Exelon Generation.

RS-14-297 10 CFR 50.54(f)

December 26, 2014

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
11555 Rockville Pike,
Rockville. MD 20852

Dresden Nuclear Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

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, 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 (ML12053A340)
2. NEI Letter, Proposed Path Forward for NTTF Recommendation 2.1: Seismic Re-evaluations, dated April 9, 2013 (ML13101A379)
3. 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 (ML13102A142)
4. NRC Letter, Electric Power Research Institute Report 3002000704, "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 Re-evaluations, dated May 7, 2013 (ML13106A331)
5. Exelon Generation Company, LLC, Seismic Hazard and Screening Report (Central and Eastern United States (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 (RS-14-067), dated March 31, 2014 (ML14091A012)
6. Exelon Generation Company, LLC Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Seismic Aspects of Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident – 1.5 Year Response for CEUS Sites (RS-13-205), dated September 12, 2013 (ML13256A070)

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

Dresden Nuclear Generating Station Units 2 & 3
6500 North Dresden Road
Morris, Illinois 60450-9765
Facility Operating License No. DPR-50
NRC Docket No. 50-237, 50-249
Correspondence No.: DRE-RS-14-297

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Report Number: 14Q4237-RPT-004, Rev. 3

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Senior Manager Design Engineering:	Mark Budelier	(Policy 12 SMDE)	12/23/2014
Corporate Acceptance:	Jeffrey S. Clark	Jeffrey S. Clark	12/23/2014

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued a 50.54(f) letter to all power reactor licensees and holders of construction permits in active or deferred status. Enclosure 1 of Reference 1 requested each addressee located in the Central and Eastern United States (CEUS) to submit a Seismic Hazard Evaluation and Screening Report within 1.5 years from the date of Reference 1.

In Reference 2, the Nuclear Energy Institute (NEI) requested NRC agreement to delay submittal of the final CEUS Seismic Hazard Evaluation and Screening Reports so that an update to the Electric Power Research Institute (EPRI) ground motion attenuation model could be completed and used to develop that information. NEI proposed that descriptions of subsurface materials and properties and base case velocity profiles be submitted to the NRC by September 12, 2013, (Reference 6), with the remaining seismic hazard and screening information submitted by March 31, 2014 (Reference 5). NRC agreed with that proposed path forward in Reference 4.

Reference 1 requested that licensees provide interim evaluations and actions taken or planned to address the higher seismic hazard relative to the design basis, as appropriate, prior to completion of the risk evaluation. In accordance with the NRC endorsed guidance in Reference 3, the enclosed Expedited Seismic Evaluation Process (ESEP) Report for Dresden Nuclear Power Station, Units 2 and 3 provides the information described in the "ESEP Report" Section 7, of Reference 3 in accordance with the schedule identified in Reference 2.

All equipment evaluated for the ESEP for Dresden Nuclear Power Station, Units 2 and 3 was found to have adequate capacity for the required seismic demand as defined by the Augmented Approach (ESEP) guidance (Reference 3). Therefore, no equipment modifications are required.

This ESEP report transmittal completes regulatory Commitment No. 3 of Reference 5.

No new regulatory commitments result from this transmittal.

If you have any questions regarding this report, please contact Ronald Gaston at (630) 657-3359.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 26th day of December 2014.

Respectfully submitted,

Ronald W. Gaston
Manager - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Enclosure:

Dresden Nuclear Power Station, Units 2 and 3, Expedited Seismic Evaluation Process (ESEP) Report

cc: Director, Office of Nuclear Reactor Regulation
Regional Administrator - NRC Region III
NRC Senior Resident Inspector - Dresden Station
NRC Project Manager, NRR - Dresden Station
Mr. Nicholas J. DiFrancesco, NRR/JLD/JHMB, NRC
Illinois Emergency Management Agency - Division of Nuclear Safety

Enclosure

Dresden Nuclear Power Station, Units 2 and 3

Expedited Seismic Evaluation Process (ESEP) Report

(89 pages)

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

Dresden Nuclear Generating Station Units 2 & 3
6500 North Dresden Road
Morris, Illinois 60450-9765
Facility Operating License No. DPR-50
NRC Docket No. 50-237, 50-249
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Senior Manager Design Engineering:	Mark Budelier	[signature] (Policy 12 SMDE)	12/23/2014
Corporate Acceptance:	Jeffrey S. Clark	Jeffrey S. Clark	12/23/2014

Document Title:
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 DRESDEN NUCLEAR GENERATING STATION UNITS 2 & 3

Report Number: 14Q4239-RPT-004 Rev. 3

Project Name: Exelon ESEP for Dresden
Job No.: 14Q4237
Client: Exelon.

This document has been prepared in accordance with the S&A Quality Assurance Program Manual, Revision 17 and project requirements:

Rev. 0 (Initial Issue)	
Prepared by: George G. Thomas	Date: 12/05/2014
Reviewed by: Dan Lavarnway	Date: 12/05/2014
Approved by: Paul R. Wilson	Date: 12/05/2014

Revision Record:				
Revision No.	Prepared by/ Date	Reviewed by/ Date	Approved by/ Date	Description of Revision
1	George G. Thomas 12/12/2014	Dan Lavarnway 12/12/2014	Paul R. Wilson 12/12/2014	Incorporated Client Comments
2	George G. Thomas 12/18/2014	Dan Lavarnway 12/18/2014	Paul R. Wilson 12/18/2014	Corrected Component Descriptions for five components per Client Comments
3	George G. Thomas 12/22/2014	Paul R. Wilson 12/22/2014	Paul R. Wilson 12/22/2014	Incorporated Client Comments
S&A Stevenson & Associates	DOCUMENT APPROVAL SHEET	CONTRACT NO. 14Q4237		

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1.0 Purpose and Objective

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

This report describes the Expedited Seismic Evaluation Process (ESEP) undertaken for Dresden Nuclear Power Station (DNPS), Units 2 & 3. The intent of the ESEP is to perform an interim action in response to the NRC's 50.54(f) letter [1] to demonstrate seismic margin through a review of a subset of the plant equipment that can be relied upon to protect the reactor core following beyond design basis seismic events.

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

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

2.0 Summary of the FLEX Seismic Implementation Strategies

The DNPS Diverse and Flexible Coping Strategies (FLEX) response strategies for Reactor Core Cooling and Heat Removal, Reactor Inventory Control, Containment Function and Spent Fuel Pool Control are summarized below. This summary is derived from the Dresden Overall Integrated Plan (OIP) including all 6 month FLEX updates through August 2014 in Response to the March 12, 2012, NRC Order EA-12 049 [3]:

Phase 1 strategies

Phase 1 strategies rely on installed plant systems. Phase 1 is expected to last approximately 2.5 hours from event initiation.

RPV PRESSURE CONTROL

As described in the DNPS UFSAR, Section 5.4.6. [21], the Isolation Condenser (IC) provides Reactor Pressure Vessel (RPV) pressure control and core cooling in the event that the reactor becomes isolated from the turbine and the main condenser. Steam flow from the reactor condenses in the tubes of the heat exchanger and returns by gravity to the reactor in a closed loop. The differential water head, created when the steam is condensed, serves as the driving force. Shell side water is boiled and vented to atmosphere outside the Reactor Building. Per the UFSAR (Reference 21, Section 5.4.6.3), the Isolation Condenser will operate approximately 20 minutes without initiation of shell-side makeup. In Phase 1 there are no shell side makeup sources that meet requirements for FLEX qualification. Therefore, the Isolation Condenser must be secured within 20 minutes of initiation to prevent operation with inadequate shell-side level.

Operation of the High Pressure Core Injection (HPCI) System also removes heat from the RPV. This heat removal will be used to maintain RPV pressure after the Isolation Condenser is secured.

RPV INVENTORY CONTROL

Phase 1 reactor water level control would be accomplished using the HPCI System with pump suction from the Torus. Operation of the HPCI Turbine will result in a heat input to the Torus. There is no current method to remove heat from the Torus when AC power is not available. With continuous HPCI operation, analysis indicates Torus temperature reaches 140°F approximately 2.5 hours after event initiation. The DNPS UFSAR [21], Section 6.3.2.3, identifies continued operation of HPCI above a Torus temperature of 140°F is not permitted for continued operability based on hydraulic/lube oil heat exchanger performance and pump net positive suction head.

Key Reactor Parameters are obtained via DC powered instrumentation. A DC load stripping strategy is employed to extend battery life for continued HPCI operation. No specific Containment control is required in Phase 1 as both temperature and pressure stay within design limits for the first 72 hours of the event. Key Containment Parameters are obtained from DC powered instrumentation. No specific Spent Fuel Pool control is required in Phase 1 as the temperature remains less than 212°F for approximately 10 hours with the Unit operating and 3.5 hours during refueling operations. Spent Fuel Pool level is obtained from the new Spent Fuel Pool wide range instrumentation installed under order EA-12-051 [22].

Phase 2 strategies.

Phase 2 commences when shell-side makeup is available to the Isolation Condenser from a FLEX pump. DNPS will utilize pre-staged/portable equipment to provide shell-side makeup to the IC prior to the loss of HPCI as an RPV Pressure Control mechanism. Utilization of the IC as the RPV Pressure Control mechanism will significantly reduce RPV inventory loss/Torus heat addition.

The conceptual design uses FLEX pumps located in Emergency Core Cooling System (ECCS) corner rooms or the Torus Basement near the Torus to take suction from the Torus and discharge into existing LPCI discharge piping. New connections will be installed on LPCI discharge piping that allow connection of temporary hoses to the IC makeup line. The IC makeup line will be used as a distribution header to supply water to the Isolation Condensers, Standby Liquid Control (SBLC)/RPV makeup and the Spent Fuel Pools for both Unit 2 and Unit 3. The use of the water in both the Unit 2 and Unit 3 Torus, sequentially, will allow for approximately 15 hours of makeup capability. The FLEX pumps will be powered by a portable FLEX generator using temporary cables.

Upon determination of a Beyond Design Basis External Event (BDBEE) and Extended Loss of AC Power (ELAP) event Operators will connect the suction of one primary FLEX pump to the FLEX connection of a LPCI pump. The FLEX pump discharge will be connected to a FLEX connection on the discharge side of the LPCI pumps in the corner room. Another hose will be utilized to connect a FLEX connection on the common LPCI discharge header to a FLEX connection on the common Isolation Condenser Makeup piping located on Elevation 517 feet.

The FLEX pump would be started to pressurize the IC Makeup piping. From the IC Makeup piping, water is available to both Isolation Condensers through installed piping and valves. Temporary hoses will be connected to the IC Makeup header and routed to open hatches on top of each Unit's SBLC tank. The SBLC system will be used as a high pressure makeup source to the RPV. The makeup to the SBLC tank provides long term makeup to the system. Other hoses will be routed from the IC Makeup header to each Unit's Spent Fuel Pool Cooling System piping for makeup to the Spent Fuel Pools.

Once the first FLEX pump is operating, station personnel will begin aligning the other primary FLEX pump. When the initial Torus is drawn down to the minimum level, personnel will start the 2nd primary FLEX pump to begin utilizing water from the Other Unit'sTorus. Approximately 15 hours of makeup is available utilizing the Torus inventory from both Units.

During the time FLEX pumps are using Torus inventory for FLEX makeup needs Station personnel will begin deployment of a hydraulic submersible pump into the Ultimate Heat Sink (UHS) for long term makeup. The hydraulic submersible pump and associated diesel driven hydraulic unit will be transported from a robust structure (a structure that meets ESEP design requirements for storage) inside the Protected Area to a location near the UHS. Personnel will connect a discharge hose to the pump and lower the pump into the UHS using a small mobile crane also stored in the robust structure. Temporary hoses will be routed from the submersible pump to the Unit 2 Reactor Building along the Protected Area access road. The hose will be connected to a FLEX connection on the LPCI header for one of the LPCI subsystems. The LPCI crosstie line on that Unit will be closed to isolate the desired LPCI subsystem. When the submersible pump is started, valves on the associated LPCI subsystem will be opened to direct water into the Torus. The FLEX pump on that Unit will continue to operate with makeup to the Torus being supplied from the submersible pump. This arrangement allows water from the UHS to be strained through the ECCS Suction Strainers prior to utilization for FLEX makeup needs.

Power to FLEX Pumps

One trailer mounted 800 kW portable generator will be staged in a robust structure outside the south side of the Reactor Building. This generator will be sized to supply all FLEX loads for both Units. Temporary cabling will be deployed from the generator robust structure to the reactor building to power the FLEX pumps. There will be multiple connection points available to ensure connections can be made to power the required loads. The connection panel in the FLEX generator enclosure will be compatible with RRC supplied equipment. Running the portable generator at its staged location in the robust structure will allow quicker availability of FLEX pumps to meet the 2.5 hour time critical action. The robust structure will accommodate the diesel generator requirements to run appropriately while inside the enclosure.

Power to 480 VAC Busses

The 480 VAC safety related busses (2-7329 for Unit 2 and 3-7339 for Unit 3) will also be capable of being energized from the 800 kW FLEX generator using separate flexible cables. The flexible cables will be stored on reels/carts located near the 480 VAC safety related busses and other locations as required. Additional flexible cables may be stored on portable carts if needed. Connection to the busses will be made using modified breakers that can be racked into empty cubicles on either safety related bus on a specific unit. The opposite division safety related bus can then be energized using the installed bus cross-connect mechanism. When the busses are energized, power will be available for the following actions: close AC valves to isolate the Recirculation System Loops to significantly reduce RPV leakage, the SBLC pumps will be available for high pressure RPV injection, the 125/250VDC battery chargers will be available for vital plant systems, and the Instrument Bus will be available to power vital plant instruments.

