197 | 0.203 | 1.03 |
| 5 | 0.212 | 0.200 | 0.94 |
| 4 | 0.222 | 0.185 | 0.83 |
| 3.5 | 0.226 | 0.176 | 0.78 |
| 3 | 0.226 | 0.164 | 0.73 |
| 2.5 | 0.217 | 0.148 | 0.68 |
| 2 | 0.198 | 0.143 | 0.72 |
| 1.5 | 0.166 | 0.128 | 0.77 |
| 1.25 | 0.145 | 0.117 | 0.81 |
| 1 | 0.123 | 0.097 | 0.79 |
| 0.9 | 0.112 | 0.087 | 0.78 |
| 0.8 | 0.104 | 0.0827 | 0.80 |
| 0.7 | 0.095 | 0.0795 | 0.84 |
| 0.6 | 0.085 | 0.065 | 0.76 |
| 0.5 | 0.074 | 0.0568 | 0.77 |
| 0.4 | 0.063 | 0.0454 | 0.72 |
| 0.35 | 0.057 | 0.0398 | 0.70 |
| 0.3 | 0.049 | 0.0341 | 0.70 |
| 0.25 | 0.041 | 0.0284 | 0.69 |
| 0.2 | 0.029 | 0.0227 | 0.78 |
| 0.15 | 0.018 | 0.017 | 0.94 |
| 0.125 | 0.012 | 0.0142 | 1.18 |
| 0.1 | 0.008 | 0.0114 | 0.81 |

The maximum ratio between the 5% damping GMRS and horizontal SSE occurs at 10 Hz and equals 1.17.

The resulting RLGM based on increasing the horizontal SSE by the maximum ratio of 1.17 is plotted below.

**Table 5.1-2 – Calvert Cliffs RLGM (5% Damping)**

| Freq. (Hz) | RLGM (g) | Freq. (Hz) | RLGM (g) |
|---|---|---|---|
| 100 | 0.176 | 3.5 | 0.264 |
| 90 | 0.176 | 3 | 0.264 |
| 80 | 0.176 | 2.5 | 0.253 |
| 70 | 0.176 | 2 | 0.232 |
| 60 | 0.176 | 1.5 | 0.194 |
| 50 | 0.176 | 1.25 | 0.170 |
| 40 | 0.176 | 1 | 0.144 |
| 35 | 0.177 | 0.9 | 0.131 |
| 30 | 0.177 | 0.8 | 0.122 |
| 25 | 0.177 | 0.7 | 0.111 |
| 20 | 0.178 | 0.6 | 0.099 |
| 15 | 0.178 | 0.5 | 0.087 |
| 12.5 | 0.178 | 0.4 | 0.074 |
| 10 | 0.187 | 0.35 | 0.067 |
| 9 | 0.197 | 0.3 | 0.057 |
| 8 | 0.209 | 0.25 | 0.048 |
| 7 | 0.220 | 0.2 | 0.034 |
| 6 | 0.230 | 0.15 | 0.021 |
| 5 | 0.248 | 0.125 | 0.014 |
| 4 | 0.259 | 0.1 | 0.009 |

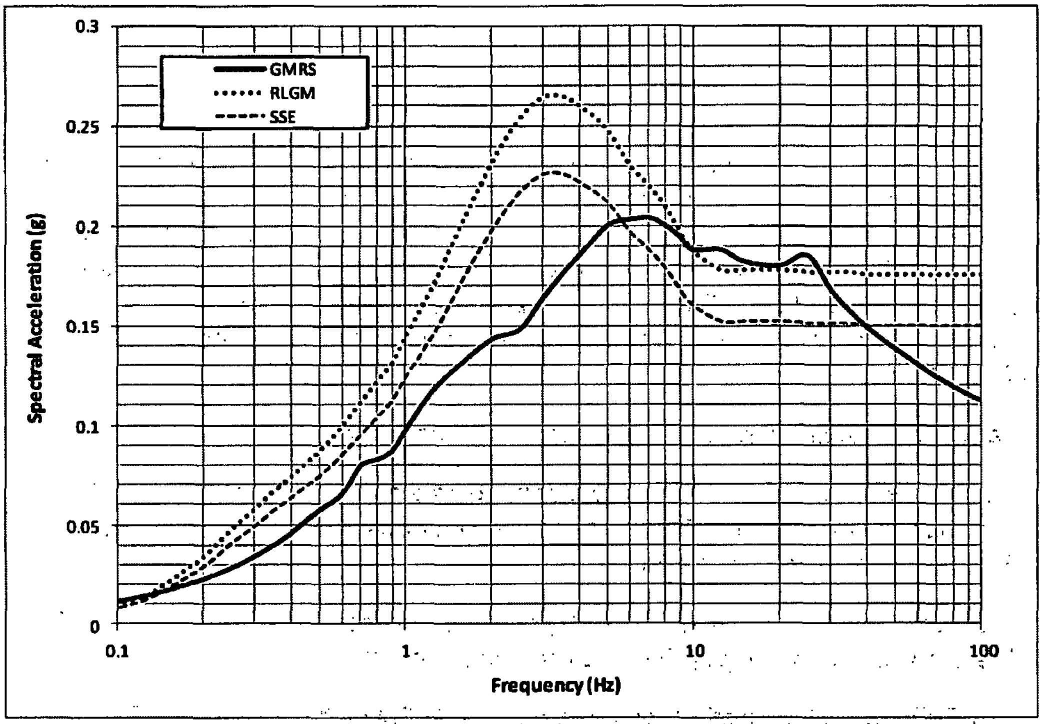


**Figure 5.1-1 Calvert Cliffs RLGM, GMRS & SSE (5% Damping)**

## 5.2 Method to Estimate ISRS

The method used to derive the ESEP in-structure response spectra (ISRS) was to scale the existing SSE-based ISRS obtained from DCALC No. CA04085, Rev. 0 (Ref. 18) by the maximum ratio of 1.17. The scaled ISRS was determined for all buildings and elevations where ESEL items are located at Calvert Cliffs.

# 6 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 peak ground acceleration (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 (Ref. 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, A Methodology for Assessment of Nuclear Power Plant Seismic Margin (Revision 1) (Ref. 7).

2. Probabilistic approach using the fragility analysis methodology of EPRI TR-103959, Methodology for Developing Seismic Fragilities (Ref. 8).

For Calvert Cliffs, the deterministic approach using the CDFM methodology of EPRI NP-6041 (Ref. 7) was used to determine HCLPFs.

## 6.1 Summary of Methodologies Used

Calvert Cliffs conservatively applied the methodology of EPRI NP-6041 (Ref. 7) to all items on the ESEL. The screening walkdowns used the screening tables from Chapter 2 of EPRI NP-6041 (Ref. 7). The walkdowns were conducted by engineers who as a minimum attended the SQUG Walkdown Screening and Seismic Evaluation Training Course. The walkdowns were documented on Screening Evaluation Work Sheets from EPRI NP-6041 (Ref. 7). Anchorage capacity calculations used the CDFM criteria from EPRI NP-6041 (Ref. 7) with Calvert Cliffs specific allowables and material strengths used as applicable. Seismic demand was based on the RLGM provided in Table 5.1-2 and Figure 5.1-1.

## 6.2 HCLPF Screening Process

The peak spectral acceleration for the RLGM equals to 0.264 g (Table 5.1-2). The screening tables in EPRI NP-6041 (Ref. 7) are based on ground peak spectral accelerations of 0.8g and 1.2g. All Calvert Cliffs ESEL components were screened against the caveats of the <0.8g column of Table 2-4 of NP-6041 (Ref. 7). For components located 40 feet above grade, screening based on ground peak spectral acceleration is not applicable and additional consideration is required. In accordance with Appendix B of EPRI 1019200 (Ref. 19), components that are above 40 feet from grade and have corresponding ISRS at the base of component not in exceedance of 1.2g in the component frequency range of interest may be screened using the caveats of the 1st screening column.

## 6.3 Seismic Walkdown Approach

### 6.3.1 Walkdown Approach

Walkdowns for Calvert Cliffs were performed in accordance with the criteria provided in Section 5 of EPRI 3002000704 (Ref. 2), which refers to EPRI NP-6041 (Ref. 7) for the Seismic Margin Assessment process. Pages 2-26 through 2-30 of EPRI NP-6041 (Ref. 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 or 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] (Ref. 2, page 5-4) 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 which 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"* of EPRI 3002000704 (Ref. 2), which refers to EPRI NP-6041 (Ref. 7) for the Seismic Margin Assessment process. Pages 2-26 through 2-30 of EPRI NP-6041 (Ref. 7) describe the seismic walkdown criteria, including the following key criteria.