Key Reactor Parameters are initially obtained via DC powered instrumentation and additional instrumentation becomes available when AC power is available from the FLEX generator. A DC load stripping strategy is employed to extend battery life. No specific Containment control is required in Phase 2 as both temperature and pressure stay within design limits for the first 72 hours of the event. Key Containment Parameters are initially obtained from DC powered instrumentation and additional instrumentation becomes available when AC power is available from the FLEX generator. Spent Fuel Pool level is obtained from the new Spent Fuel Pool wide range instrumentation installed under order EA-12-051 [22].

Phase 3 strategies.

Phase 1 and 2 strategies will provide sufficient capability and no additional Phase 3 strategies are required. However, Phase 3 support will be employed to provide backup equipment and consumable supplies. Phase 3 support for DNPS includes backup portable pumps, generators and consumable supplies.

3.0 Equipment Selection Process and ESEL

The selection of equipment for the Expedited Seismic Equipment List (ESEL) followed the guidelines of EPRI 3002000704 [2].The ESEL for Unit 2 & 3 is presented in Attachment 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 DNPS Overall Integrated Plan (OIP) in Response to the March 12, 2012, Commission Order EA-12-049 including all 6 month FLEX updates through August 2014 [3]. The OIP provides the DNPS 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 DNPS OIP including all 6 month FLEX updates through August 2014 [3]. FLEX recovery actions are excluded from the ESEP scope per EPRI 3002000704 [2]. The overall list of planned FLEX modifications and the scope for consideration herein is limited to those required to support Core Cooling, Reactor Coolant System (RCS) inventory control, Containment integrity, and required plant monitoring parameters. The DNPS FLEX plan only includes permanently installed FLEX equipment and therefore, this equipment is included on the ESEL.

The ESEL component selection followed the EPRI guidance outlined in Section 3.2 of EPRI 3002000704 [2].

1. The scope of components is limited to those 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 DNPS OIP including all 6 month FLEX updates through August 2014 [3].

2. The scope of components is limited to installed plant equipment and FLEX connections necessary to implement the DNPS OIP including all 6 month FLEX updates through August 2014 [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 [2] guidance are:

   - Structures (e.g. Containment, Reactor Building, Turbine 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 (NSSS) 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 DNPS OIP [3] to determine the major equipment involved in the FLEX strategies. The Reference 20 report validated the ESEL to the DNPS OIP through the February 2014 update [3.1, 3.2, 3.3]. It was confirmed by DNPS review [25] that the ESEL was also consistent with the August 2014 [3.4] FLEX update. Further reviews of plant drawings (e.g., Process and Instrumentation Diagrams (P&IDs) and Electrical One Line Diagrams) were performed to identify the boundaries of the flow paths to be used in the FLEX strategies and to identify specific components in the flow paths needed to support implementation of the FLEX strategies. Boundaries were established at an electrical or mechanical isolation device (e.g., isolation amplifier, valve, etc.) in branch circuits / branch lines off the defined electrical or fluid flow path. P&IDs were the primary reference documents used to identify mechanical components and instrumentation. The flow paths used for FLEX strategies were selected and specific components were identified using detailed equipment and instrument drawings, piping isometrics, electrical schematics and one-line drawings, system descriptions, design basis documents, etc., as necessary.

The flow paths credited for the DNPS ESEP are shown in Table 3-1.

Table 3-1: Flow Paths Credited for ESEP

Flow Path	FLEX Drawing	P&IDs	
		Unit 2	Unit 3
Steam from Reactor Pressure Vessel (RPV) to Isolation Condenser and Condensate from Isolation Condenser back to RPV	Not Applicable	M-28 [24.1] M-32 [24.19] M-26, Sh. 2 [24.12]	M-359 [24.6] M-363 [24.14] M-357, Sh. 2 [24.20]
Isolation Condenser Shell Side Make-Up from FLEX Connection[1] and Shell Side Steam Vent to Atmosphere	[3.3] & [3.4]	M-28 [24.1] M-4203 [24.15] M-39 [24.13]	M-359 [24.6] M-4203 [24.15] M-369 [24.16]
High Pressure Coolant Injection (HPCI) from Torus to Reactor Pressure Vessel via HPCI Pump (for Core Heat Removal)	Not Applicable	M-51 [24.21] M-14 [24.22] M-46, Sh. 1 [24.8] M-46, Sh. 2 [24.9] M-46, Sh. 3 [24.10]	M-374 [24.7] M-347 [24.23] M-46, Sh. 1 [24.8] M-46, Sh. 2 [24.9] M-46, Sh. 3 [24.10]
High Pressure Reactor Coolant Make-Up from Standby Liquid Control Tank to RPV	Not Applicable	M-33 [24.3] M-26, Sh. 1 [24.11]	M-364 [24.24] M-357, Sh. 1 [24.4]
Low Pressure Reactor Coolant Make-Up from FLEX Pump[2] powered by a portable FLEX Diesel Generator to RPV, SFP, ISCO[3]	[3.3] & [3.4]	M-29, Sh. 1 [24.2]	M-361, Sh. 1 [24.17]
Reactor Recirculation Pump Seal Isolation from Recirculation System	Not Applicable	M-26, Sh. 2 [24.12]	M-357, Sh. 2 [24.20]
Fuel Oil from the Emergency Diesel Generator Fuel Oil Storage Tank.	Not Applicable	M-41, Sh. 2 [24.18]	

3.1.2 Power Operated Valves

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

[1] Flex Pump Provides make-up from either unit's Torus to either unit's Isolation Condenser shell side, Spent Fuel Pool, and Reactor Pressure Vessel [3.3], [3.4].

[2] The FLEX Pump suction is upstream of the LCPI Pump and the discharge is downstream of the LPCI Pump on both sub-systems for each unit [3.3], [3.4].

[3] Portable Diesel Driven Pumps Provide Make-up from the Ultimate Heat Sink (UHS) to either Units Torus providing continuous supply to the FLEX Pumps [3.3], [3.4].

- 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 [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

Instruments identified to monitor parameters critical to control of elements of the FLEX Strategy [3.1, 3.2, 3.3] are included in the ESEL. Only instruments critical to control and decision-making were included. Instruments that only indicate the success of the strategy (and not used for control or decision-making) were excluded from ESEP. For each of the included instruments, flow diagrams were reviewed as applicable to confirm the transmitter is within an established FLEX flow path. Elementary diagrams were reviewed to establish the signal path between the instrument transmitter and the credited indicator. The transmitter, indicator and any signal conditioning components, as well as power supplies used to power all the components necessary to the signal path were identified. For each of these items either the component itself or the instrumentation cabinet containing it was included in the ESEL. Instrument loops for the following parameters were included in the ESEL:

- Reactor Coolant Pressure Indication
- Reactor Coolant Level Indication
- Drywell Pressure Indication
- Torus Level Indication
- Torus Temperature Indication
- Isolation Condenser Shell-Side Level Indication
- Low Pressure Coolant Injection Flow Indication
- Low Pressure Coolant Injection Flow Indication

3.1.6 Phase 2 and Phase 3 Piping Connections

Item 2 in Section 3.1 above notes that the scope of equipment in the ESEL includes "… FLEX connections necessary to implement the DNPS OIP [3] as described in Section 2." Item 3 in Section 3.1 notes that "The scope of components assumes the credited FLEX connection modifications are implemented, and are limited to those required to support a single FLEX success path (i.e., either "Primary" or "Back-up/Alternate")."

Item 6 in Section 3 goes on to explain that "Piping, cabling, conduit, HVAC, and their supports" are excluded from the ESEL scope in accordance with EPRI 3002000704 [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 the 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

All equipment used for FLEX implementation on the DNPS ESEL are the primary path.

4.0 Ground Motion Response Spectrum (GMRS)

4.1 Plot of GMRS Submitted by the Licensee

As discussed in the DNPS March Submittal [4], Dresden was designed and constructed before the concept of control point was defined, and the UFSAR [21] does not provide specific definition of the SSE control point. The SPID [14] guidance in Section 2.4.2 recommends for rock sites to define the control point at the top of the rock. Therefore, the control point was defined as elevation 515 feet MSL, which is the approximate top of the bedrock in the vicinity of the main power block. This elevation is used for comparison to the GMRS. The UFSAR [21], states that the site SSE is anchored to a PGA of 0.2g.

The GMRS, taken from the DNPS March submittal report [4], is shown in Table 4-1 and Figure 4-1.

Table 4-1: DNPS GMRS (5% Damping)

Freq. (Hz)	GMRS (unscaled, g)
0.1	1.37E-02
0.125	1.72E-02
0.15	2.06E-02
0.2	2.75E-02
0.25	3.43E-02
0.3	4.12E-02
0.35	4.81E-02
0.4	5.49E-02
0.5	6.87E-02
0.6	7.82E-02
0.7	8.78E-02
0.8	9.71E-02
0.9	0.103
1	0.108
1.25	0.122
1.5	0.128
2	0.141
2.5	0.152
3	0.186
3.5	0.227
4	0.266
5	0.343
6	0.389
7	0.431
8	0.465

Freq. (Hz)	GMRS (unscaled, g)
9	0.499
10	0.534
12.5	0.577
15	0.587
20	0.577
25	0.504
30	0.422
35	0.369
40	0.338
50	0.296
60	0.269
70	0.257
80	0.251
90	0.248
100	0.246

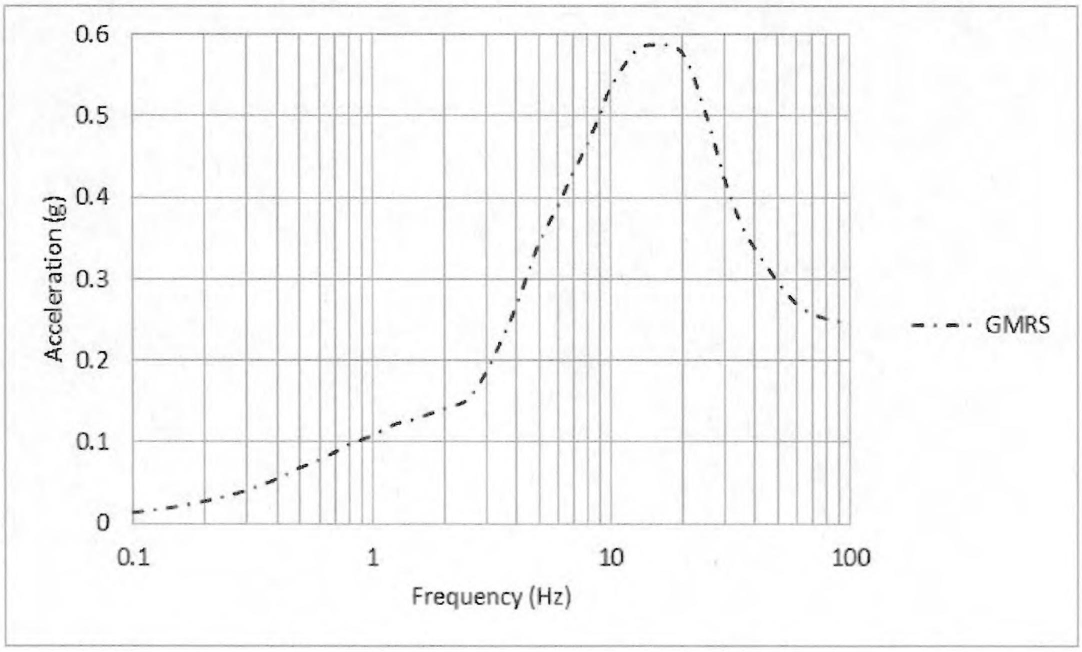

Figure 4-1: DNPS GMRS (5% Damping)

4.2 Comparison to SSE

As identified in the DNPS March submittal report [4], the GMRS exceeds the SSE in the 1-10Hz range. A comparison of the GMRS to the SSE between 1-10Hz is shown in Table 4-2 and Figure 4-2.

Table 4-2: DNPS GMRS and SSE Between 1-10 Hz (5% Damping)

Freq. (Hz)	GMRS (unscaled, g)	Horizontal SSE (g)
1	0.108	0.200
1.25	0.122	0.220
1.5	0.128	0.253
2	0.141	0.290
2.5	0.152	0.310
3	0.186	0.321
3.5	0.227	0.329
4	0.266	0.332
5	0.343	0.330
6	0.389	0.324
7	0.431	0.318
8	0.465	0.312
9	0.499	0.306
10	0.534	0.300

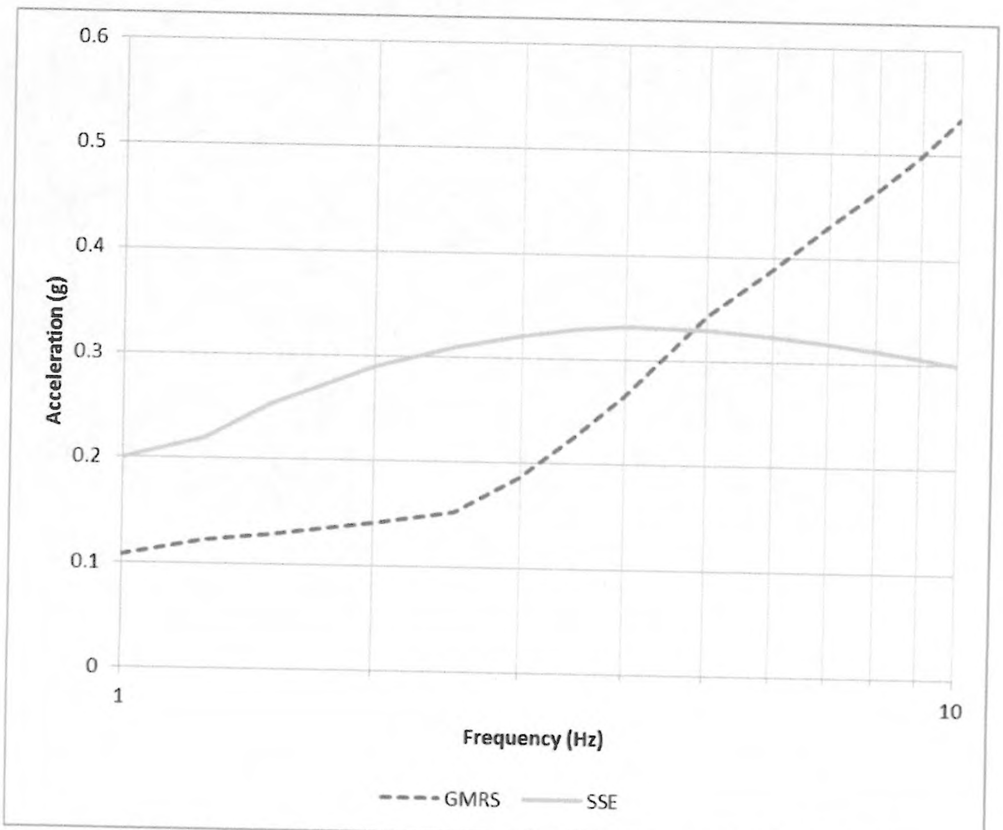

Figure 4-2: DNPS GMRS to SSE Comparison (5% Damping)

5.0 Review Level Ground Motion (RLGM)

5.1 Description of RLGM selected

The RLGM for DNPS was determined in accordance with Section 4 of EPRI 3002000704 [2] by linearly scaling the DNPS SSE by the maximum GMRS/SSE ratio between the 1 and 10Hz range. This calculation is shown in Table 5-1.

Table 5-1: DNPS Maximum GMRS/SSE Ratio (5% Damping)

Freq. (Hz)	GMRS (unscaled, g)	Horizontal SSE (g)	GMRS/SSE
1	0.108	0.200	0.54
1.25	0.122	0.220	0.55
1.5	0.128	0.253	0.51
2	0.141	0.290	0.49
2.5	0.152	0.310	0.49
3	0.186	0.321	0.58
3.5	0.227	0.329	0.69
4	0.266	0.332	0.80
5	0.343	0.330	1.04
6	0.389	0.324	1.20
7	0.431	0.318	1.36
8	0.465	0.312	1.49
9	0.499	0.306	1.63
10	0.534	0.300	1.78

As shown above, the maximum GMRS/SSE ratio occurs at 10 Hz and equals 1.78.

The resulting 5% damped RLGM, based on scaling the horizontal SSE by the GMRS/SSE ratio of 1.78, is shown in Table 5-2 and Figure 5-2. Note that the RLGM PGA is 0.356g.

Table 5-2: DNPS RLGM (5% Damping)

Freq. (Hz)	RLGM (g)
1.14	0.356
1.25	0.392
1.43	0.438
1.67	0.481
2.00	0.516
2.50	0.552
3.33	0.584
4.00	0.591
4.44	0.591
5.00	0.587
6.67	0.570
10.0	0.534
11.1	0.520
12.5	0.506
14.3	0.491
16.7	0.473
20.0	0.456
25.0	0.438
28.6	0.427
33.3	0.417
40.0	0.402
50.0	0.388
66.7	0.374
100	0.356

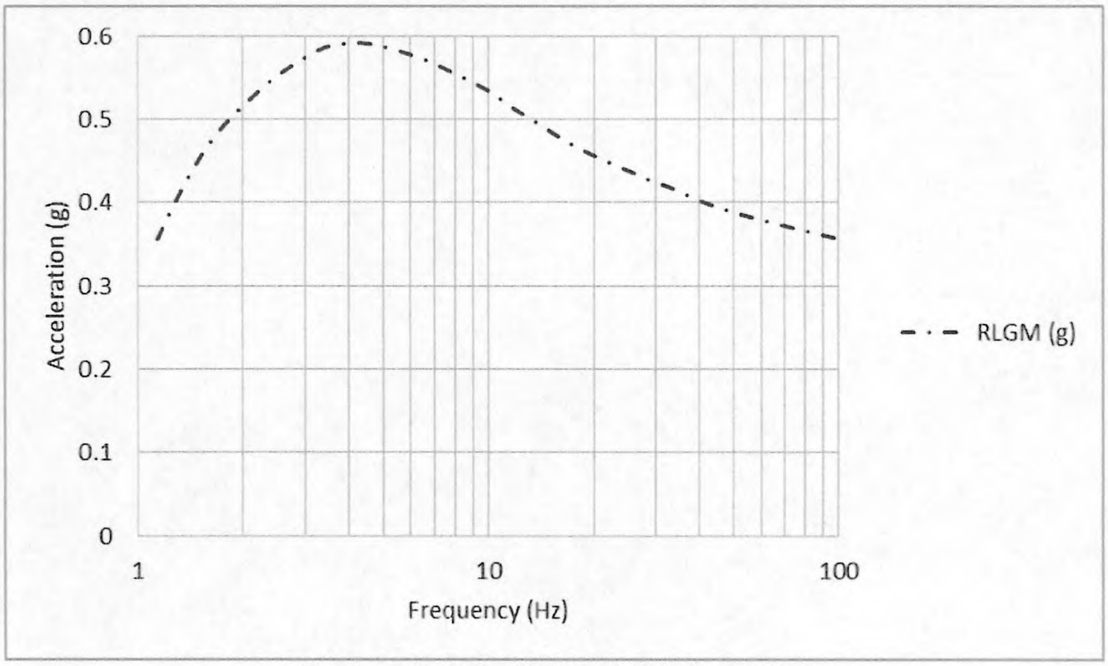

Figure 5-1: DNPS RLGM (5% Damping)

5.2 Method to Estimate ISRS

The method used to derive the ESEP in-structure response spectra (ISRS) was to uniformly scale existing SSE-based ISRS from Structural Criteria Document TDBD-DQ-1 [17] by the maximum GMRS/SSE ratio from Table 5-1 of 1.78. Existing ISRS were the same as those used for the USI A-46 program. Scaled ISRS are calculated for all buildings and elevations where ESEL items are located at DNPS. These scaled ISRS were used as the basis for screening and for the High Confidence Low Probability of Failure (HCLPF) calculations 14Q4237-CAL-002, 14Q4239-CAL-003, and 14Q4239-CAL-004 [10].

6.0 Seismic Margin Evaluation Approach

It is necessary to demonstrate that ESEL items have sufficient seismic capacity to meet or exceed the demand characterized by the RLGM. The seismic capacity is characterized as the highest peak ground acceleration (PGA) for which there is a high confidence of a low probability of failure (HCLPF). The PGA is associated with a particular spectral shape, in this case the 5% damped RLGM spectral shape. The calculated HCLPF capacity must be equal to or greater than the RLGM PGA (0.356g from Table 5-2). The criteria for seismic capacity determination are given in Section 5 of EPRI 3002000704 [2].

There are two basic approaches for developing HCLPF capacities:

1. Deterministic approach using the conservative deterministic failure margin (CDFM) methodology of EPRI NP-6041 [7].
2. Probabilistic approach using the fragility analysis methodology of EPRI TR-103959 [8].

The deterministic approach using the CDFM methodology of EPRI NP-6041 [7] was used for DNPS to determine HCLPF capacities.

6.1 Summary of Methodologies Used

DNPS performed a Seismic Margin Assessment (SMA) in 1997. The SMA is documented in the DNPS IPEEE report [9] and consisted of screening walkdowns and HCLPF anchorage calculations. The screening walkdowns used Table 2-4 of EPRI NP-6041 [7]. The walkdowns were conducted by trained engineers that successfully completed the SQUG Walkdown Screening and Seismic Evaluation Training Course. The majority of these engineers were also trained in using EPRI NP-6041 (the engineers attended the EPRI SMA Add-On course). The walkdown results were documented on Screening Evaluation Work Sheets (SEWS) that are included in the Reference 11 report. Anchorage capacity calculations used the CDFM criteria from EPRI NP-6041[7].

DNPS conservatively applied the methodology of EPRI NP-6041 [7] to all items on the ESEL for the ESEP. The performed screening used Table 2-4 from EPRI NP-6041 [7]. The walkdowns were conducted by engineers who, as a minimum, have attended the SQUG Walkdown Screening and Seismic Evaluation Training Course. The walkdowns were documented in SEWS from EPRI NP-6041 [7]. Anchorage capacity calculations use the CDFM criteria established within EPRI NP-6041 [7] with DNPS specific allowables and material strengths used as applicable. The input seismic demand used was the RLGM shown in Table 5-2 and Figure 5-1.

6.2 HCLPF Screening Process

From Table 5-2, the spectral peak of the RLGM for DNPS equals 0.591g. Screening lanes 1 and 2 in Table 2-4 of NP-6041 [7] are bounded by peak spectral accelerations of 0.8g and 1.2g, respectively. Both lane limits exceed the RLGM peak spectral acceleration. ESEL components were screened to lane 1 of Table 2-4 in NP-6041 [7].

The DNPS Unit 2 and Unit 3 ESEL contain 114 items and 108 items respectively [20]. It is noted that the highest number designation is 228. There were 6 number designations not used: 28, 64, 152, 172, 196 and 202. Of the ESEL items, 27 and 27 are valves for Unit 2 and 3 respectively, both power-operated and air operated. Note that the difference in the number of ESEL components between the units is that the shared new FLEX equipment and the Diesel Fuel Oil Storage Tank are all included on the Unit 2 ESEL. In accordance with Table 2-4 of EPRI NP-6041 [7], active valves may be assigned a functional capacity of 0.8g (relative to the spectral peak) only requiring a review of valves with large extended operators on small diameter piping. Note that anchorage is not a failure mode. Valves on the ESEL may be screened out, subject to the caveat regarding large extended operators on small diameter piping. The non-valve components in the ESEL were evaluated to the remaining EPRI NP-6041 Table 2-4 [7] screening caveats, as applicable.

6.3 Seismic Walkdown Approach

6.3.1 Walkdown approach

Walkdowns for the DNPS were performed in accordance with the criteria provided in Section 5 of EPRI 3002000704 [2], which refers to EPRI NP-6041 [7] for the Seismic Margin Assessment process. Pg. 2-26 through 2-30 of EPRI NP-6041 [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[4] *[Seismic Interaction] 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.*

The DNPS walkdowns included, as a minimum, a 100% walk-by of all "existing" items on the DNPS ESEL except as noted in Section 7.0. Note that "new" items on the DNPS ESEL represent new permanently installed equipment that was not installed at the time of the walkdowns. These items are being installed to meet the RLGM input. Previous walkdown

[4] EPRI 3002000704 [2] page 5-4 limits the ESEP seismic interaction reviews to "nearby block walls" and "piping attached to tanks" which are reviewed "to address the possibility of failures due to differential displacements." Other potential seismic interaction evaluations are "deferred to the full seismic risk evaluations performed in accordance with EPRI 1025287 [14].".

information that was relied upon as the basis for SRT judgment in excluding an item walkdown is documented in Section 6.3.2.

6.3.2 Application of Previous Walkdown Information

The seismic walkdowns for DNPS included, as a minimum, a walk-by of all the components on the ESEL by the SRT with the following exceptions:

- ESEL Item # 24 2-2301-8 U2 HPCI MN PMP DISCH MOV TO FEED HDR
- ESEL Item #175 2-0202-4A 2A RECIRC PMP SUCT VLV (MOV)
- ESEL Item #176 2-0202-5A 2A RECIRC PMP DISCH VLV (MOV)
- ESEL Item #177 2-0202-4B 2B RECIRC PMP SUCT VLV (MOV)
- ESEL Item #178 2-0202-5B 2B RECIRC PMP DISCH VLV (MOV)
- ESEL Item #213 2/3-5201 Diesel Fuel Oil Storage Tank

A detailed discussion and resolution for the items listed above is provided in Section 7.0. All non-energized cabinets were opened when specialized tools were not needed to operate the cabinet doors. Photos were taken during the walkdowns. In general the NTTF Recommendation 2.3 walkdowns for DNPS [15] and [18] were not used but were available for reference. The existing calculations and SEWS from the USI A-46 evaluation of DNPS [16] were utilized to aid the SRT in their screening decisions as indicated in Attachments C and D of this report. 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[5]. The results of the walkdowns, screenings and subsequent evaluations are included in the Reference 11 report.

6.3.3 Significant Walkdown Findings

Consistent with that guidance from NP-6041 [7], no significant outliers or anchorage concerns were identified during the DNPS ESEP walkdowns. The following finding was 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

[5] EPRI 3002000704 [2] page 5-4 limits the ESEP seismic interaction reviews to "nearby block walls" and "piping attached to tanks" which are reviewed "to address the possibility of failures due to differential displacements." Other potential seismic interaction evaluations are "deferred to the full seismic risk evaluations performed in accordance with EPRI 1025287 [15].

failure mode for an ESEL item, it is noted in the tabulated HCLPF values described in Section 6.6 and shown in Attachments C & D.

6.4 HCLPF Calculation Process

ESEL items were evaluated using the criteria in EPRI NP-6041 [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 [7] as described in Section 6.2.
- Performing HCLPF calculations considering various failure modes that include both structural (e.g. anchorage, load path etc.) and functional failure modes.

All HCLPF calculations were performed using the CDFM methodology and are documented in DNPS calculations 14Q4239-CAL-002, 14Q4239-CAL-003, and 14Q4239-CAL-004 [10].

Anchorage configurations for non-valve components were evaluated either by SRT judgment, large margins in existing design basis calculations, or CDFM based HCLPF calculations [10]. The results of these analysis methods are documented in Attachment C and D for DNPS Unit 2 and 3 respectively. For components beyond 40 feet above grade, Table 2-4 of NP-6041 [7] is not directly applicable.