The Calvert Cliffs walkdowns included as a minimum a 100% walk-by of all items on the ESEL except as noted in Section 7.0. Any previous walkdown information that was relied upon for SRT judgment is documented in Section 6.3.2. ESEP Walkdown and Screening Report (Ref. 20) documents the walkdown results.

### 6.3.2 Application of Previous Walkdown Information

Previous seismic walkdowns were used to support the ESEP seismic evaluations. Some of the components on the ESEL were included in the NTTF 2.3 seismic walkdowns (Ref. 16).

Several ESEL items were previously walked down during the Calvert Cliffs Seismic IPEEE program. Those walkdown results were reviewed and the following steps were taken to confirm that the previous walkdown conclusions remained valid.

A walk by was performed to confirm that the equipment material condition and configuration is consistent with the walkdown 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.

[1] EPRI 3002000704 (Ref. 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." Other potential seismic interaction evaluations are "deferred to the full seismic risk evaluations performed in accordance with EPRI 1025287 (Ref. 14)."

The seismic walkdowns for Calvert Cliffs included as a minimum a walk-by of all the components on the ESEL with the exception of the items inside containment as they were not accessible at the time of the walkdowns.

### 6.3.3 Significant Walkdown Findings

Consistent with that guidance from NP-6041 (Ref. 7), no significant outliers or anchorage concerns were identified during the Calvert Cliffs 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 to withstand the seismic loads resulting from the RLGM. For any cases where the block wall represented the HCLPF failure mode for an ESEL item, it is noted in the tabulated HCLPF values in Attachments C and D described in Section 6.6.
- The component 1PI-3988 was screened in due to the fact that mounting is missing a manufacturer screw, however the anchorage was judged adequate and no HCLPF was calculated for the component. The missing screw is required to be replaced in order for the component to be screened out and a HCLPF greater than the RLGM could be credited. CR-2014-003666 was entered into Corrective action process. Work Order C92642395 has been generated to replace missing screw; therefore 1PI-3988 will screen out as the HCLPF will be greater than RLGM.

## 6.4 HCLPF Calculation Process

ESEL items were evaluated using the criteria in EPRI NP-6041 (Ref. 7). Those evaluations included the following steps:

- Performing seismic capability walkdowns for equipment to evaluate the equipment installed plant conditions
- Performing screening evaluations using the screening tables in EPRI NP-6041(Ref. 7) 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.

All HCLPF calculations were performed using the CDFM methodology and are documented in CDFM HCLPF calculation (Ref. 9).

Anchorage for non-valve components was evaluated either by SRT judgment or CDFM HCLPF calculation (Ref. 9).

### 6.5 Functional Evaluation of Relays

No relays existed in the Calvert Cliffs ESEL, therefore, no evaluations were performed for relay functionality.

### 6.6 Tabulated ESEL HCLPF Values (including Key failure modes)

Tabulated ESEL HCLPF values including the key failure modes are included in Attachment C for Unit 1 and common items and in Attachment D for Unit 2 items.

- For items screened out using NP 6041 (Ref. 7) screening tables, the screening level is provided as (0.53g) and the failure mode is listed as "Screened out". The PGA associated with the $1^{st}$ screening lane is calculated by obtaining the ratio between the peak spectral acceleration of the $1^{st}$ screening lane (0.8g), and RLGM peak spectra acceleration (0.264g), then multiplying it by the RLGM PGA (0.175g) as follows; (0.8g/0.264g)*0.175g=0.53g. Hence, any anchorage HCLPF calculated is beyond 0.53g.
- For items that were screened out using SMA analysis in the checklists and no HCLPFs were calculated, a HCLPF value of ">RLGM" is assigned to the component and the failure mode is listed as "Screened out".
- For items above 40 feet which are screened out for anchorage, the associated PGA is calculated by obtaining the ratio between the peak spectral acceleration of the $2^{nd}$ screening lane (1.2g) multiplied by 1.5 for above 40 feet criteria, and ISRS peak spectra acceleration above 40 feet (1.25g) per section 5.2 in Reference 20, then multiplying it by the RLGM PGA (0.175g) as follows; (1.2g*1.5/1.25g)*0.175g=0.252g. The failure mode is also listed as "Screened out".
- For items where anchorage controls the HCLPF value, the HCLPF value is listed in the table and the failure mode is noted as "Anchorage Capacity".
- For items where anchorage HCLPF was calculated to be higher than the PGA associated with the $1^{st}$ screening lane per EPRI NP 6041 (Ref. 7), the anchorage is not identified as the critical failure mode and the failure mode is noted as "Equipment Capacity" as the anchorage does not control the capacity and an equipment HCLPF capacity of 0.53g ($1^{st}$ screening lane) is assigned to the equipment.
- For items whose capacities were controlled by nearby blockwalls as the nearby blockwall capacities were lower than the equipment and the anchorage capacities, a blockwall HCLPF value of 0.175g calculated per 14Q4242-CAL-002 (Ref. 9) (Ref. 9) is assigned to the component. The failure mode is noted as "Interaction with Blockwalls".
- For components were functionality controls the capacity, a HCLPF value of "<RLGM" is assigned to the component, and the failure mode is noted as "Functionality".

# 7 INACCESSIBLE ITEMS

## 7.1 Identification of ESEL Items Inaccessible For Walkdowns

All items located inside containment were inaccessible. Photos of Unit 1 containment items were used for the screening and HCLPF evaluations. No photos were available for the Unit 2 items, Calvert Cliffs states that the two units are sufficiently similar to be considered identical; therefore Unit 1 screening and HCLPF evaluations were applied to Unit 2 containment items.

## 7.2 Planned Walkdown / Evaluation Schedule / Close Out

Since all items that were inaccessible during the ESEP were resolved by alternative means (i.e. confirmatory photos and similar states) to the satisfaction of the SRT, no additional walkdowns are required.

# 8 ESEP CONCLUSIONS AND RESULTS

## 8.1 Supporting Information

Calvert Cliffs has performed the ESEP as an interim action in response to the NRC's 50.54(f) Screening and Prioritization letter dated May 9, 2014 (Ref. 13). It was performed using the methodologies in the NRC endorsed guidance in EPRI 3002000704 (Ref. 2).

The ESEP provides an important demonstration of seismic margin and expedites plant safety enhancements through evaluations and potential near-term modifications 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 Calvert Cliffs response to the NRC's 50.54(f) letter (Ref. 1). On March 12, 2014, NEI submitted to the NRC results of a study (Ref. 11) 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 (Ref. 13) 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 Calvert Cliffs was included in the fleet risk evaluation submitted in the March 12, 2014 NEI letter (Ref. 11) therefore, the conclusions in the NRC's May 9 letter (Ref. 13) also apply to Calvert Cliffs .

In addition, the March 12, 2014 NEI letter (Ref. 11) 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 which 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
- 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

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.

## 8.2 Summary of ESEP Identified and Planned Modifications

The results of the Calvert Cliffs ESEP performed as an interim action in response to the NRC's 50.54(f) letter (Ref. 1) using the methodologies in the NRC endorsed guidance in EPRI 3002000704 (Ref. 2) show that all equipment evaluated are adequate in resisting the seismic loads expected to result from the site RLGM. Therefore, no plant modifications are required as a result of the Calvert Cliffs ESEP.

## 8.3 Modification Implementation Schedule

No modifications are required.

## 8.4 Summary of Regulatory Commitments

No regulatory commitments are required.

# 9 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. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), Supplement to Overall Integrated Plan for Mitigation Strategies for Beyond-Design-Basis External Events, dated March 8, 2013

4. (a) Letter from E. D. Dean (CENG) to Document Control Desk (NRC), Calvert Cliffs Nuclear Power Plant, Units 1 and 2 Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated August 27, 2013 (ADAMS Accession No. ML 13254A278)

   (b) Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), February 2014 Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 27, 2014 (ADAMS Accession No. ML 14069A318)

   (c) Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), August 2014 Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated August 26, 2014

5. Reference Deleted.

6. Seismic Hazard and Screening Report in Response to the 50.54(f) Information Request Regarding Fukushima Near-Term Task Force Recommendation 2.1: Seismic for the Calvert Cliffs Nuclear Power Plant dated 3/12/14, (S&L Report SL-012325, Revision 0)

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

8. Methodology for Developing Seismic Fragilities, August 1991, EPRI, Palo Alto, CA. 1994, TR-103959

9. 14Q4242-CAL-002 Rev. 1 "Seismic Capacity of Components for ESEP"

10. Nuclear Regulatory Commission, NUREG/CR-0098, Development of Criteria for Seismic Review of Selected Nuclear Power Plants, published May 1978

11. 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

12. Nuclear Energy Institute (NEI), A. Pietrangelo, Letter to D. Skeen of the USNRC, "Proposed Path Forward for NTTF Recommendation 2.1: Seismic Reevaluations", April 9, 2013

13. 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

14. 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 (EPRI 1025287)

15. NRC (E Leeds) Letter to NEI (J Pollock), "Electric Power Research Institute Final Draft Report, "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," May 7, 2013

16. NTTF 2.3 Seismic Walkdown Submittals
    a. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC),"Response to 10CFR 50.54(f) Request for Information, Recommendation 2.3, Seismic" Calvert Cliffs Nuclear Power Plant, Unit 1, Dated November 27, 2012
    b. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC),"Response to 10CFR 50.54(f) Request for Information, Recommendation 2.3, Seismic" Calvert Cliffs Nuclear Power Plant, Unit 2, Dated November 27, 2012

17. Calvert Cliffs Updated Final Safety Analysis Report (UFSAR)

18. DCALC No. CA04085, Rev. 0 " Numeric (Digitized) Seismic Response Spectras"

19. EPRI Technical Report (TR) 1019200, "Seismic Fragility Applications Guide Update" December-2009.

20. S&A Calculation 14Q4242-RPT-002 Rev. 0 "ESEP Walkdown and Screening Report for Calvert Cliffs"

21. 14Q4242-CAL-001 Rev.1 "Generation of Scaled In-Structure Response Spectra for CCNPP"

22. CCNPP transmittal letter to S&A for sections 2 and 3 for the ESEP Report dated 12/2/2014

23. CCNPP transmittal to S&A for Attachments A and B for the ESEP Report via email received on 10/30/2014

## 10 ATTACHMENTS

### 10.1 Attachment A
### Calvert Cliffs Unit 1 and Common Area ESEL (Ref. 23)

**Calvert Cliffs Unit 1 and Common Area ESEL**

| ESEL Item Number | | Equipment | Operating State | | Notes/Comments |
|---|---|---|---|---|---|
| 1 | 11 TDAFW | Turbine Driven Aux Feedwater Pump | Standby | Manual in service | EOP-0 Plant Trip, EOP-7 Sation Blackout |
| 2 | 1PI-3986 | TDAFW Pp Steam Supply Press | Standby | Manual in service | Instrument for local manual operation of AFW |
| 3 | 1PI-4501 | TDAFW Pp Discharge Press | Standby | Manual in service | Instrument for local manual operation of AFW |
| 4 | 12 TDAFW | Turbine Driven Aux Feedwater Pump | Standby | Manual in service | EOP-0 Plant Trip, EOP-7 Sation Blackout |
| 5 | 1PI-3988 | TDAFW Pp Steam Supply Press | Standby | Manual in service | Instrument for local manual operation of AFW |
| 6 | 1PI-4502 | TDAFW Pp Discharge Press | Standby | Manual in service | Instrument for local manual operation of AFW |
| 13 | 1CV3939 | 12 S/G Atmospheric Dump Valve | Standby | Manual in service | EOP-0 Plant Trip, EOP-7 Sation Blackout |
| 14 | 1CV3938 | 11 S/G Atmospheric Dump Valve | Standby | Manual in service | EOP-0 Plant Trip, EOP-7 Sation Blackout |
| 17 | 12 CST | Condensate Storage Tank | In service | In service | EOP-0 Plant Trip, EOP-7 Sation Blackout |
| 18 | 0LT5610 | 12 CST Level Indication | In service | In service | 1LIA-5610 on Panel 1C04 |
| 19 | 0LT5611 | 12 CST Level Indication | In service | In service | 1LIA-5611 on Panel 1C04 |
| 20 | 1A01 (1BUS1A01) | AP/4KV BUS 11 | In service | Energized | 2000 KW DG from NSRC connection point |
| 21 | 1A04 (1BUS1A04) | AP/4KV BUS 14 | In service | Energized | 2000 KW DG from NSRC connection point |

**Calvert Cliffs Unit 1 and Common Area ESEL**

| ESEL Item Number | Equipment | | Operating State | | Notes/Comments |
|---|---|---|---|---|---|
| 22 | 1D01 (1BUS1D01) | AP/125 VDC BUS 11 | In service | Energized | Power to Vital AC Inverter 11 |
| 23 | 1D02 (1BUS1D02) | AP/125 VDC BUS 12 | In service | Energized | Power to Vital AC Inverter 12 |
| 24 | 1D05 (1CHGR11) | AP/BATTERY CHARGER 11 | In service | Energized | Power to DC Bus 11 |
| 25 | 1D06 (1CHGR12) | AP/BATTERY CHARGER 12 | In service | Energized | Power to DC Bus 12 |
| 26 | 1D07 (1CHGR13) | AP/BATTERY CHARGER 13 | In service | Energized | Power to DC Bus 21 |
| 27 | 1D08 (1CHGR14) | AP/BATTERY CHARGER 14 | In service | Energized | Power to DC Bus 22 |
| 28 | 1D03/1D04 (1BATT1D03/4) | AP/125V BATTERY 11 | In service | Energized | Power to DC Bus 11 |
| 29 | 1D09/1D10 (1BATT1D09/10) | AP/125V BATTERY 12 | In service | Energized | Power to DC Bus 12 |
| 30 | 1D11 (1PNL1D11) | AP/125 VDC CONTROL PANEL 11 | In service | Energized | Power to Vital AC Inv 11 and 21 |
| 31 | 1D12 (1PNL1D12) | AP/125 VDC CONTROL PANEL 12 | In service | Energized | Power to Vital AC Inv 13 and 23 |
| 32 | 1D13 (1PNL1D13) | AP/125 VDC CONTROL PANEL 13 | In service | Energized | Vital Instrumentation Power Supply |
| 33 | 1D14 (1PNL1D14) | AP/125 VDC CONTROL PANEL 14 | In service | Energized | Vital Instrumentation Power Supply |
| 34 | 1D15 (1PNL1D15) | AP/125 VDC CONTROL PANEL 15 | In service | Energized | Vital Instrumentation Power Supply |
| 35 | 1D16 (1PNL1D16) | AP/125 VDC CONTROL PANEL 16 | In service | Energized | Vital Instrumentation Power Supply |
| 36 | 1D17 (1PNL1D17) | AP/125 VDC CONTROL PANEL 17 | In service | Energized | Vital Instrumentation Power Supply |

Calvert Cliffs Unit 1 and Common Area ESEL

| ESEL Item Number | Equipment | | Operating State | | Notes/Comments |
|---|---|---|---|---|---|
| 37 | 1Y01 (1PNL1Y01) | AP/120 VAC VITAL DIST PANEL 11 | In service | Energized | Vital Instrumentation Power Supply |
| 38 | 1Y01A (1INV1Y01A) | AP/INVERTER 11 | In service | Energized | Vital Instrumentation Power Supply |
| 39 | 1Y02 (1PNL1Y02) | AP/120 VAC VITAL DIST PANEL 12 | In service | Energized | Vital Instrumentation Power Supply |
| 40 | 1Y02A (1INV1Y02A) | AP/INVERTER 12 | In service | Energized | Vital Instrumentation Power Supply |
| 41 | 1Y03 (1PNL1Y03) | AP/120 VAC VITAL DIST PANEL 13 | In service | Energized | Vital Instrumentation Power Supply |
| 42 | 1Y03A (1INV1Y03A) | AP/INVERTER 13 | In service | Energized | Vital Instrumentation Power Supply |
| 43 | 1Y04 (1PNL1Y04) | AP/120 VAC VITAL DIST PANEL 14 | In service | Energized | Vital Instrumentation Power Supply |
| 44 | 1Y04A (1INV1Y04A) | AP/INVERTER 14 | In service | Energized | Vital Instrumentation Power Supply |
| 45 | 1Y01-1 (1PNL1Y01-1) | AP/120 VAC VITAL DIST PANEL | In service | Energized | Vital Instrumentation Power Supply |
| 46 | 1Y02-1 (1PNL1Y02-1) | AP/120 VAC VITAL PANEL 12-1 | In service | Energized | Vital Instrumentation Power Supply |
| 47 | 1Y11 (1BUS1Y11) | AP/120 VAC INVERTER BACKUP BUS 11 | In service | Energized | Vital Instrumentation Power Supply |
| 76 | 1C03 (1PNL1C03) | IC/CONDENSATE AND FEEDWATER CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 77 | 1C04 (1PNL1C04) | IC/AUXILIARY FEEDWATER CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |

## Calvert Cliffs Unit 1 and Common Area ESEL

| ESEL Item Number | Equipment | | Operating State | | Notes/Comments |
|---|---|---|---|---|---|
| 78 | 1C05 (1PNL1C05) | IC/REACTIVITY CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 79 | 1C06 (1PNL1C06) | IC/REACTOR COOLANT SYSTEM CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 80 | 1C07 (1PNL1C07) | IC/CHEMICAL AND VOLUME CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 81 | 1C08 (1PNL1C08) | IC/ENGINEERING SAFEGUARDS CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 82 | 1C09 (1PNL1C09) | IC/ENGINEERING SAFEGUARDS CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 83 | 1C010 (1PNL1C10) | IC/ENGINEERING SAFEGUARDS CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 92 | 11 A SIT | 11 A Safety Injection Tank | In service | In service | EOP-7 Station Blackout |
| 93 | 1-SI-624-MOV | 11 A Safety Injection Tank Outlet | In service | In service | EOP-7 requires isolation |
| 94 | 1LT321 | 11 A SIT Level Transmitter | In service | In service | 1LI-321 on Panel 1C09 |
| 95 | 1PT-321 | 12 A SIT Pressure Transmitter | In service | In service | 1PI-321 on Panel 1C09 |
| 96 | 11 B SIT | 11 B Safety Injection Tank | In service | In service | EOP-7 Station Blackout |
| 97 | 1-SI-614-MOV | 11 B Safety Injection Tank Outlet | In service | In service | EOP-7 requires isolation |
| 98 | 1LT311 | 11 B SIT Level Transmitter | In service | In service | 1LI-311 on Panel 1C09 |
| 99 | 1PT-311 | 12 A SIT Pressure Transmitter | In service | In service | 1PI-311 on Panel 1C09 |
| 100 | 12 A SIT | 12 A Safety Injection Tank | In service | In service | EOP-7 Station Blackout |
| 101 | 1-SI-644-MOV | 12 A Safety Injection Tank Outlet | In service | In service | EOP-7 requires isolation |

Calvert Cliffs Unit 1 and Common Area ESEL

| ESEL Item Number | Equipment | | Operating State | | Notes/Comments |
|---|---|---|---|---|---|
| 102 | 1LT341 | 12 A SIT Level Transmitter | In service | In service | 1LI-341 on Panel 1C09 |
| 103 | 1PT-341 | 12 A SIT Pressure Transmitter | In service | In service | 1PI-341 on Panel 1C09 |
| 104 | 12 B SIT | 12 B Safety Injection Tank | In service | In service | EOP-7 Station Blackout |
| 105 | 1-SI-634-MOV | 12 B Safety Injection Tank Outlet | In service | In service | EOP-7 requires isolation |
| 106 | 1LT331 | 12 B SIT Level Transmitter | In service | In service | 1LI-331 on Panel 1C09 |
| 107 | 1PT-331 | 12 B SIT Pressure Transmitter | In service | In service | 1PI-331 on Panel 1C09 |
| 124 | 1PT-1013A | Steam Generator Safety Channel Pressure | In service | In service | 1PI-1013A on Panel 1C03 |
| 125 | 1PT-1023A | Steam Generator Safety Channel Pressure | In service | In service | 1PI-1023A on Panel 1C03 |
| 126 | 1LT-1124A | Steam Generator Wide Range Level | In service | In service | 1LI-1124A on Panel 1C04 |
| 127 | 1TT-112HA | Hot Leg Temp 11 | In service | In service | PAMS - 1PNL2C182A, TT in 1PNLC43E |
| 128 | 1TT-112CA | Cold Leg Temp 11A | In service | In service | PAMS - 1PNL2C182A, TT in 1PNLC43E |
| 129 | 1TT122HA | Hot Leg Temp 12 | In service | In service | PAMS - 1PNL2C182A, TT in 1PNLC43E |
| 130 | 1TT122CA | Cold Leg Temp 12A | In service | In service | PAMS - 1PNL2C182A, TT in 1PNLC43E |
| 131 | 1FT-4509A | SG Steam Train AFW Flow | Standby | In service | 1FI-4509A on 1PNLC43B |
| 132 | 1FT-4510A | SG Steam Train AFW Flow | Standby | In service | 1FI-4510A on 1PNLC43B |
| 133 | 1LT-110X | Pressurizer Level | In service | In service | 1LI-110X-1 on Panel 1CO6 |
| 134 | 1LT-110Y | Pressurizer Level | In service | In service | 1LI-110Y-1 on Panel 1CO6 |
| 135 | 1LT-103 | Pressurizer Level | In service | In service | 1LI-103 on Panel 1C06 |
| 136 | 1PT-105A | Pressurizer Pressure | In service | In service | 1PI105A on Panel 1C06 |
| 137 | 1NX001 | WR Log power Channels | In service | In service | PAMS, Panel 1C05 |
| 138 | 1NX002 | WR Log power Channels | In service | In service | PAMS, Panel 1C05 |
| 139 | 1NX003 | WR Log power Channels | In service | In service | PAMS, Panel 1C05 |

**Calvert Cliffs Unit 1 and Common Area ESEL**

| ESEL Item Number | | Equipment | Operating State | | Notes/Comments |
|---|---|---|---|---|---|
| 140 | 1NX004 | WR Log power Channels | In service | In service | PAMS, Panel 1C05 |
| 141 | 1PT-5307 | Containment Wide Range Pressure | In service | In service | 1PI-5307 on Panel 1C09 |
| 142 | 1PT-5310 | Containment Wide Range Pressure | In service | In service | 1PI-5310 on Panel 1C09 |
| 143 | 1TE-5309 | Containment Dome Temp | In service | In service | 1TE-5310 on Panel 1C09 |
| 144 | 1VI-11 (1-E1-211) | 11 Vital DC Bus Voltage | In service | In service | Panel 1C24 |
| 145 | 1VI-12 (1-E1-212) | 12 Vital DC Bus Voltage | In service | In service | Panel 1C24 |
| 165 | 1PNL1C182A | PAMS | In service | In service | Various Indications required for OIP execution-RX power, level pressure |
| 166 | 1PNL1C182B | PAMS | In service | In service | Various Indications required for OIP execution-RX power, level pressure |
| 172 | 0LT2001 | Spent Fuel pool Level 11 | In service | In service | EOP-7, AOP-6F Loss of SFP Cooling |
| 173 | 0LT2002 | Spent Fuel pool Level 21 | In service | In service | EOP-7, AOP-6F Loss of SFP Cooling |
| 174 | 0LT2003 | New SFP WR level | Standby | In service | EOP-7, AOP-6F Loss of SFP Cooling |
| 175 | 0LI2003A | New SFP WR level | Standby | In service | EOP-7, AOP-6F Loss of SFP Cooling |
| 176 | 0LT2004 | New SFP WR level | Standby | In service | EOP-7, AOP-6F Loss of SFP Cooling |
| 177 | 0LI2004A | New SFP WR level | Standby | In service | EOP-7, AOP-6F Loss of SFP Cooling |

Calvert Cliffs Unit 1 and Common Area ESEL

| ESEL Item Number | Equipment | | Operating State | | Notes/Comments |
|---|---|---|---|---|---|
| 178 | 0LI2003 | New SFP WR level | Standby | In service | EOP-7, AOP-6F Loss of SFP Cooling |
| 179 | 0LI2004 | New SFP WR level | Standby | In service | EOP-7, AOP-6F Loss of SFP Cooling |
| 180 | 1B01A (1BUS1B01A) | AP/480V BUS 11A | In service | Energized | Potential 500 KW DG connection point |
| 181 | 1B01B (1BUS1B01B) | AP/480V BUS 11B | In service | Energized | Battery Charger Power supply, 500 KW DG Connection Point |
| 182 | 1B04A (1BUS1B04A) | AP/480V BUS 14A | In service | Energized | Battery Charger Power supply, 500 KW DG Connection Point |
| 183 | 1B04B (1BUS1B04B) | AP/480V BUS 14B | In service | Energized | Potential 500 KW DG connection point |
| 188 | 1CV-4070 | TDAFW Pump Stm Supp Isol | Open | Open | EOP-07 |
| 189 | 1CV-4070A | TDAFW Pump Stm Supp Isol | Open | Open | EOP-07 |
| 190 | 1CV-4071 | TDAFW Pump Stm Supp Isol | Open | Open | EOP-07 |
| 191 | 1CV-4071A | TDAFW Pump Stm Supp Isol | Open | Open | EOP-07 |
| 196 | 1B004 (1MCC104R) | AP/480V MOTOR CONTROL CENTER 104R | In service | Energized | Power to SIT Outlet Isolation valves |
| 197 | 1B014 (1MCC114R) | AP/480V MOTOR CONTROL CENTER 114R | In service | Energized | Power to SIT Outlet Isolation valves |
| 200 | 1PNL1C13 | SW,SRW,CCW Panel | In service | In service | SFP Level and Temp |