EPRI 3002000704 [2] Section 5 references EPRI 1019200 [19] with respect to screening criteria beyond 40 feet above grade. This guide update allows multiplying the screening lane spectral acceleration value ranges by a factor of 1.5 in order to account for spectral acceleration (SAS) at the base of the component. This screening level at the base of a component is compared to the ISRS demand corresponding to the RLGM. For example, by factoring the acceleration ranges for screening lane 1 of NP-6041-SL Table 2-4, the capacity at the base of a component is bounded by 0.8g*1.5=1.2g. This is compared with the seismic demand presented by the ISRS.

ESEP equipment items which are beyond 40 feet above grade are located in the Reactor Building (RB) at elevation 570 feet and 589 feet. The 5% damped horizontal response spectra at these elevations are documented in 14Q4239-CAL-001 [10]. The maximum spectral peaks at these locations are 4.23g (E-W direction) and 6.83g (E-W direction) and well above the lane 2 bound applicable to floor response spectra of 1.5 * 1.2g = 1.8g. The maximum ZPA at these elevations were 1.19g and 1.42g respectively. This presented screening challenges that were addressed as discussed in the notes section of Attachment C and D.

As described in Section 6.0, for HCLPF calculations the conservative, deterministic failure margin (CDFM) analysis criteria established in Section 6 of EPRI NP-6041 [7] are used for a detailed analysis of components. The relevant CDFM criteria from EPRI NP-6041 [7] are summarized in Table 6-1.

Table 6-1: DNPS Maximum GMRS/SSE Ratio

Load combination:	Normal + Seismic Margin Earthquake (SME) [6]
Ground response spectrum:	Conservatively specified (84% non-exceedance probability)
Damping:	Conservative estimate of median damping.
Structural model:	Best estimate (median) + uncertainty variation in frequency.
Material strength:	Code specified minimum strength or 95% exceedance of actual strength if test data is available.
Static capacity equations:	Code ultimate strength (ACI), maximum strength (AISC), Service Level D (ASME) or functional limits. If test data is available to demonstrate excessive conservatism of code equations then use 84% exceedance of test data for capacity equations.
Inelastic energy absorption:	For non-brittle failure modes and linear analysis, use 80% of computed seismic stress in capacity evaluation to account for ductility benefits or perform nonlinear analysis and use 95% exceedance ductility levels.

The HCLPF capacity is equal to the PGA at which the strength limit is reached. The HCLPF earthquake load is calculated as follows:

U = Normal + Ec

Where:

- U = Ultimate strength per Section 6 of EPRI NP-6041[7]
- Ec = HCLPF earthquake load
- Normal = Normal operating loads (dead and live load expected to be present, etc.)

For this calculation, the HCLPF earthquake load is related to a fixed reference earthquake:

Ec = SFc*Eref

[6] The ESEP evaluation uses the RLGM spectra as the SME.

Where:

- Eref = reference earthquake from the relevant in-structure response spectrum (ISRS)
- SFc = component-specific scale factor that satisfies U = Normal +Ec

The HCLPF will be defined as the PGA produced by Ec. Because the DNPS RLGM PGA is 0.356g:

HCLPF = 0.356g*SFc

6.5 Functional Evaluation of Relays

A HCLPF evaluation is performed for all relays and switches which may negatively "seal in" or "lock out" on the DNPS ESEL [20].

For relay evaluations, NP-6041-SL Appendix Q describes the following steps:

- Calculate in-cabinet response spectra (ICRS):
- Establish a clipping factor to be applied to the ICRS:
- Determine a relay's GERS Capacity:
- Establish adjustment factors to convert the relay's GERS capacity to a CDFM level:
- Compare clipped-peak and ZPA demands to the GERS capacity:

Of the 114 items on the DNPS Unit 2 ESEL, 9 are relays [20]. Of the 108 items on the DNPS Unit 3 ESEL, 9 are relays [20]. Specific seismic qualification test-based capacities were available for all 18 relays using either industry or DNPS specific documentation. In-cabinet capacity to demand evaluations were performed using the DNPS relay seismic capacities and the ESEP ISRS scaled with the NP-6041 in-cabinet amplification factors. In each case, the capacity exceeded the demand. HCLPF capacities for these 18 total components are calculated in 14Q4239-CAL-004 [10] and are presented in Attachment C and D.

6.6 Tabulated ESEL HCLPF Values (including Key Failure Modes)

Tabulated ESEL HCLPF values including the key failure modes are included in Attachment C and D. It is noted that several HCLPFs were calculated and shown not to control.

- For items screened out using NP 6041 [7] screening tables, the listed HCLPF is indicated to be greater than the RLGM PGA (>0.356g) and the failure mode is listed as "Screened". It is noted that components on the ESEL screen for as a minimum Screening Lane 1, that is the 0.8g screening lane. For equipment < 40 feet above grade, the screening HCLPF is limited by equipment capacity. This ground motion

HCLPF is estimated to be a minimum of (0.8g / 0.591g) * 0.356g = 0.482g, where, 0.8g is the minimum screening level, 0.591g is the peak of the ground RLGM and 0.356g is the PGA of the RLGM.

- For items where anchorage controls the HCLPF value, and the HCLPF is less than the minimum capacity of 0.482g Peak Ground Acceleration (PGA), the HCLPF value is listed in the table and the failure mode is set to "Anchorage". When the anchorage HCLPF turned out to be above this level, the listed HCLPF is set to >RLGM and the failure mode is "Equipment Capacity" along with a note providing the anchorage HCLPF and that it did not control capacity. When this was the case for equipment located less than 40 feet above grade, the HCLPF of 0.482g was given as the governing HCLPF for Equipment Capacity. When this was the case for equipment located above 40 feet above grade a HCLPF of 0.356g was given as the governing HCLPF for Equipment Capacity.
- For items where relay function controls the HCLPF value, and the HCLPF is less than the minimum capacity of 0.482g Peak Ground Acceleration (PGA), the HCLPF value is listed in the table and the failure mode is set to "Equipment Function". When the relay function HCLPF turned out to be above this level, the listed HCLPF is set to >RLGM and the failure mode is "Equipment Capacity" along with a note providing the relay HCLPF and that it did not control capacity. When this was the case for equipment located less than 40 feet above grade, the HCLPF of 0.482g was given as the governing HCLPF for Equipment Capacity. When this was the case for equipment located above 40 feet above grade a HCLPF of 0.356g was given as the governing HCLPF for Equipment Capacity.
- For items where interaction controls the HCLPF value, and the HCLPF is less than the minimum capacity of 0.482g Peak Ground Acceleration (PGA), the HCLPF value is listed in the table and the failure mode is set to "Interaction". It is noted there were no cases for Dresden ESEL items where this was the case. Therefore, the listed HCLPF is set to >RLGM and the failure mode is "Equipment Capacity" along with a note providing the interaction HCLPF and that it did not control capacity. When this was the case for equipment located less than 40 feet above grade, the HCLPF of 0.482g was given as the governing HCLPF for Equipment Capacity. When this was the case for equipment located above 40 feet above grade a HCLPF of 0.356g was given as the governing HCLPF for Equipment Capacity.

7.0 Inaccessible Items

7.1 Identification of ESEL Items Inaccessible for Walkdowns

Six ESEL items were not accessible to the SRT during the ESEP walkdowns at DNPS. A description of circumstances and disposition for each of these items is provided below.

ESEL Item #24 2-2301-8 U2 HPCI MN PMP DISCH MOV TO FEED HDR

This valve is inside a locked Steam Tunnel that is inaccessible when the unit is on line which has been the case throughout the ESEP effort. This valve was screened for the 0.8g screening lane in EPRI NP-6041 guidance based on the identical valve 3-2301-8 in Unit 3. This valve screened by comparison as judged acceptable by the Seismic Review Team (SRT) that performed the walkdown on valve 3-2301-8 in Unit 3.

ESEL Item #175 2-0202-4A 2A RECIRC PMP SUCT VLV (MOV)

This valve is inside containment shield wall that is inaccessible when the unit is on line which has been the case throughout the ESEP effort. This valve was screened for the 0.8g to 1.2g screening lane in EPRI NP-6041 guidance based on the identical valve 3-0202-4A in Unit 3. This valve screened by comparison as judged acceptable by the Seismic Review Team (SRT) that performed the walkdown on valve 3-0202-4A in Unit 3.

ESEL Item #176 2-0202-5A 2A RECIRC PMP DISCH VLV (MOV)

This valve is inside containment shield wall that is inaccessible when the unit is on line which has been the case throughout the ESEP effort. This valve was screened for the 0.8g to 1.2g screening lane in EPRI NP-6041 guidance based on the identical valve 3-0202-5A in Unit 3. This valve screened by comparison as judged acceptable by the Seismic Review Team (SRT) that performed the walkdown on valve 3-0202-5A in Unit 3.

ESEL Item #177 2-0202-4B 2B RECIRC PMP SUCT VLV (MOV)

This valve is inside containment shield wall that is inaccessible when the unit is on line which has been the case throughout the ESEP effort. This valve was screened for the 0.8g to 1.2g screening lane in EPRI NP-6041 guidance based on the identical valve 3-0202-4B in Unit 3. This valve screened by comparison as judged acceptable by the Seismic Review Team (SRT) that performed the walkdown on valve 3-0202-4B in Unit 3.

ESEL Item #178 2-0202-5B 2B RECIRC PMP DISCH VLV (MOV)

This valve is inside containment shield wall that is inaccessible when the unit is on line which has been the case throughout the ESEP effort. This valve was screened for the 0.8g to 1.2g screening lane in EPRI NP-6041 guidance based on the identical valve 3-0202-5B in Unit 3.

This valve screened by comparison as judged acceptable by the Seismic Review Team (SRT) that performed the walkdown on valve 3-0202-5B in Unit 3.

ESEL Item #218 2/3-5201 Diesel Fuel Oil Storage Tank:

This tank is buried and, by definition, not accessible. Per the screening criteria of Table 2-4 in EPRI NP-6041[7], the anchorage configurations of buried tanks are inherently seismically rugged and of no concern as judged by the SRT that are the preparer and checker of this report. A review of the flexibility of attached piping for 2/3-5201 was performed based on available documentation. The conclusion of that review as judged by the SRT that are the preparer and checker of this report was that there was adequate flexibility of the attached lines and that the tank is screened.

7.2 Planned Walkdown / Evaluation Schedule / Close Out

No additional walkdowns are required.

8.0 ESEP Conclusions and Results

8.1 Supporting Information

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

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

The NRC's May 9, 2014 NTTF 2.1 Screening and Prioritization letter [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 DNPS was included in the fleet risk evaluation submitted in the March 12, 2014 NEI letter [12] therefore, the conclusions in the NRC's May 9 letter [13] also apply to DNPS.

In addition, the March 12, 2014 NEI letter [12] provided an attached "Perspectives on the Seismic Capacity of Operating Plants," which (1) assessed a number of qualitative reasons why the design of Structures, Systems, and Components (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 of those plants that have actually experienced significant earthquakes. The seismic design process has inherent (and intentional) conservatisms which result in significant seismic margins within 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 the dynamic analysis of SSCs
- Bounding synthetic time histories for in-structure response spectra calculations
- Broadening criteria for in-structure response spectra
- Response spectra enveloping criteria typically used in SSC analysis and testing applications
- Response spectra based frequency domain analysis rather than explicit time history based time domain analysis
- Bounding requirements in codes and standards
- Use of minimum strength requirements of structural components (concrete and steel)
- Bounding testing requirements, and
- Ductile behavior of the primary materials (that is, not crediting the additional capacity of materials such as steel and reinforced concrete beyond the essentially elastic range, etc.).

These design practices combine to result in margins such that the SSCs will continue to fulfill their functions at ground motions well above the SSE.

8.2 Identification of Planned Modifications

No modifications are required as a result of the DNPS ESEP.

8.3 Modification Implementation Schedule

No modification implementation schedule is required because no modifications are required.

8.4 Summary of Regulatory Commitments

No regulatory commitments are required.

9.0 References

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

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

3 Order Number EA-12-049 responses:

3.1 NRC Letter RS-13-020 from Dresden (ML13063A320), "Overall Integrated Plan 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)", February 28, 2013

3.2 NRC Letter RS-13-119 from Dresden (ML13241A282), "First 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)", August 28, 2013

3.3 NRC Letter RS-14-010 from Dresden (ML14059A430), "Second 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)", February 28, 2014.