## 10.2 Attachment B
## Calvert Cliffs Unit 2 ESEL (Ref. 23)

**Calvert Cliffs Unit 2 ESEL**

| ESEL Item Number | Equipment | | Operating State | | Notes/Comments |
|---|---|---|---|---|---|
| 7 | 21 TDAFW | Turbine Driven Aux Feedwater Pump | Standby | Manual in service | EOP-0 Plant Trip, EOP-7 Sation Blackout |
| 8 | 2PI-3986 | TDAFW Pp Steam Supply Press | Standby | Manual in service | Instrument for local manual operation of AFW |
| 9 | 2PI-4501 | TDAFW Pp Discharge Press | Standby | Manual in service | Instrument for local manual operation of AFW |
| 10 | 22 TDAFW | Turbine Driven Aux Feedwater Pump | Standby | Manual in service | EOP-0 Plant Trip, EOP-7 Sation Blackout |
| 11 | 2PI-3988 | TDAFW Pp Steam Supply Press | Standby | Manual in service | Instrument for local manual operation of AFW |
| 12 | 2PI-4502 | TDAFW Pp Discharge Press | Standby | Manual in service | Instrument for local manual operation of AFW |
| 15 | 2CV3939 | 21 S/G Atmospheric Dump Valve | Standby | Manual in service | EOP-0 Plant Trip, EOP-7 Sation Blackout |
| 16 | 2CV3938 | 22 S/G Atmospheric Dump Valve | Standby | Manual in service | EOP-0 Plant Trip, EOP-7 Sation Blackout |
| 48 | 2A01 (2BUS2A01) | AP/4KV BUS 21 | In service | Energized | 2000 KW DG from NSRC connection point |
| 49 | 2A04 (2BUS2A04) | AP/4KV BUS 24 | In service | Energized | 2000 KW DG from NSRC connection point |
| 50 | 2D01 (2BUS2D01) | AP/125 VDC BUS 21 | In service | Energized | Power to Vital AC inverter 22 |
| 51 | 2D02 (2BUS2D02) | AP/125 VDC BUS 22 | In service | Energized | Power to Vital AC inverter 24 |
| 52 | 2D03/2D04 (2BATT2D03/04) | AP/125V BATTERY 21 | In service | Energized | Power to DC Bus 21 |

**Calvert Cliffs Unit 2 ESEL**

| ESEL Item Number | Equipment | | Operating State | | Notes/Comments |
|---|---|---|---|---|---|
| 53 | 2D05 (2CHGR21) | AP/BATTERY CHARGER 21 | In service | Energized | Power to DC Bus 21 and battery 21 |
| 54 | 2D06 (2CHGR22) | AP/BATTERY CHARGER 22 | In service | Energized | Power to DC Bus 22 and battery 22 |
| 55 | 2D07 (2CHGR23) | AP/BATTERY CHARGER 23 | In service | Energized | Power to DC Bus 11 |
| 56 | 2D08 (2CHGR24) | AP/BATTERY CHARGER 24 | In service | Energized | Power to DC Bus 24 |
| 57 | 2D09/2D10 (2BATT2D010) | AP/125V BATTERY 22 | In service | Energized | Power to DC Bus 22 |
| 58 | 2D11 (2PNL2D11) | AP/125 VDC CONTROL PANEL 21 | In service | Energized | Power to Vital AC Inv 12 and 22 |
| 59 | 2D12 (2PNL2D12) | AP/125 VDC CONTROL PANEL 22 | In service | Energized | Power to Vital AC Inv 14 and 24 |
| 60 | 2D13 (2PNL2D13) | AP/125 VDC CONTROL PANEL 23 | In service | Energized | Vital Instrumentation Power Supply |
| 61 | 2D14 (2PNL2D14) | AP/125 VDC CONTROL PANEL 24 | In service | Energized | Vital Instrumentation Power Supply |
| 62 | 2D15 (2PNL2D15) | AP/125 VDC CONTROL PANEL 25 | In service | Energized | Vital Instrumentation Power Supply |
| 63 | 2D16 (2PNL2D16) | AP/125 VDC CONTROL PANEL 26 | In service | Energized | Vital Instrumentation Power Supply |
| 64 | 2D17 (2PNL2D17) | AP/125 VDC CONTROL PANEL 27 | In service | Energized | Vital Instrumentation Power Supply |
| 65 | 2Y01 (2PNL2Y01) | AP/120 VAC VITAL DIST PANEL 21 | In service | Energized | Vital Instrumentation Power Supply |
| 66 | 2Y01-1 (2PNL2Y01-1) | AP/120 VAC VITAL DIST PANEL 21-1 | In service | Energized | Vital Instrumentation Power Supply |
| 67 | 2Y01A (2INV2Y01A) | AP/INVERTER 21 | In service | Energized | Vital Instrumentation Power Supply |

| ESEL Item Number | Equipment | | Operating State | | Notes/Comments |
|---|---|---|---|---|---|
| 68 | 2Y02 (2PNL2Y02) | AP/120 VAC VITAL DIST PANEL 22 | In service | Energized | Vital Instrumentation Power Supply |
| 69 | 2Y02-1 (2PNL2Y02-1) | AP/120 VAC VITAL DIST PANEL | In service | Energized | Vital Instrumentation Power Supply |
| 70 | 2Y02A (2INV2Y02A) | AP/INVERTER 22 | In service | Energized | Vital Instrumentation Power Supply |
| 71 | 2Y03 (2PNL2Y03) | AP/120 VAC VITAL DIST PANEL 23 | In service | Energized | Vital Instrumentation Power Supply |
| 72 | 2Y03A (2INV2Y03A) | AP/INVERTER 23 | In service | Energized | Vital Instrumentation Power Supply |
| 73 | 2Y04 (2PNL2Y04) | AP/120 VAC VITAL DIST PANEL 24 | In service | Energized | Vital Instrumentation Power Supply |
| 74 | 2Y04A (2INV2Y04A) | AP/INVERTER 24 | In service | Energized | Vital Instrumentation Power Supply |
| 75 | 2Y11, (2BUS2Y11) | AP/120 VAC INVERTER BACKUP BUS 21 | In service | Energized | Vital Instrumentation Power Supply |
| 84 | 2C03 (2PNL2C03) | IC/CONDENSATE AND FEEDWATER CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 85 | 2C04 (2PNL2C04) | IC/AUXILIARY FEEDWATER CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 86 | 2C05 (2PNL2C05) | IC/REACTIVITY CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 87 | 2C06 (2PNL2C06) | IC/REACTOR COOLANT SYSTEM CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |

**Calvert Cliffs Unit 2 ESEL**

| ESEL Item Number | Equipment | | Operating State | | Notes/Comments |
|---|---|---|---|---|---|
| 88 | 2C07 (2PNL2C07) | IC/CHEMICAL AND VOLUME CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 89 | 2C08 (2PNL2C08) | IC/ENGINEERING SAFEGUARDS CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 90 | 2C09 (2PNL2C09) | IC/ENGINEERING SAFEGUARDS CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 91 | 2C10 (2PNL2C10) | IC/ENGINEERING SAFEGUARDS CONTROL | In service | In service | Main Control panel -Various OIP indicators and controls |
| 108 | 21 A SIT | 21 A Safety Injection Tank | In service | In service | EOP-7 Station Blackout |
| 109 | 2-SI-624-MOV | 21 A Safety Injection Tank Outlet | In service | In service | EOP-7 requires isolation |
| 110 | 2LT321 | 21 A SIT Level Transmitter | In service | In service | 2LI-321 on Panel 2C09 |
| 111 | 2PT-321 | 12 A SIT Pressure Transmitter | In service | In service | 2PI-321 on Panel 2C09 |
| 112 | 21 B SIT | 21 B Safety Injection Tank | In service | In service | EOP-7 Station Blackout |
| 113 | 2-SI-614-MOV | 21 B Safety Injection Tank Outlet | In service | In service | EOP-7 requires isolation |
| 114 | 2LT311 | 21 B SIT Level Transmitter | In service | In service | 2LI-311 on Panel 2C09 |
| 115 | 2PT-311 | 12 A SIT Pressure Transmitter | In service | In service | 2PI-311 on Panel 2C09 |
| 116 | 22 A SIT | 22 A Safety Injection Tank | In service | In service | EOP-7 Station Blackout |
| 117 | 2-SI-644-MOV | 22 A Safety Injection Tank Outlet | In service | In service | EOP-7 requires isolation |
| 118 | 2LT341 | 22 A SIT Level Transmitter | In service | In service | 2LI-341 on Panel 2C09 |
| 119 | 2PT-341 | 12 A SIT Pressure Transmitter | In service | In service | 2PI-341 on Panel 2C09 |
| 120 | 22 B SIT | 22 B Safety Injection Tank | In service | In service | EOP-7 Station Blackout |
| 121 | 2-SI-634-MOV | 22 B Safety Injection Tank Outlet | In service | In service | EOP-7 requires isolation |
| 122 | 2LT331 | 22 B SIT Level Transmitter | In service | In service | 2LI-331 on Panel 2C09 |
| 123 | 2PT-331 | 12 B SIT Pressure Transmitter | In service | In service | 2PI-331 on Panel 2C09 |
| 146 | 2VI-21 (2-E21-221) | 21 Vital DC Bus Voltage | In service | In service | Panel 2C24 |