3.4 NRC Letter RS-14-208 from Dresden, "Third 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)", August 28, 2014

4 Exelon Generation Company, LLC, Seismic Hazard and Screening Report (Central and Eastern United States (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 *for Dresden Nuclear Power Station, Units 2 & 3* (RS-14-067), dated March 31, 2014 (ML14091A012)

5 Nuclear Regulatory Commission, NUREG-1407, Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities, June 1991

6 Nuclear Regulatory Commission, Generic Letter No. 88-20 Supplement 4, Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities - 10CFR 50.54(f), June 1991

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

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

9 "Individual Plant Examination of External Events (IPEEE) Submittal Report", Dresden Nuclear Power Station Units 2 and 3, December 1997

10 DNPS ESEP Calculations:

- 10.1 14Q4237-CAL-002 Rev. 0, "High Confidence Low Probability of Failure (HCLPF) Calculations for Components of the ESEP that did not Screen".
- 10.2 14Q4239-CAL-003 Rev. 1, "ESEP HCLPFs for Relays"
- 10.3 14Q4239-CAL-004 Rev. 0, "High Confidence Low Probability of Failure (HCLPF) Calculations for Unit 2 & 3 Isolation Condenser Assemblies"

11 S&A Report No.: 14Q4237-RPT-005 Rev 1, "Dresden ESEP SEWS"

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

13 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. 1025287

15 Dresden Nuclear Power Station Unit 2, NTTF 2.3 Seismic Walkdown Submittal, Correspondence No. 12-167, dated November 15, 2012

16 Dresden Nuclear Power Station Units 2 & 3, "USI A-46 Seismic Evaluation Report", June 1996

17 TDBD-DQ-1 Rev 1, "Structural Design Criteria for Quad Cities and Dresden Stations", April 13, 2000.

18 Dresden Nuclear Power Station Unit 3, NTTF 2.3 Seismic Walkdown Submittal, Correspondence No. 12-167, dated November 12, 2012

19 Seismic Fragility Applications Guide Update, December 2009, EPRI, Palo Alto, CA. 1994, 1019200

20 S&A Report No.: 14Q4237-RPT-003 Rev 1, "Validation of Expedited Seismic Equipment List"

21 Dresden Power Station Updated Final Safety Analysis Report (UFSAR), Revision 10, June 2013

22 Order EA-12-051

23 14Q4237-CAL-001 Rev. 0, "Generation of In-Structure Response Spectra for use in ESEP Evaluations"

24 Dresden P&ID Drawings and Supplemental References

24.1 Dresden Drawing M-28, Rev. LP, *Diagram of Isolation Condenser Piping*

24.2 Dresden Drawing M-29 Sheet 1, Rev. CI, *Diagram of Low Pressure Coolant Injection Piping*

24.3 Dresden Drawing M-33, Rev. HZ, *Diagram of Standby Liquid Control Piping.*

24.4 Dresden Drawing M-357 Sheet 1, Rev. BX, *Diagram of Nuclear Boiler and Reactor Recirculation Piping*

24.5 Dresden Drawing M-357 Sheet 2, Rev BS, *Diagram of Nuclear Boiler and Reactor Recirculating Piping*

24.6 Dresden Drawing M-359, Rev BN, *Diagram of Isolation Condenser Piping*

24.7 Dresden Drawing M-374, Rev CU, *Diagram of High Pressure Coolant Injection Piping*

24.8 Quad Cities[7] Drawing M-46 Sheet 1, Rev. CD, *Diagram of High Pressure Coolant Injection –HPCI Piping*

24.9 Quad Cities[8] Drawing M-46 Sheet 2, Rev. S, *Diagram of High Pressure Coolant Injection HPCI Piping*

24.10 Quad Cities[8] Drawing M-46 Sheet 3, Rev. G, *Diagram of HPCI Turbine Lubricating and Hydraulic Oil System and Pump Seal Cooler Piping*

24.11 Dresden Drawing M-26 Sheet 1, Rev. BR, *Diagram of Nuclear Boiler and Reactor Recirculating Piping*

24.12 Dresden Drawing M-26 Sheet 2, Rev. KK, *Diagram of Nuclear Boiler and Reactor Recirculating Piping*

24.13 Dresden Drawing M-39, Rev. DM, *Diagram of Reactor Building Equipment Drains*

24.14 Dresden Drawing M-363, Rev. BF, *Diagram of Shutdown Reactor Cooling Piping*

24.15 Dresden Drawing M-4203, Rev. E, *Flow Diagram Isolation Condenser Make Up System*

24.16 Dresden Drawing M-369, Rev. WI, *Diagram of Reactor Building Equipment Drains*

24.17 Dresden Drawing M-361 Sheet 1, Rev. VP, *Diagram of Low Pressure Coolant Injection System*

24.18 Dresden Drawing M-41 Sheet 2, Rev. AI, *Diagram of Turbine and Diesel Oil Piping*

[7] These Quad Cities drawings are to be used for validating the lube oil system at Dresden per TODI 14-036 [24.25].

24.19 Dresden Drawing M-32, Rev. BC, *Diagram of Shutdown Reactor Cooling Piping*

24.20 Dresden Drawing M-357 Sheet 2, Rev BS, *Diagram of Nuclear Boiler and Reactor Recirculating Piping*

24.21 Dresden Drawing M-51, Rev. CR, *Diagram of High Pressure Coolant Injection Piping*

24.22 Dresden Drawing M-14, Rev. LZ, *Diagram of Reactor Feed Piping*

24.23 Dresden Drawing M-347, Rev. CF, *Diagram of Reactor Feed Piping*

24.24 Dresden Drawing M-364, Rev AS, *Diagram of Standby Liquid Control Piping*

24.25 Dresden Station Transmittal of Design Information to Stevenson & Associates, DOC ID# 14-036 Rev. 000, "Use of QDC HPCI System Drawings for DRE", September 8, 2014

25 Correspondence 14Q4237-LRC-115, Subject: Question: Do your ESELs Include FLEX Mods which meet the Augmented Approach Section 3.2 Criteria to be included on the ESEL?, From Eyad Ali to Jeffrey S. Clark, November 11, 2014

Attachment A - DNPS Unit 2 ESEL

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
1	2-1501-22A	U2 LPCI LOOP I COOLANT INJ INBD ISOL MOV	Closed	Open	MOV will be manually opened with hand wheel to support RPV injection.
2	2-1501-20B	U2 LPCI LOOP II FULL FLOW BYP TEST INB MOV	Closed	Open	MOV will be manually opened with hand wheel to support Torus makeup from UHS.
3	2-1501-38B	U2 LPCI LOOP II FULL FLOW BYP TEST OTBD MOV	Closed	Open	MOV will be manually opened with hand wheel to support Torus makeup from UHS.
4	2-1501-32B	U2 LPCI LOOP I AND II X-TIE MOV	Open	Closed	MOV will be manually closed with hand wheel to support Torus makeup from UHS.
5	2-1501-21A	U2 LPCI LOOP I COOLANT INJ OTBD ISOL VLV	Open	Throttle	
11	2-2301-3	U2 HPCI TURB STM SUPPLY MOV	Closed	Open	
12	2-2301-64	U2 HPCI TURB SV ABOVE SEAT DRN AOV	Open	Closed	AOV fails closed on loss of instrument air
13	2-2301-65	U2 HPCI TURB SV ABOVE SEAT DRN VLV (AOV)	Open	Closed	AOV fails closed on loss of instrument air
14	2-2303-STPV	HPCI Turbine Stop Valve	Closed	Open	
15	2-2301-CV1 (2) (3) (4) (5) (6)	HPCI Turbine Control Valve	Closed	Open	There are 6 control valves mounted on a single assembly on the HPCI Turbine
16	2-2301	HPCI Turbine	Available	Operating	
17	2-2301-6	U2 HPCI SUCT VLV FROM CST	Open	Closed	
18	2-2301-35	U2 HPCI TORUS SUCT MOV	Closed	Open	
19	2-2301-36	U2 HPCI SUCT ISOL MOV	Closed	Open	
20	2-2302-1	HPCI Booster Pump	Available	Operating	
21	2-2302-2	GEAR UNIT HPCI PUMP HPCI Speed Reducer	Available	Operating	
22	2-2302	HPCI Main Pump	Available	Operating	
23	2-2301-14	U2 HPCI MN PMP RECIRC TO TORUS MOV	Closed	Open	

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
24	2-2301-8	U2 HPCI MN PMP DISCH MOV TO FEED HDR	Closed	Open	
25	2-2301-48	U2 HPCI CLG WTR RETURN TO BOOST PMP SUCT MOV	Closed	Open	
26	2-2301-49	U2 HPCI CLG WTR RETURN TO COND STORAGE MOV	Open	Closed	
27	2-2303-AOP	HPCI Auxiliary Oil Pump	Off	On	
28	Not Used				
29	2-2303-TG	HPCI Turning Gear	Off	On	
30	2-2320-GSLO	Gland Seal Leak off Drain Pump	Off	On	
31	2-2320-GSEF	HPCI Turbine Gland Seal Condenser Exhaust Fan	Off	On	
32	2-2303-MSC	Motor Speed Changer	Low Speed Stop	High Speed Stop	
33	2-2303-MGU	Motor Gear Unit	High Speed Stop	Varies to control HPCI flow	
34	2-2386	HPCI Turbine Signal Converter	Available	Operating	
35	2-2340-1	HPCI Flow Controller	Available	Operating	Controlled by flow transmitter 2-2358 on instrument rack 2-2202-29
36	2-2303-SOC	Lube Oil Cooler	Available	Operating	Passive Component
37	2-2320-GSC	Gland Seal Leak off Condenser	Available	Operating	Passive Component
38	2-2202-28	INSTRUMENT RACK ISO COND AND HPCI FLOW INDICATION	Available	Operating	Contains instrumentation transmitters associated with HPCI isolation (Steam Line Break & Rx Pressure Trips).
39	2-2202-29	Instrument Rack	Available	Operating	Contains instrumentation transmitters associated with HPCI operation/isolation (HPCI Flow Control).
40	2-2330-124	RELAY HPCI 90 PSI INTERLOCK	De-energized	De-energized	Isolation relay in panel 902-39. If the relay chatters HPCI may isolate.
41	2-2330-125A	RELAY CONTROL GEN-PURPOSE	De-energized	De-energized	Isolation relay in panel 902-33. If the relay chatters HPCI may isolate.

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
42	2-2330-125B	RELAY CONTROL GEN-PURPOSE	De-energized	De-energized	Isolation relay in panel 902-39. If the relay energizes HPCI may isolate.
43	2-2330-126	RELAY CONTROL GEN-PURPOSE	De-energized	De-energized	Isolation relay in panel 902-39. If the relay energizes HPCI may isolate.
44	2-2330-104	RELAY CONTROL GEN-PURPOSE	De-energized	De-energized	Turbine Trip relay in panel 902-39. If the relay energizes HPCI may trip
45	2-0902-39	PANEL HPCI RELAYS ESS 2	Available	Available	Contains relays related to HPCI operation
46	2-0902-3	PANEL REACTOR + CONTAINMENT COOLING	Available	Available	Main Control Room panel that contains control switches for system initiation and component starts.
47	2-0902-33	PANEL LPCI/CORE SPRAY ESS 2	Available	Available	Contains Isolation Relay 2330-125A
85	2-1302	Isolation Condenser assembly	Available	Operating	Passive Component
86	2-1301-3	U2 ISOLATION CONDENSER RX INLET ISOL VLV (MOV,DC)	Closed	Open	
87	2-1301-10	U2 ISOL CDSR CNTAM DEMIN WTR FILL SV (MOV, Emerg., AC)	Closed	Open	Motor Operated Valve allows FLEX Pump to makeup water to ISCO shell side.
88	2-1301-17	U2 ISOL CDSR VENT TO MN STM LINE INBD ISOL VLV (AOV)	Open	Closed	Air Operated Valve Fails Closed on Loss of Air
89	2-1301-20	U2 ISOL CDSR VENT TO MN STM LINE OTBD ISOL VLV (AOV)	Open	Closed	Air Operated Valve Fails Closed On Loss of Air
90	2-4399-74	U2 ISOL CDSR CLEAN DEMIN WTR FILL VLV (MOV, DC)	Closed	Open	Motor Operated Valve that will need to be opened for primary makeup path for ISCO.
91	2-0595-115A	RELAY ISO COND	Energized	Energized	Relay in panel 902-40. If the relay chatters the Isolation Condenser may isolate

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
92	2-0595-115B	RELAY ISO COND	Energized	Energized	Relay in panel 902-41. If the relay chatters the Isolation Condenser may isolate
93	2-0595-116A	RELAY ISO CONDINBOARD VALVE CONTROL	Energized	Energized	Relay in panel 902-40. If the relay de-energizes the Iso. Condenser may isolate
94	2-0595-116B	RELAY ISO COND OUTBOARD VALVE CONTROL	Energized	Energized	Relay in panel 902-41. If the relay de-energizes, the Iso. Condenser may isolate
95	2-0902-40	PANEL PCIS RELAYS INBOARD PCIS 1	Available	Available	Contains the ISCO Valve Relays.
96	2-0902-41	PANEL PCIS RELAYS OUTBOARD PCIS 2	Available	Available	Contains the ISCO Valve Relays.
109	2-83125-2	125 VDC Battery	Available	Operating	
110	2-83125-2	125 VDC Charger 2	Energized	Energized	
111	2-83125-2	125 VDC Battery Bus 2	Energized	Energized	
112	2-83125-2A-1	125 VDC Turbine Building Bus 2A-1	Energized	Energized	
113	2-83125-2B	125 VDC Turbine Building Bus 2B	Energized	Energized	
114	2-83125-2B-1	125 VDC Turbine Building Bus 2B-1	Energized	Energized	
115	2-83125-2	Unit 2 125 VDC Reactor Building Distribution Panel	Energized	Energized	
124	2-83250-2	250 VDC Battery	Available	Operating	
125	2-83250-2	Unit 2 250 VDC Charger 2	Energized	Energized	
126	2-83250-2	Unit 2 250 VDC MCC 2	Energized	Energized	
127	2-83250-2A	Unit 2 250 VDC MCC 2A	Energized	Energized	
128	2-83250-2B	Unit 2 250 VDC MCC 2B	Energized	Energized	
134	2-0902-49	ESS Bus PANEL 120/240 VAC ESS SERV DIST PNL	Energized	Energized	Provides power to instruments.
135	2-0902-63	ESS Uninterruptible Power Supply and Static Switch	Energized	Energized	
136	2-0902-50	Instrument Bus	Energized	Energized	Provides power to instruments.
137	2-0640-29A	2A RPV NR LVL	Energized	Energized	Reactor Water Level indicator in Main Control Room.

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
138	2-0646A	U2 REACTOR NARROW RANGE LVL FW CONTROL	Energized	Energized	Level Transmitter for 2-0640-29A
139	2-2202-5	Instrument Rack that transmitter 2-0646-A is located on.	Available	Available	
140	2-0263-156	U2 REACTOR WIDE RANGE PRESSURE	Energized	Energized	Reactor Water Level indicator in Main Control Room.
141	2-0263-152A	U2 REACTOR WIDE RANGE PRESSURE	Energized	Energized	Pressure Transmitter for 2-0263-156
142	2-2202-78	Instrument Rack that PT 2-0263-152A is located on.	Available	Available	Instrument Cabinet
143	2-8540-2/4	U2 PRI CNMT MR DW PRESS & M-U FLOW	Energized	Energized	Reactor Water Level indicator in Main Control Room.
144	2-1625	U2 DRYWELL MEDIUM RANGE PRESS	Energized	Energized	Pressure Transmitter for 2-8540-2/4
145	2-1602-3	U2 TORUS NARROW RANGE LEVEL	Energized	Energized	Torus Level indicator in Main Control Room.
146	2-1626	U2 TORUS NARROW RANGE LEVEL	Energized	Energized	Level Transmitter for 2-1602-3
147	2-1640-200	U2 TORUS TEMP MON	Energized	Energized	Recorder will be used to monitor Torus Temperature. Power supplied via terminal block in cabinet 2-2202-70A. (No active components for this function in 2-2202-70A)
148	2-0902-36	Main Control Room Panel PANEL IRM/SRM	Available	Available	Panel contains the Torus Temperature Recorder.
149	2-1340-2	U2 ISOLATION CONDENSER SHELL SIDE	Energized	Energized	Isolation Condenser Shell-side Level indicator
150	2-1341	U2 ISOLATION CDSR SHELL SIDE	Energized	Energized	Transmitter for Isolation Condenser Shell-side Level
151	2-0902-5	Main Control Room Panel	Available	Available	Contains RPV level and pressure indicators
152	Not Used				
153	2-1549-A	U2 LPCI LOOP I MAIN SUPPLY HDR	Energized	Energized	Flow Transmitter for LPCI line Flow which will measure the primary FLEX pump flow.(Flow Recorder2-1540-7 on 902-3, ROB)

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
154	2-2202-19A	INSTRUMENT RACK (LPCI)	Available	Available	Rack that FT 2-1549-A is mounted on.
175	2-0202-4A	2A RECIRC PMP SUCT VLV (MOV)	Open	Closed	Motor Operated Valve is to be closed when power is available from FLEX Generator.
176	2-0202-5A	2A RECIRC PMP DISCH VLV (MOV)	Open	Closed	Motor Operated Valve is to be closed when power is available from FLEX Generator.
177	2-0202-4B	2B RECIRC PMP SUCT VLV (MOV)	Open	Closed	Motor Operated Valve is to be closed when power is available from FLEX Generator.
178	2-0202-5B	2B RECIRC PMP DISCH VLV (MOV)	Open	Closed	Motor Operated Valve is to be closed when power is available from FLEX Generator.
179	2-0902-4	Main Control Room Panel PANEL SHUTDOWN HO COOLING CLEANUP + RECIRC	Available	Available	Panel contains control switches for the Recirculation Loop Isolation Valves.
180	2-7329	Bus 29	Energized	Energized	Main Bus for distribution from FLEX Generator
181	2-7828-7	MOTOR CONTROL CENTER 28-7	Energized	Energized	MCC that powers the "A" Recirculation Loop Isolation Valves.
182	2-7829-7	MOTOR CONTROL CENTER 29-7	Energized	Energized	MCC that powers the "B" Recirculation Loop Isolation Valves.
191	2-1103	2-1103 UNIT 2 STANDBY LIQUID CONTROL TANK	Available	Available	Passive Component
192	2-1102-A	2A STANDBY LIQUID CONTROL PUMP	De-energized	Energized	
193	2-1107-A	2A STANDBY LIQUID ACCUMULATOR	Available	Available	Passive Component
194	2-1106-A	2A SBLC DISCH HDR SQUIB VLV	De-energized	Energized	
195	2-7828-1	MOTOR CONTROL CENTER 28-1	Energized	Energized	MCC that powers the "A" SBLC pump and Squib Valve.
196	Not Used				

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
203	TBD	Primary FLEX Makeup Pump[§§]	Standby	Operating	Pump: This item is in the FLEX mod design phase. Will be Pre-Staged in RB basement. Common to both units
204	TBD	Primary FLEX 800kW Diesel Generator[***]	Standby	Operating	Diesel Generator: This item is in the FLEX mod design phase. Will be Staged in New Seismically Robust Structure. Common to both units
205	TBD	Primary FLEX Diesel Generator Power Distribution Cabinet[***]	Standby	Operating	Distribution Cabinet: This item is in the FLEX mod design phase. Will be Staged in New Seismically Robust Structure. Common to both units
206	TBD	Disconnect Switch with Receptacle at D/G for Swgr Neutral Connection[***]	Standby	Operating	Disconnect Switch: This item is in the FLEX mod design phase. Will be Staged in New Seismically Robust Structure. Common to both units
207	2-0902-32	Panel 902-32	Energized	Energized	Added for HPCI Trip Circuit
208	2-0902-18	Panel 902-18	Energized	Energized	Added for Reactor Level Instrumentation
209	2-0902-19	Panel 902-19	Energized	Energized	Added for Drywell Pressure Instrument Power Source
210	2-1503A	Containment Cooling Hx	Available	Available	Added for pressure boundary
211	2-1503B	Containment Cooling Hx	Available	Available	Added for pressure boundary
212	2-2202-70B	Panel 2202-70B	Available	Available	Added for HPCI Trip Circuit
213	2-2202-73A	Panel 2202-73A	Energized	Energized	Added for Reactor Pressure Instrumentation
214	2-2202-73B	Panel 2202-73B	Energized	Energized	Added for Torus Level Instrumentation
215	2-7829-2	Motor Control Center 29-2	Energized	Energized	Added MCC to provide power to 125V DC Battery Charger
216	2-7828-2	Motor Control Center 28-2	Energized	Energized	Added MCC to provide power to Instrument Bus on 2-0902-50
217	2-7828-3	Motor Control Center 28-3	Energized	Energized	Added MCC to provide power to 250V DC Battery Charger

[§§] Addressed in FLEX Implementation Modification and Procured to meet the ESEP Requirements.

[***] These are portable equipment that are no longer required to be on the ESEL. These equipment items are addressed in the FLEX implementation modification.

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
218	2/3-5201	Diesel Fuel Oil Storage Tank	Available	Available	Added for Fuel Oil Source

Attachment B - DNPS Unit 3 ESEL

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
6	3-1501-22B	U3 LPCI LOOP II COOLANT INJ INBD ISOL MOV	Closed	Open	MOV will be manually opened with hand wheel to support RPV injection.
7	3-1501-20A	U3 LPCI LOOP I FULL FLOW BYP TEST INBD MOV	Closed	Open	MOV will be manually opened with hand wheel to support Torus makeup from UHS.
8	3-1501-38A	U3 LPCI LOOP I FULL FLOW BYP TEST OTBD MOV	Closed	Open	MOV will be manually opened with hand wheel to support Torus makeup from UHS.
9	3-1501-32A	U3 LPCI LOOP I AND II X-TIE MOV	Open	Closed	MOV will be manually closed with hand wheel to support Torus makeup from UHS.
10	3-1501-21B	U3 LPCI LOOP II COOLANT INJ OTBD ISOL MOV	Open	Throttle	
48	3-2301-3	U3 HPCI TURB STM SUPPLY MOV	Closed	Open	
49	3-2301-64	U3 HPCI TURB SV ABOVE SEAT DRN AOV	Open	Closed	Air Operated Valve fails closed on loss of instrument air
50	3-2301-65	U3 HPCI TURB SV ABOVE SEAT DRN VLV	Open	Closed	Air Operated Valve fails closed on loss of instrument air
51	3-2303-STPV	HPCI Turbine Stop Valve	Closed	Open	
52	3-2301-CV1 (2) (3) (4) (5) (6)	HPCI Turbine Control Valve	Closed	Open	There are 6 control valves mounted on a single assembly on the HPCI Turbine
53	3-2301	HPCI Turbine	Available	Operating	
54	3-2301-6	U3 HPCI SUCT VLV FROM CST	Open	Closed	
55	3-2301-35	U3 HPCI TORUS SUCT MOV	Closed	Open	
56	3-2301-36	U3 HPCI SUCT ISOL MOV	Closed	Open	
57	3-2302-1	HPCI Booster Pump	Available	Operating	
58	3-2302-2	GEAR UNIT HPCI PUMP HPCI Speed Reducer	Available	Operating	
59	3-2302	HPCI Main Pump	Available	Operating	
60	3-2301-14	U3 HPCI MN PMP RECIRC TO TORUS MOV	Closed	Open	
61	3-2301-8	U3 HPCI MN PMP DISCH MOV TO FEED HDR	Closed	Open	
62	3-2301-48	U3 HPCI CLG WTR RETURN TO BOOST PMP SUCT MOV	Closed	Open	

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
63	3-2301-49	U3 HPCI CLG WTR RETURN TO COND STORAGE MOV	Open	Closed	
64	Not Used				
65	3-2303-AOP	Auxiliary Oil Pump	Off	On	
66	3-2303-TG	Turning Gear	Off	On	
67	3-2320-GSLO	HPCI GLAND SEAL LEAK OFF DRAIN PUMP	Off	On	
68	3-2320-GSEF	Gland Seal Exhauster Fan	Off	On	
69	3-2303-MSC	Motor Speed Changer	Low Speed Stop	High Speed Stop	
70	3-2303-MGU	Motor Gear Unit	High Speed Stop	Varies to control HPCI flow	
71	3-2386	HPCI TURB SIGNAL CONVERTER	Available	Operating	
72	3-2340-1	HPCI Flow Controller	Available	Operating	Controlled by flow transmitter 3-2358 on instrument rack 3-2203-29
73	3-2303-SOC	Lube Oil Cooler	Available	Operating	Passive Component
74	3-2320-GSC	HPCI TURBINE GLAND SEAL CONDENSER	Available	Operating	Passive Component
75	3-2203-28	Instrument Rack	Available	Operating	Contains instrumentation transmitters associated with HPCI isolation (Steam Line Break & Rx Pressure Trips).
76	3-2203-29	Instrument Rack	Available	Operating	Contains instrumentation transmitters associated with HPCI operation/isolation (HPCI Flow Control).
77	3-2330-124	RELAY HPCI 90 PSI INTERLOCK	De-energized	De-energized	Isolation relay in panel 903-39. If the relay chatters HPCI may isolate.
78	3-2330-125A	RELAY CONTROL GEN-PURPOSE	De-energized	De-energized	Isolation relay on panel 903-33. If the relay chatters HPCI may isolate.
79	3-2330-125B	RELAY CONTROL GEN-PURPOSE	De-energized	De-energized	Isolation relay on panel 903-39. If the relay chatters HPCI may isolate.

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
80	3-2330-126	RELAY CONTROL GEN-PURPOSE	De-energized	De-energized	Isolation relay on panel 903-39. If the relay chatters HPCI may isolate.
81	3-2330-104	RELAY CONTROL GEN-PURPOSE	De-energized	De-energized	Turbine Trip relay on panel 903-39. If the relay chatters HPCI may trip.
82	3-0903-39	PANEL HPCI RELAYS ESS 2	Available	Available	Contains relays related to HPCI operation
83	3-0903-3	PANEL REACTOR + CONTAINMENT COOLING	Available	Available	Main Control Room panel that contains control switches for system initiation and component starts.
84	3-0903-33	PANEL LPCI/CORE SPRAY ESS 2	Available	Available	Contains Isolation Relay 2330-125A
97	3-1302	Isolation Condenser assembly	Available	Operating	Passive Component
98	3-1301-3	U3 ISOLATION CONDENSER RX INLET ISOL VLV	Closed	Open	
99	3-1301-10	U3 ISOL CDSR CNTAM DEMIN WTR FILL SV	Closed	Open	Allows FLEX Pump to makeup water to ISCO shell side.
100	3-1301-17	U3 ISOL CDSR VENT TO MN STM LINE INBD ISOL VLV	Open	Closed	Air Operated Valve fails closed on loss of instrument air
101	3-1301-20	U3 ISOL CDSR VENT TO MN STM LINE OTBD ISOL VLV	Open	Closed	Air Operated Valve fails closed on loss of instrument air
102	3-4399-74	U3 ISOL CDSR CLEAN DEMIN WTR FILL VLV	Closed	Open	Motor Operated Valve that will need to be opened for primary makeup path for ISCO.
103	3-0595-115A	RELAY ISO COND	Energized	Energized	Relay in panel 903-40. If the relay chatters the Isolation Condenser may isolate
104	3-0595-115B	RELAY ISO COND	Energized	Energized	Relay in panel 903-41. If the relay chatters the Isolation Condenser may isolate
105	3-0595-116A	RELAY ISO COND	Energized	Energized	Relay in panel 903-40. If the relay de-energizes the Iso. Condenser will isolate.
106	3-0595-116B	RELAY ISO COND OUTBOARD VALVE CONTROL	Energized	Energized	Relay in panel 903-41. If the relay de-energizes the Iso. Condenser will isolate.