| ESEL Item Number | Equipment | | Operating State | | Notes/Comments |
|---|---|---|---|---|---|
| 147 | 2VI-22 (2-E1-222) | 22 Vital DC Bus Voltage | In service | In service | Panel 2C24 |
| 148 | 2PT-1013A | Steam Generator Safety Channel Pressure | In service | In service | 2PI-1013A on Panel 2C03 |
| 149 | 2PT-1023A | Steam Generator Safety Channel Pressure | In service | In service | 2PI-1023A on Panel 2C03 |
| 150 | 2LT-1124A | Steam Generator Wide Range Level | In service | In service | 2LI-1124A on Panel 2C04 |
| 151 | 2TT-112HA | Hot Leg Temp 21 | In service | In service | PAMS - 2PNL2C182A, TT in 2PNLC43E |
| 152 | 2TT-112CA | Cold Leg Temp 21A | In service | In service | PAMS - 2PNL2C182A, TT In 2PNLC43E |
| 153 | 2TT122HA | Hot Leg Temp 22 | In service | In service | PAMS - 2PNL2C182A, TT in 2PNLC43E |
| 154 | 2TT122CA | Cold Leg Temp 22A | In service | In service | PAMS - 2PNL2C182A, TT in 2PNLC43E |
| 155 | 2FT-4509A | SG Steam Train AFW Flow | In service | In service | 2FI-4509A on 2PNLC43B |
| 156 | 2FT-4510A | SG Steam Train AFW Flow | In service | In service | 2FI-4510A on 2PNLC43B |
| 157 | 2LT-110X | Pressurizer Level | In service | In service | 2LI-110X-1 on Panel 2CO6 |
| 158 | 2LT-110Y | Pressurizer Level | In service | In service | 2LI-110Y-1 on Panel 2CO6 |
| 159 | 2LT-103 | Pressurizer Level | In service | In service | 2LI-103 on Panel 2C06 |
| 160 | 2PT-105A | Pressurizer Pressure | In service | In service | 2PI105A on Panel 2C06 |
| 161 | 2NX001 | WR Log power Channels | In service | In service | PAMS, Panel 2C05 |
| 162 | 2NX002 | WR Log power Channels | In service | In service | PAMS, Panel 2C05 |
| 163 | 2NX003 | WR Log power Channels | In service | In service | PAMS, Panel 2C05 |
| 164 | 2NX004 | WR Log power Channels | In service | In service | PAMS, Panel 2C05 |
| 167 | 2PNL2C182A | PAMS | In service | In service | Various Indications required for OIP execution-RX power, level pressure |
| 168 | 2PNL2C182B | PAMS | In service | In service | Various Indications required for OIP execution-RX power, level pressure |

**Calvert Cliffs Unit 2 ESEL**

| ESEL Item Number | Equipment | | Operating State | | Notes/Comments |
|---|---|---|---|---|---|
| 169 | 2PT-5307 | Containment Wide Range Pressure | In service | In service | 2PI-5307 on Panel 2C09 |
| 170 | 2PT-5310 | Containment Wide Range Pressure | In service | In service | 2PI-5310 on Panel 2C09 |
| 171 | 2TE-5309 | Containment Dome Temp | In service | In service | 2TE-5310 on Panel 2C09 |
| 184 | 2B01A (2BUS2B01A) | AP/480V BUS 21A | In service | Energized | Potential 500 KW DG connection point |
| 185 | 2B01B (2BUS2B01B) | AP/480V BUS 21B | In service | Energized | Battery Charger Power supply, 500 KW DG Connection Point |
| 186 | 2B04A (2BUSB04A) | AP/480V BUS 24A | In service | Energized | Battery Charger Power supply, 500 KW DG Connection Point |
| 187 | 2B04B (2BUSB04B) | AP/480V BUS 24B | In service | Energized | Potential 500 KW DG connection point |
| 192 | 2CV-4070 | TDAFW Pump Stm Supp Isol | Open | Open | EOP-07 |
| 193 | 2CV-4070A | TDAFW Pump Stm Supp Isol | Open | Open | EOP-07 |
| 194 | 2CV-4071 | TDAFW Pump Stm Supp Isol | Open | Open | EOP-07 |
| 195 | 2CV-4071A | TDAFW Pump Stm Supp Isol | Open | Open | EOP-07 |
| 198 | 2B004 (2MCC204R) | AP/480V MOTOR CONTROL CENTER 204R | In service | Energized | Power to SIT Outlet Isolation valves |
| 199 | 2B014 (2MCC214R) | AP/480V MOTOR CONTROL CENTER 214R | In service | Energized | Power to SIT Outlet Isolation valves |

## 10.3 Attachment C

## ESEP HCLPF Values and Failure Modes Tabulation, Unit 1 and Common area

ESEP HCLPF Values and Failure Modes Tabulation, Unit 1 and Common area

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 178 | 0 | 0LI2003 | Screened out | 0.53g | Component screened by SRT analysis |
| 175 | 0 | 0LI2003A | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 179 | 0 | 0LI2004 | Screened out | 0.53g | Component screened by SRT analysis |
| 177 | 0 | 0LI2004A | Screened out | 0.53g | Component screened by SRT analysis |
| 172 | 0 | 0LT2001 | Screened out | 0.53g | Component screened by SRT judgment |
| 173 | 0 | 0LT2002 | Screened out | 0.53g | Component screened by SRT judgment |
| 174 | 0 | 0LT2003 | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 176 | 0 | 0LT2004 | Screened out | 0.53g | Component screened by SRT analysis |
| 18 | 0 | 0LT5610 | Screened out | 0.53g | Component screened by SRT analysis |
| 19 | 0 | 0LT5611 | Screened out | 0.53g | Component screened by SRT analysis |
| 92 | 1 | 11 A SIT | Anchorage Capacity | 0.211g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 96 | 1 | 11 B SIT | Anchorage Capacity | 0.211g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |

## ESEP HCLPF Values and Failure Modes Tabulation, Unit 1 and Common area

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 1 | 1 | 11 TDAFW | Anchorage Capacity | 0.51g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 100 | 1 | 12 A SIT | Anchorage Capacity | 0.211g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 104 | 1 | 12 B SIT | Anchorage Capacity | 0.211g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 17 | 0 | 12 CST | Anchorage Capacity | 0.396g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 4 | 1 | 12 TDAFW | Anchorage Capacity | 0.51g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 20 | 1 | 1A01 (1BUS1A01) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 21 | 1 | 1A04 (1BUS1A04) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 196 | 1 | 1B004 (1MCC104R) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 197 | 1 | 1B014 (1MCC114R) | Anchorage Capacity | 0.33g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 180 | 1 | 1B01A (1BUS1B01A) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |

ESEP HCLPF Values and Failure Modes Tabulation, Unit 1 and Common area

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 181 | 1 | 1B01B (1BUS1B01B) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 182 | 1 | 1B04A (1BUS1B04A) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 183 | 1 | 1B04B (1BUS1B04B) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 83 | 1 | 1C010 (1PNL1C10) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 76 | 1 | 1C03 (1PNL1C03) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 77 | 1 | 1C04 (1PNL1C04) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 78 | 1 | 1C05 (1PNL1C05) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 79 | 1 | 1C06 (1PNL1C06) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 80 | 1 | 1C07 (1PNL1C07) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 81 | 1 | 1C08 (1PNL1C08) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |