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
107	3-0903-40	PANEL PCIS RELAYS INBOARD PCIS 1	Available	Available	Contains the ISCO Valve Relays.
108	3-0903-41	PANEL PCIS RELAYS OUTBOARD PCIS 2	Available	Available	Contains the ISCO Valve Relays.
116	3-83125-3	125 VDC Battery	Available	Operating	
117	3-83125-3	125 VDC Charger 3	Energized	Energized	
118	3-83125-3	125 VDC Battery Bus 3	Energized	Energized	
119	3-83125-3A	125 VDC Turbine Building Bus 3A	Energized	Energized	
120	3-83125-3A-1	125 VDC Turbine Building Bus 3A-1	Energized	Energized	
121	3-83125-3B	125 VDC Turbine Building Bus 3B	Energized	Energized	
122	3-83125-3B-1	125 VDC Turbine Building Bus 3B-1	Energized	Energized	
123	3-83125-3	Unit 3 125 VDC Reactor Building Distribution Panel	Energized	Energized	
129	3-83250-3	250 VDC Battery	Available	Operating	
130	3-83250-3	Unit 3 250 VDC Charger	Energized	Energized	
131	3-83250-3	Unit 3 250 VDC MCC 3	Energized	Energized	
132	3-83250-3A	Unit 3 250 VDC MCC 3A	Energized	Energized	
133	3-83250-3B	Unit 3 250 VDC MCC 3B	Energized	Energized	
155	3-0903-49	ESS Bus PANEL 120/240 VAC ESS SERV DIST PNL	Energized	Energized	Provides power to instruments.
156	3-0903-63	ESS Uninterruptible Power Supply and Static Switch	Energized	Energized	
157	3-0903-50	Instrument Bus	Energized	Energized	Provides power to instruments.
158	3-0640-29A	3A RPV NR LVL	Energized	Energized	Reactor Water Level indicator in Main Control Room.
159	3-0646A	U3 REACTOR NARROW RANGE LVL FW CONTROL	Energized	Energized	Level Transmitter for 3-0640-29A
160	3-0263-156	U3 REACTOR WIDE RANGE PRESSURE	Energized	Energized	Reactor Water Level indicator in Main Control Room.
161	3-0263-152A	U3 REACTOR WIDE RANGE PRESSURE	Energized	Energized	Pressure Transmitter for 3-0263-156
162	3-2203-5	Instrument Rack that transmitter 3-263-152A & 3-0646-A is located on.	Available	Available	
163	3-8540-2/4	U3 PRI CNMT MR DW PRESS & M-U FLOW	Energized	Energized	Reactor Water Level indicator in Main Control Room.

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
164	3-1625	U3 DRYWELL MEDIUM RANGE PRESS	Energized	Energized	Pressure Transmitter for 3-8540-2/4
165	3-1602-3	U3 TORUS NARROW RANGE LEVEL	Energized	Energized	Torus Level indicator in Main Control Room.
166	3-1626	U3 TORUS NARROW RANGE LEVEL	Energized	Energized	Level Transmitter for 3-1602-3
167	3-1640-200	U3 TORUS TEMP MON	Energized	Energized	Recorder will be used to monitor Torus Temperature. Power supplied via terminal block in cabinet 3-2203-70A. (No active components for this function in 3-2203-70A)
168	3-0903-36	Main Control Room Panel PANEL IRM/SRM	Available	Available	Panel contains the Torus Temperature Recorder.
169	3-1340-2	U3 ISOLATION CONDENSER SHELL SIDE	Energized	Energized	Isolation Condenser Shell-side Level indicator.
170	3-1341	U3 ISOLATION CDSR SHELL SIDE	Energized	Energized	Transmitter for Isolation Condenser Shell-side Level
171	3-0903-5	Main Control Room Panel	Available	Available	Contains RPV level and pressure indicators
172	Not Used				
173	3-1549-B	U3 LPCI LOOP II MAIN SUPPLY HDR	Energized	Energized	Flow Transmitter for LPCI line which will measure the primary FLEX pump flow. (Flow Recorder3-1540-7 on 903-3, ROB)
174	3-2203-19B	INSTRUMENT RACK (LPCI)	Available	Available	Rack that FT 3-1549-B is mounted on.
183	3-0202-4A	3A RECIRC PMP SUCT VLV	Open	Closed	Motor Operated Valve is to be closed when power is available from FLEX Generator.
184	3-0202-5A	3A RECIRC PMP DISCH VLV	Open	Closed	Motor Operated Valve is to be closed when power is available from FLEX Generator.
185	3-0202-4B	3B RECIRC PMP SUCT VLV	Open	Closed	Motor Operated Valve is to be closed when power is available from FLEX Generator.
186	3-0202-5B	3B RECIRC PMP DISCH VLV	Open	Closed	Motor Operated Valve is to be closed when power is available from FLEX Generator.

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
187	3-0903-4	Main Control Room Panel PANEL SHUTDOWN HO COOLING CLEANUP + RECIRC	Available	Available	Panel contains control switches for the Recirculation Loop Isolation Valves.
188	3-7339	Bus 39	Energized	Energized	Main bus for distribution from FLEX Generator
189	3-7838-7	MOTOR CONTROL CENTER 38-7	Energized	Energized	MCC that powers the "A" Recirculation Loop Isolation Valves.
190	3-7839-7	MOTOR CONTROL CENTER 39-7	Energized	Energized	MCC that powers the "B" Recirculation Loop Isolation Valves.
197	3-1103	3-1103 UNIT 3 STANDBY LIQUID CONTROL TANK	Available	Available	Passive Component
198	3-1102-A	3A STANDBY LIQUID CONTROL PUMP	De-energized	Energized	
199	3-1107-A	3A STANDBY LIQUID ACCUMULATOR	Available	Available	Passive Component
200	3-1106-A	3A SBLC DISCH HDR SQUIB VLV	De-energized	Energized	
201	3-7838-1	MOTOR CONTROL CENTER 38-1	Energized	Energized	MCC that powers the "A" SBLC pump and Squib Valve.
202	Not Used				
219	3-0903-18	Panel 903-18	Energized	Energized	Added for reactor level instrumentation
220	3-0903-19	Panel 903-19	Energized	Energized	Added for Drywell Pressure Instrument Power Source
221	3-0903-32	Panel 903-32	Energized	Energized	Added for HPCI Trip Circuit
222	3-1503A	Containment Cooling Hx	Available	Available	Added for pressure boundary
223	3-1503B	Containment Cooling Hx	Available	Available	Added for pressure boundary
224	3-2203-70B	Panel 2203-70B	Available	Available	Added for HPCI Trip Circuit
225	3-2203-73A	Panel 2203-73A	Energized	Energized	Added for Reactor Pressure Instrumentation
226	3-2203-73B	Panel 2203-73B	Energized	Energized	Added for Torus Level Instrumentation
227	3-7839-2	Motor Control Center 39-2	Energized	Energized	Added MCC to provide power to 125V DC battery charger

ESEL, Item #	Equipment		Operating State		Notes/Comments
	ID	Description	Normal State	Desired State	
228	3-7838-2	Motor Control Center 38-2	Energized	Energized	Added MCC to provide power to 250V DC battery charger and 120V AC instrument bus on 3-0903-50

Attachment C - DNPS Unit 2 ESEP HCLPF Values and Failure Mode Tabulation

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
1	2-1501-22A	U2 LPCI LOOP I COOLANT INJ INBD ISOL MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
2	2-1501-20B	U2 LPCI LOOP II FULL FLOW BYP TEST INB MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
3	2-1501-38B	U2 LPCI LOOP II FULL FLOW BYP TEST OTBD MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
4	2-1501-32B	U2 LPCI LOOP I AND II X-TIE MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
5	2-1501-21A	U2 LPCI LOOP I COOLANT INJ OTBD MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
11	2-2301-3	U2 HPCI TURB STM SUPPLY MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
12	2-2301-64	U2 HPCI TURB SV ABOVE SEAT DRN AOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
13	2-2301-65	U2 HPCI TURB SV ABOVE SEAT DRN VLV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
14	2-2303-STPV	HPCI Turbine Stop Valve	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
15	2-2301-CV1	HPCI Turbine Control Valve	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
16	2-2301	HPCI Turbine	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
17	2-2301-6	U2 HPCI SUCT VLV FROM CST	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
18	2-2301-35	U2 HPCI TORUS SUCT MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
19	2-2301-36	U2 HPCI SUCT ISOL MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
20	2-2302-1	HPCI Booster Pump	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
21	2-2302-2	GEAR UNIT HPCI PUMP ; HPCI Speed Reducer	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Gear Unit included with main HPCI Pump 2-2302. Gear Unit is adequately supported for the RLGM. Gear Unit screened with Pump 2-2302.
22	2-2302	HPCI Main Pump	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
23	2-2301-14	U2 HPCI MN PMP RECIRC TO TORUS MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
24	2-2301-8	U2 HPCI MN PMP DISCH MOV TO FEED HDR	Screened	>RLGM	Inaccessible. See Section 7.1 for Screening.
25	2-2301-48	U2 HPCI CLG WTR RETURN TO BOOST PMP SUCT MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
26	2-2301-49	U2 HPCI CLG WTR RETURN TO COND STORAGE MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
27	2-2303-AOP	HPCI Auxiliary Oil Pump	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. The small vertical pump measures approximately 13" in diameter and 27" tall. Pump is anchored to skid using five approximately 5/8" bolts steel to steel bolts. Very rugged installation, anchorage screened for RLGM.
29	2-2303-TG	HPCI Turning Gear	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. R.O.B. with 2-2301 turbine, see parent.
30	2-2320-GSLO	Gland Seal Leakoff Drain Pump	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Very small pump, anchored to the floor using four anchor bolts. Anchorage screened for RLGM.
31	2-2320-GSEF	HPCI Turbine Gland Seal Condenser Exhaust Fan	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Fan casing measures approximately 18" in diameter and approximately 20" in length. Bolted to a plate that is welded on top of 2-2320-GSC using four 3/8" bolts. Unit likely weighs no more than 150 lbs. Anchorage is screened for RLGM.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
32	2-2303-MSC	Motor Speed Charger	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Motor Speed Charger included with lubricating and hydraulic oil system. Motor Speed Charger is adequately supported for the RLGM.
33	2-2303-MGU	Motor Gear Unit	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Motor Gear Unit included with lubricating and hydraulic oil system. Motor Gear Unit is adequately supported for the RLGM.
34	2-2386	HPCI Turb Signal Converter	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Small panel measures 42" tall, 30" wide, and 12" deep. Panel is anchored to wall using four 3/8" anchor bolts, one in each corner. Anchorage screened for RLGM.
35	2-2340-1	HPCI Flow Controller	Screened	>RLGM	Instrument contained in 2-0902-3. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 2-0902-3, see parent.
36	2-2303-SOC	Lube Oil Cooler	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Lube oil cooler is 10' long and 1' in diameter. Equipment has three straps around it, two that are welded to the side of the skid and one that is on a plate embedded into the concrete longitudinally supported by a lug. Anchorage screened for RLGM.
37	2-2320-GSC	Gland Seal Leakoff Condenser	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Small condenser, located under grating, is mounted on two short piers (2.375" high) that are 3' apart. It is anchored through the piers into the concrete floor by two ¾" anchors per pier. The anchor bolts, grout-in-place type, are embedded into the concrete slab a distance of 18" and the anchor's core hole is filled with bonding compound. Anchorage screened for RLGM.
38	2-2202-28	INSTRUMENT RACK ISO COND AND HPCI FLOW INDICATION	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
39	2-2202-29	Instrument Rack	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
40	2-2330-124	RELAY HPCI 90 PSI INTERLOCK ; Isolation relay	Equipment Capacity	0.482g	Relay contained in 2-0902-39. Relay in this panel were adequately supported for the RLGM. GE 12HGA11JG52G Relay. Relay HCLPF capacity determined to be 0.63g in Calculation 14Q4237-CAL-003 and did not control capacity.
41	2-2330-125A	RELAY CONTROL GEN-PURPOSE ; Isolation relay	Equipment Capacity	0.482g	Relay contained in 2-0902-33. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A9H Relay. Relay HCLPF capacity determined to be 0.53g in Calculation 14Q4237-CAL-003 and did not control capacity.
42	2-2330-125B	RELAY CONTROL GEN-PURPOSE ; Isolation relay	Functional Capacity	0.37g	Relay contained in 2-0902-39. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay HCLPF capacity determined to be 0.37g in Calculation 14Q4237-CAL-003.
43	2-2330-126	RELAY CONTROL GEN-PURPOSE ; Isolation relay	Functional Capacity	0.37g	Relay contained in 2-0902-39. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay HCLPF capacity determined to be 0.37g in Calculation 14Q4237-CAL-003.
44	2-2330-104	RELAY CONTROL GEN-PURPOSE ; Turbine Trip relay	Equipment Capacity	0.482g	Relay contained in 2-0902-39. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay HCLPF capacity determined to be 0.53g in Calculation 14Q4237-CAL-003 and did not control capacity.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
45	2-0902-39	PANEL HPCI RELAYS ESS 2	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
46	2-0902-3	PANEL REACTOR + CONTAINMENT COOLING	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
47	2-0902-33	PANEL LPCI/CORE SPRAY ESS 2	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
85	2-1302	Isolation Condenser assembly	Anchorage	0.369g	Screened based on specific HCLPF analysis for this large Horizontal tank. The HCLPF value is governed by the capacity of the anchor bolts attaching the saddle to the pedestal, and has a value of 0.369g as indicated in Calculation 14Q4237-CAL-004.
86	2-1301-3	U2 ISOLATION CONDENSER RX INLET ISOL VLV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. Valve on large bore line with very rugged yoke. Screens based on similar valves evaluated.
87	2-1301-10	U2 ISOL CDSR CNTAM DEMIN WTR FILL SV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. Small MOV on small Limitorque operator. Attached to a 4" line. 30" offset. Line well supported adjacent to valve. Valve meets GERS caveats that have a peak spectral acceleration capacity of 22g for the valve operator. Taking a high estimate for in piping demand acceleration, the capacity exceeds the demand.
88	2-1301-17	U2 ISOL CDSR VENT TO MN STM LINE INBD ISOL VLV	Screened	>RLGM	Noted that the yoke is independently supported, this is acceptable because they are from the same structure. Valve has a 42" offset but is well supported on all sides. Valve meets GERS caveats that have a peak spectral acceleration capacity of 7g. Taking a high estimate for in piping demand acceleration, the capacity exceeds the demand.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
89	2-1301-20	U2 ISOL CDSR VENT TO MN STM LINE OTBD ISOL VLV	Screened	>RLGM	Noted that the yoke is independently supported, this is acceptable because they are from the same structure. Valve has a 42" offset but is well supported on all sides. Valve meets GERS caveats that have a peak spectral acceleration capacity of 7g. Taking a high estimate for in piping demand acceleration, the capacity exceeds the demand.
90	2-4399-74	U2 ISOL CDSR CLEAN DEMIN WTR FILL VLV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. Small MOV on small Limitorque operator. Attached to a 4" line. 28" offset. Line well supported adjacent to valve. Noted that it is a small Limitorque SMB000 operator) with a maximum weight = 160 lbs. (including hand wheel) < 200 lbs. limitation. Valve meets GERS caveats that have a peak spectral acceleration capacity of 22g for the valve operator. Taking a high estimate for in piping demand acceleration, the capacity exceeds the demand.
91	2-0595-115A	RELAY ISO COND	Equipment Capacity	0.482g	Relay contained in 2-0902-40. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay HCLPF capacity determined to be 1.07g in Calculation 14Q4237-CAL-003 and does not control the capacity.
92	2-0595-115B	RELAY ISO COND	Equipment Capacity	0.482g	Relay contained in 2-0902-41. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay HCLPF capacity determined to be 1.07g in Calculation 14Q4237-CAL-003 and does not control the capacity.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
93	2-0595-116A	RELAY ISO COND	Equipment Capacity	0.482g	Relay contained in 2-0902-40. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay HCLPF capacity determined to be 1.07g in Calculation 14Q4237-CAL-003 and does not control the capacity.
94	2-0595-116B	RELAY ISO COND OUTBOARD VALVE CONTROL	Equipment Capacity	0.482g	Relay contained in 2-0902-41. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay HCLPF capacity determined to be 1.07g in Calculation 14Q4237-CAL-003 and does not control the capacity.
95	2-0902-40	PANEL PCIS RELAYS INBOARD PCIS 1	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on the HCLPF performed for 3-0903-41 which is a similar panel with similar anchorage. The HCLPF in Calculation 14Q4237-CAL-002 was shown to be > RLGM without considering the top anchorage. Interaction HCLPF from Block Wall calculated in Calculation 14Q4237-CAL-002 to be 3.34g and therefore did not control capacity.
96	2-0902-41	PANEL PCIS RELAYS OUTBOARD PCIS 2	Anchorage	0.392g	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on the HCLPF performed for 3-0903-41 which is a similar panel with similar anchorage. The HCLPF in Calculation 14Q4237-CAL-002 was shown to be 0.392g for anchorage without considering the top anchorage.
109	2-83125-2-Batt	125 VDC Battery	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation. Interaction HCLPF from Block Wall calculated in Calculation 14Q4237-CAL-002 to be 1.11g and therefore did not control capacity. .