ESEP HCLPF Values and Failure Modes Tabulation, Unit 1 and Common area

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 82 | 1 | 1C09 (1PNL1C09) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| | 1 | 1C24A (1PNL1C24A) | Screened out | 0.53g | Component screened by SRT analysis |
| 14 | 1 | 1CV3938 | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 13 | 1 | 1CV3939 | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 188 | 1 | 1CV-4070 | Screened out | 0.53g | Component screened by SRT analysis |
| 189 | 1 | 1CV-4070A | Screened out | 0.53g | Component screened by SRT analysis |
| 190 | 1 | 1CV-4071 | Screened out | 0.53g | Component screened by SRT analysis |
| 191 | 1 | 1CV-4071A | Screened out | 0.53g | Component screened by SRT analysis |
| 22 | 1 | 1D01 (1BUS1D01) | Anchorage Capacity | 0.19g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 23 | 1 | 1D02 (1BUS1D02) | Anchorage Capacity | 0.21g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 28 | 1 | 1D03/1D04 (1BATT1D03/4) | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 24 | 1 | 1D05 (1CHGR11) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |

**ESEP HCLPF Values and Failure Modes Tabulation, Unit 1 and Common area**

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 25 | 1 | 1D06 (1CHGR12) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 26 | 1 | 1D07 (1CHGR13) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 27 | 1 | 1D08 (1CHGR14) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 29 | 1 | 1D09/1D10 (1BATT1D09/10) | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 30 | 1 | 1D11 (1PNL1D11) | Screened out | >RLGM | Component screened by SRT analysis |
| 31 | 1 | 1D12 (1PNL1D12) | Screened out | >RLGM | Component screened by SRT analysis |
| 32 | 1 | 1D13 (1PNL1D13) | Screened out | >RLGM | Component screened by SRT analysis |
| 33 | 1 | 1D14 (1PNL1D14) | Screened out | >RLGM | Component screened by SRT analysis |
| 34 | 1 | 1D15 (1PNL1D15) | Screened out | >RLGM | Component screened by SRT analysis |
| 35 | 1 | 1D16 (1PNL1D16) | Screened out | >RLGM | Component screened by SRT analysis |
| 36 | 1 | 1D17 (1PNL1D17) | Screened out | >RLGM | Component screened by SRT analysis |
| 131 | 1 | 1FT-4509A | Anchorage Capacity | 0.3g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |

ESEP HCLPF Values and Failure Modes Tabulation, Unit 1 and Common area

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 132 | 1 | 1FT-4510A | Screened out | 0.53g | Component screened by SRT analysis |
| 135 | 1 | 1LT-103 | Screened out | >RLGM | Component screened by SRT analysis |
| 133 | 1 | 1LT-110X | Screened out | 0.53g | Component screened by SRT analysis |
| 134 | 1 | 1LT-110Y | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 126 | 1 | 1LT-1124A | Screened out | 0.53g | Component screened by SRT analysis |
| 98 | 1 | 1LT311 | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 94 | 1 | 1LT321 | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 106 | 1 | 1LT331 | Anchorage Capacity | 0.183g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 102 | 1 | 1LT341 | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 137 | 1 | 1NX001 | Screened out | 0.53g | Component screened by SRT analysis |
| 138 | 1 | 1NX002 | Screened out | 0.53g | Component screened by SRT analysis |
| 139 | 1 | 1NX003 | Screened out | 0.53g | Component screened by SRT analysis |

**ESEP HCLPF Values and Failure Modes Tabulation, Unit 1 and Common area**

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 140 | 1 | 1NX004 | Screened out | 0.53g | Component screened by SRT analysis |
| 2 | 1 | 1PI-3986 | Screened out | >RLGM | Component screened by SRT analysis |
| 5 | 1 | 1PI-3988 | Functionality | >RLGM | Pressure Indicator is missing a manufacturer screw NOTE 1 |
| 3 | 1 | 1PI-4501 | Screened out | >RLGM | Component screened by SRT analysis |
| 6 | 1 | 1PI-4502 | Screened out | >RLGM | Component screened by SRT analysis |
| 200 | 1 | 1PNL1C13 | Screened out | 0.53g | Component screened by SRT analysis |
| 165 | 1 | 1PNL1C182A | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 166 | 1 | 1PNL1C182B | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 124 | 1 | 1PT-1013A | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 125 | 1 | 1PT-1023A | Screened out | >RLGM | Component screened by SRT analysis |
| 136 | 1 | 1PT-105A | Screened out | 0.53g | Component screened by SRT analysis |
| 99 | 1 | 1PT-311 | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |

ESEP HCLPF Values and Failure Modes Tabulation, Unit 1 and Common area

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 95 | 1 | 1PT-321 | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 107 | 1 | 1PT-331 | Anchorage Capacity | 0.183g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 103 | 1 | 1PT-341 | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 141 | 1 | 1PT-5307 | Screened out | 0.53g | Component screened by SRT analysis |
| 142 | 1 | 1PT-5310 | Screened out | 0.53g | Component screened by SRT analysis |
| 97 | 1 | 1-SI-614-MOV | Screened out | >RLGM | Component screened by SRT analysis |
| 93 | 1 | 1-SI-624-MOV | Screened out | >RLGM | Component screened by SRT analysis |
| 105 | 1 | 1-SI-634-MOV | Screened out | >RLGM | Component screened by SRT analysis |
| 101 | 1 | 1-SI-644-MOV | Screened out | >RLGM | Component screened by SRT analysis |
| 128 | 1 | 1TT-112CA | Screened out | 0.53g | Component screened by SRT analysis. Component is Rule of Box to 1PNL1C43E |
| 127 | 1 | 1TT-112HA | Screened out | 0.53g | Component screened by SRT analysis. Component is Rule of Box to 1PNL1C43E |
| 130 | 1 | 1TT122CA | Screened out | 0.53g | Component screened by SRT analysis. Component is Rule of Box to 1PNL1C43E |

**ESEP HCLPF Values and Failure Modes Tabulation, Unit 1 and Common area**

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 129 | 1 | 1TT122HA | Screened out | 0.53g | Component screened by SRT analysis. Component is Rule of Box to 1PNL1C43E |
| 143 | 1 | 1TE-5309 | Screened out | 0.252g | Component screened by SRT analysis (Above 40 feet) |
| 144 | 1 | 1VI-11 Vital DC (1-EI-211) | Screened out | 0.53g | Component screened by SRT analysis. Component is Rule of Box to 1PNL1C24A |
| 145 | 1 | 1VI-12 Vital DC (1-EI-212) | Screened out | 0.53g | Component screened by SRT analysis. Component is Rule of Box to 1PNL1C24A |
| 37 | 1 | 1Y01 (1PNL1Y01) | Screened out | >RLGM | Component screened by SRT analysis |
| 45 | 1 | 1Y01-1 (1PNL1Y01-1) | Screened out | >RLGM | Component screened by SRT analysis |
| 38 | 1 | 1Y01A (1INV1Y01A) | Screened out | >RLGM | Component screened by SRT analysis |
| 39 | 1 | 1Y02 (1PNL1Y02) | Screened out | >RLGM | Component screened by SRT analysis |
| 46 | 1 | 1Y02-1 (1PNL1Y02-1) | Screened out | >RLGM | Component screened by SRT analysis |
| 40 | 1 | 1Y02A (1INV1Y02A) | Screened out | >RLGM | Component screened by SRT analysis |
| 41 | 1 | 1Y03 (1PNL1Y03) | Screened out | >RLGM | Component screened by SRT analysis |
| 42 | 1 | 1Y03A (1INV1Y03A) | Screened out | >RLGM | Component screened by SRT analysis |
| 43 | 1 | 1Y04 (1PNL1Y04) | Screened out | >RLGM | Component screened by SRT analysis |

**ESEP HCLPF Values and Failure Modes Tabulation, Unit 1 and Common area**

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 44 | 1 | 1Y04A (1INV1Y04A) | Screened out | >RLGM | Component screened by SRT analysis |
| 47 | 1 | 1Y11 (1BUS1Y11) | Interaction with Blockwalls | 0.26g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |

Note1: Work order C92642395 replaces missing screw, therefore equipment will screen-out.

## 10.4 Attachment D
## ESEP HCLPF Values and Failure Modes Tabulation, Unit 2

**ESEP HCLPF Values and Failure Modes Tabulation, Unit 2**

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 108 | 2 | 21 A SIT | Anchorage Capacity | 0.211g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 112 | 2 | 21 B SIT | Anchorage Capacity | 0.211g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 7 | 2 | 21 TDAFW | Anchorage Capacity | 0.51g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 116 | 2 | 22 A SIT | Anchorage Capacity | 0.211g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 120 | 2 | 22 B SIT | Anchorage Capacity | 0.211g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 10 | 2 | 22 TDAFW | Anchorage Capacity | 0.51g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 48 | 2 | 2A01 (2BUS2A01) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 49 | 2 | 2A04 (2BUS2A04) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 198 | 2 | 2B004 (2MCC204R) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 199 | 2 | 2B014 (2MCC214R) | Anchorage Capacity | 0.33g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |

**ESEP HCLPF Values and Failure Modes Tabulation, Unit 2**

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 184 | 2 | 2B01A (2BUS2B01A) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 185 | 2 | 2B01B (2BUS2B01B) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 186 | 2 | 2B04A (2BUSB04A) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 187 | 2 | 2B04B (2BUSB04B) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 84 | 2 | 2C03 (2PNL2C03) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 85 | 2 | 2C04 (2PNL2C04) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 86 | 2 | 2C05 (2PNL2C05) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 87 | 2 | 2C06 (2PNL2C06) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 88 | 2 | 2C07 (2PNL2C07) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 89 | 2 | 2C08 (2PNL2C08) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |

**ESEP HCLPF Values and Failure Modes Tabulation, Unit 2**

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 90 | 2 | 2C09 (2PNL2C09) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 91 | 2 | 2C10 (2PNL2C10) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 16 | 2 | 2CV3938 | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 15 | 2 | 2CV3939 | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 192 | 2 | 2CV-4070 | Screened out | 0.53g | Component screened by SRT analysis |
| 193 | 2 | 2CV-4070A | Screened out | 0.53g | Component screened by SRT analysis |
| 194 | 2 | 2CV-4071 | Screened out | 0.53g | Component screened by SRT analysis |
| 195 | 2 | 2CV-4071A | Screened out | 0.53g | Component screened by SRT analysis |
| 50 | 2 | 2D01 (2BUS2D01) | Anchorage Capacity | 0.19g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 51 | 2 | 2D02 (2BUS2D02) | Anchorage Capacity | 0.21g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 52 | 2 | 2D03/2D04 (2BATT2D03/04) | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |

## ESEP HCLPF Values and Failure Modes Tabulation, Unit 2

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 53 | 2 | 2D05 (2CHGR21) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 54 | 2 | 2D06 (2CHGR22) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 55 | 2 | 2D07 (2CHGR23) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 56 | 2 | 2D08 (2CHGR24) | Anchorage Capacity | 0.52g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 57 | 2 | 2D09/2D10 (2BATT2D010) | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 58 | 2 | 2D11 (2PNL2D11) | Screened out | >RLGM | Component screened by SRT analysis |
| 59 | 2 | 2D12 (2PNL2D12) | Screened out | >RLGM | Component screened by SRT analysis |
| 60 | 2 | 2D13 (2PNL2D13) | Screened out | >RLGM | Component screened by SRT analysis |
| 61 | 2 | 2D14 (2PNL2D14) | Screened out | >RLGM | Component screened by SRT analysis |
| 62 | 2 | 2D15 (2PNL2D15) | Screened out | >RLGM | Component screened by SRT analysis |
| 63 | 2 | 2D16 (2PNL2D16) | Screened out | >RLGM | Component screened by SRT analysis |
| 64 | 2 | 2D17 (2PNL2D17) | Screened out | >RLGM | Component screened by SRT analysis |

## ESEP HCLPF Values and Failure Modes Tabulation, Unit 2

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 155 | 2 | 2FT-4509A | Screened out | 0.53g | Component screened by SRT analysis |
| 156 | 2 | 2FT-4510A | Screened out | >RLGM | Component screened by SRT analysis |
| 159 | 2 | 2LT-103 | Screened out | >RLGM | Component screened by SRT analysis |
| 157 | 2 | 2LT-110X | Screened out | 0.53g | Component screened by SRT analysis |
| 158 | 2 | 2LT-110Y | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 150 | 2 | 2LT-1124A | Screened out | 0.53g | Component screened by SRT analysis |
| 114 | 2 | 2LT311 | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 110 | 2 | 2LT321 | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 122 | 2 | 2LT331 | Anchorage Capacity | 0.183g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 118 | 2 | 2LT341 | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 161 | 2 | 2NX001 | Screened out | 0.53g | Component screened by SRT analysis |
| 162 | 2 | 2NX002 | Screened out | 0.53g | Component screened by SRT analysis |

ESEP HCLPF Values and Failure Modes Tabulation, Unit 2

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 163 | 2 | 2NX003 | Screened out | 0.53g | Component screened by SRT analysis |
| 164 | 2 | 2NX004 | Screened out | 0.53g | Component screened by SRT analysis |
| 8 | 2 | 2PI-3986 | Screened out | >RLGM | Component screened by SRT analysis |
| 11 | 2 | 2PI-3988 | Screened out | >RLGM | Component screened by SRT analysis |
| 9 | 2 | 2PI-4501 | Screened out | >RLGM | Component screened by SRT analysis |
| 12 | 2 | 2PI-4502 | Screened out | >RLGM | Component screened by SRT analysis |
| 167 | 2 | 2PNL2C182A | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 168 | 2 | 2PNL2C182B | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 148 | 2 | 2PT-1013A | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 149 | 2 | 2PT-1023A | Screened out | >RLGM | Component screened by SRT analysis |
| 160 | 2 | 2PT-105A | Screened out | 0.53g | Component screened by SRT analysis |
| 115 | 2 | 2PT-311 | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |

ESEP HCLPF Values and Failure Modes Tabulation, Unit 2

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 111 | 2 | 2PT-321 | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 123 | 2 | 2PT-331 | Anchorage Capacity | 0.183g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 119 | 2 | 2PT-341 | Equipment Capacity | 0.53g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 169 | 2 | 2PT-5307 | Screened out | >RLGM | Component screened by SRT analysis |
| 170 | 2 | 2PT-5310 | Screened out | 0.53g | Component screened by SRT analysis |
| 113 | 2 | 2-SI-614-MOV | Screened out | >RLGM | Component screened by SRT analysis |
| 109 | 2 | 2-SI-624-MOV | Screened out | >RLGM | Component screened by SRT analysis |
| 121 | 2 | 2-SI-634-MOV | Screened out | >RLGM | Component screened by SRT analysis |
| 117 | 2 | 2-SI-644-MOV | Screened out | >RLGM | Component screened by SRT analysis |
| 171 | 2 | 2TE-5309 | Screened out | 0.252g | Component screened by SRT analysis (Above 40 ft) |
| 152 | 2 | 2TT-112CA | Screened out | 0.53g | Component screened by SRT analysis. Component is Rule of Box to 2PNL2C43E |
| 151 | 2 | 2TT-112HA | Screened out | 0.53g | Component screened by SRT analysis. Component is Rule of Box to 2PNL2C43E |

**ESEP HCLPF Values and Failure Modes Tabulation, Unit 2**

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 154 | 2 | 2TT122CA | Screened out | 0.53g | Component screened by SRT analysis. Component is Rule of Box to 2PNL2C43E |
| 153 | 2 | 2TT122HA | Screened out | 0.53g | Component screened by SRT analysis. Component is Rule of Box to 2PNL2C43E |
| 146 | 2 | 2VI-21 Vital DC (2-EI-221) | Screened out | 0.53g | Component screened by SRT analysis. Component is Rule of Box to 1PNL1C24A |
| 147 | 2 | 2VI-22 Vital DC (2-EI-222) | Screened out | 0.53g | Component screened by SRT analysis. Component is Rule of Box to 1PNL1C24A |
| 65 | 2 | 2Y01 (2PNL2Y01) | Anchorage Capacity | 0.28g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 66 | 2 | 2Y01-1 (2PNL2Y01-1) | Screened out | >RLGM | Component screened by SRT analysis |
| 67 | 2 | 2Y01A (2INV2Y01A) | Screened out | >RLGM | Component screened by SRT analysis |
| 68 | 2 | 2Y02 (2PNL2Y02) | Screened out | >RLGM | Component screened by SRT analysis |
| 69 | 2 | 2Y02-1 (2PNL2Y02-1) | Screened out | >RLGM | Component screened by SRT analysis |
| 70 | 2 | 2Y02A (2INV2Y02A) | Screened out | >RLGM | Component screened by SRT analysis |
| 71 | 2 | 2Y03 (2PNL2Y03) | Screened out | >RLGM | Component screened by SRT analysis |
| 72 | 2 | 2Y03A (2INV2Y03A) | Screened out | >RLGM | Component screened by SRT analysis |

**ESEP HCLPF Values and Failure Modes Tabulation, Unit 2**

| ESEL | UNIT | Equipment ID | Failure Mode | HCLPF | Basis |
|---|---|---|---|---|---|
| 73 | 2 | 2Y04 (2PNL2Y04) | Anchorage Capacity | 0.28g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |
| 74 | 2 | 2Y04A (2INV2Y04A) | Screened out | >RLGM | Component screened by SRT analysis |
| 75 | 2 | 2Y11 (2BUS2Y11) | Interaction with Blockwalls | 0.175g | Component Anchorage HCLPF is calculated per 14Q4242-CAL-002 (Ref. 9) |