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
110	2-83125-2-Charg	125 VDC Charger 2	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF for anchorage calculated in Calculation 14Q4237-CAL-002 to be 0.657g and did not control capacity.
111	2-83125-2-Bus	125 VDC Battery Bus 2	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
112	2-83125-2A-1	125 VDC Turbine Building Bus 2A-1	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
113	2-83125-2B	125 VDC Turbine Building Bus-2B	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
114	2-83125-2B-1	125 VDC Turbine Building Bus-2B-1	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
115	2-83125-2-Dist	Unit 2 125 VDC Reactor Building Distribution Panel	Equipment Capacity	0.356g	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. This panel was braced at the top as a result of USI A-46 and IPEEE evaluations. Frequency of the braced assembly a minimum of 15 Hz. The peak seismic demand spectral acceleration at 15 Hz. and above is 1.702g < 1.8g, therefore screens. It is noted that this screening lane is appropriate since all caveats have been satisfied. Anchorage screens by inspection since without the braces and a seismic input of 1.752g the anchorage was only about 15% overstressed. Therefore, with the addition of the top braces the anchorage also screens.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
124	2-83250-2-Batt	250 VDC Battery	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation. Interaction HCLPF from Block Wall calculated in Calculation 14Q4237-CAL-002 to be 2.68g and therefore did not control capacity. .
125	2-83250-2-Charg	Unit 2 250 VDC Charger	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Charger is anchored using four sets of two anchor bolts spaced more than 5" apart, with the exception of the front right set, which are only spaced 4" apart. The current anchorage configuration is deemed by the SRT to be adequate given the high margin for similar equipment item, which has less rigorous anchorage and identical dimensions. Interaction HCLPF from Block Wall calculated in Calculation 14Q4237-CAL-002 to be 1.11g and therefore did not control capacity. .
126	2-83250-2-MCC	Unit 2 250 VDC MCC 2	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation. Interaction HCLPF from Block Wall calculated in Calculation 14Q4237-CAL-002 to be 1.11g and therefore did not control capacity. .

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
127	2-83250-2A	Unit 2 250 VDC MCC 2A	Equipment Capacity	0.356g	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. This panel was braced at the top as a result of USI A-46 and IPEEE evaluations. Frequency of the braced assembly a minimum of 15 Hz. The peak seismic demand spectral acceleration at 15 Hz. and above is 1.702g < 1.8g, therefore screens. It is noted that this screening lane is appropriate since all caveats have been satisfied. Anchorage screens by inspection since without the braces and a seismic input of 1.752g the anchorage was only about 15% overstressed. Therefore, with the addition of the top braces the anchorage also screens.
128	2-83250-2B	Unit 2 250 VDC MCC 2B	Equipment Capacity	0.356g	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. This panel was braced at the top as a result of USI A-46 and IPEEE evaluations. Frequency of the braced assembly a minimum of 15 Hz. The peak seismic demand spectral acceleration at 15 Hz. and above is 1.702g < 1.8g, therefore screens. It is noted that this screening lane is appropriate since all caveats have been satisfied. Anchorage screens by inspection since without the braces and a seismic input of 1.752g the anchorage was only about 15% overstressed. Therefore, with the addition of the top braces the anchorage also screens.
134	2-0902-49	ESS Bus ; PANEL 120/240 VAC ESS SERV DIST PNL	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on size and weight of cabinet and anchorage similarity to other assemblies that screened based on existing calculations. Interaction HCLPF from Block Wall calculated in Calculation 14Q4237-CAL-002 to be 3.38g and therefore did not control capacity. .

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
135	2-0902-63	ESS Uninterruptible Power Supply and Static Switch	Screened	>RLGM	There are two separate components shared by this equipment ID number, a wall-mounted panel and a floor mounted assembly consisting of 3 cabinets. The wall-mounted cabinet has dimensions of 46.5" tall, 13.5" deep, and 28.5" wide. Meets NP-6041 Table 2-4 caveats. Wall mounted portion of 2-0902-63 anchorage screens for RLGM based on low seismic input at EL. 517 (ground spectra) and high margin for other similarly anchored cabinets. Floor mounted cabinet screens due to the robust anchorage and low seismic input.
136	2-0902-50	Instrument Bus	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on size and weight of cabinet and anchorage similarity to other assemblies that screened based on existing calculations. Interaction HCLPF from Block Wall calculated in Calculation 14Q4237-CAL-002 to be 3.38g and therefore did not control capacity. .
137	2-0640-29A	2A RPV NR LVL	Screened	>RLGM	Instrument contained in 2-0902-5. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 2-0902-3, see parent.
138	2-0646-A	U2 REACTOR NARROW RANGE LVL FW CONTROL	Screened	>RLGM	Instrument contained in 2-2202-5. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 2-2202-5, see parent.
139	2-2202-5	Instrument Rack that transmitter 2-0646-A is located on	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
140	2-0263-156	U2 REACTOR WIDE RANGE PRESSURE	Screened	>RLGM	Instrument contained in 2-0902-3. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 2-0902-3, see parent.
141	2-0263-152A	U2 REACTOR WIDE RANGE PRESSURE	Screened	>RLGM	Instrument contained in 2-2202-78. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 2-2202-78, see parent.
142	2-2202-78	Instrument Rack that PT 2-0263-152A is located on	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Small instrument rack consisting of 4" nominal pipe. The rack is anchored to the floor with four 5/8" bolts and transmitter 2-0263-152A is bolted to the rack using four 3/8" bolts. Very rugged installation, anchorage screened for RLGM.
143	2-8540-2/4	U2 PRI CNMT MR DW PRESS & M-U FLOW	Equipment Capacity	0.482g	Instrument contained in 2-0902-3. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 2-0902-3, see parent.
144	2-1625	U2 DRYWELL MEDIUM RANGE PRESS	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Small transmitter mounted to the wall using four 1/2" expansion anchors. Very rugged installation, anchorage screened for RLGM.
145	2-1602-3	U2 TORUS NARROW RANGE LEVEL	Screened	>RLGM	Instrument contained on Panel 2-0902-3. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 2-0902-3, see parent.
146	2-1626	U2 TORUS NARROW RANGE LEVEL	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Small transmitter mounted to a 6" channel using four 1/4" bolts. The channel is then welded to the platform. Very rugged installation, anchorage screened for RLGM.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
147	2-1640-200	U2 TORUS TEMP MON	Screened	>RLGM	Instrument contained on Panel 2-0902-36. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 2-0902-36, see parent.
148	2-0902-36	Main Control Room Panel ; PANEL IRM/SRM	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
149	2-1340-2	U2 ISOLATION CONDENSER SHELL SIDE	Screened	>RLGM	Instrument contained in 2-0902-3. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 2-0902-3, see parent.
150	2-1341	U2 ISOLATION CDSR SHELL SIDE	Equipment Capacity	0.356g	Transmitter mounted directly to a wall of rack. Affixed to wall with a 3" channel bolted to the column with two 1/4" bolts cantilevered out from wall 9" and up 7". The equipment is then U-bolted to the 1.5" nominal pipe that extends the 7" up from the 3" channel (pipe welded all around) using two U-bolts. Transmitter meets GERS caveats that has a peak spectral acceleration capacity of 10g. Taking a high estimate for demand acceleration, the capacity exceeds the demand. HCLPF calculated in 14Q4237-CAL-002 for the anchorage and was calculated to be 1.116g and did not control the capacity.
151	2-0902-5	Main Control Room Panel	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
153	2-1549-A	U2 LPCI LOOP I MAIN SUPPLY HDR	Screened	>RLGM	Instrument contained on rack 2-2202-19A. Instruments on this rack were adequately supported for the RLGM. Instrument ROB with Rack 2-2202-19A, see parent.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
154	2-2202-19A	INSTRUMENT RACK (LPCI)	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
175	2-0202-4A	2A RECIRC PMP SUCT VLV (MOV)	Screened	>RLGM	Inaccessible. See Section 7.1 for Screening.
176	2-0202-5A	2A RECIRC PMP DISCH VLV (MOV)	Screened	>RLGM	Inaccessible. See Section 7.1 for Screening.
177	2-0202-4B	2B RECIRC PMP SUCT VLV (MOV)	Screened	>RLGM	Inaccessible. See Section 7.1 for Screening.
178	2-0202-5B	2B RECIRC PMP DISCH VLV (MOV)	Screened	>RLGM	Inaccessible. See Section 7.1 for Screening.
179	2-0902-4	Main Control Room Panel ; PANEL SHUTDOWN HOW COOLING CLEANUP + RECIRC	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
180	2-7329	Bus 29	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation. Interaction HCLPF from Block Wall calculated in Calculation 14Q4237-CAL-002 to be 0.89g and did not control capacity.
181	2-7828-7	MOTOR CONTROL CENTER 28-7	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.649g and did not control capacity.
182	2-7829-7	MOTOR CONTROL CENTER 29-7	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.649g and did not control capacity.
191	2-1103	2-1103 UNIT 2 STANDBY LIQUID CONTROL TANK	Screened	>RLGM	Tank screened for RLGM based on review of design basis analysis 002316 (CQD) and scaling of the acceptance criteria for the analysis for the applicable failure modes.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
192	2-1102-A	2A STANDBY LIQUID CONTROL PUMP	Equipment Capacity	0.356g	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. Relatively small pump anchored using 6 anchor bolts. Very well anchored. Pump will respond rigidly with about a 2g horizontal input based on the RLGM input. Capacity Vs. Demand and Anchorage screens by inspection and engineering judgment, pump is seismically rugged.
193	2-1107-A	2A STANDBY LIQUID ACCUMULATOR	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. Small accumulator light weight that is U-bolted to the support. Measured 16" in height and 8" in diameter. Very well supported, screens by inspection.
194	2-1106-A	2A SBLC DISCH HDR SQUIB VLV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. Relatively small Valve is located on an approximately 2" nominal pipe. The valve measures 6" in diameter and 15" long. Capacity Vs. Demand screens by inspection and engineering judgment, valve is seismically rugged.
195	2-7828-1	MOTOR CONTROL CENTER 28-1	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.649g and did not control capacity.
207	2-0902-32	PANEL LPCI/CORE SPRAY AUTO BLOWDOWN ESS 1	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
208	2-0902-18	Panel 902-18	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on comparison to existing USI A-46 anchorage evaluation for similar panels.
209	2-0902-19	PANEL PROCESS INSTRUMENTAT ION	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on comparison to existing USI A-46 anchorage evaluation for similar panels.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
210	2-1503A	2A CONTAINMENT COOLING HEAT EXCHANGER	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Equipment support was modified as a result of the USI A-46 and IPEEE evaluations. Due to the high safety factors in the braces to the wall and the redundancy of the support the anchorage screens.
211	2-1503B	2B CONTAINMENT COOLING HEAT EXCHANGER	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Equipment support was modified as a result of the USI A-46 and IPEEE evaluations. Due to the high safety factors in the braces to the wall and the redundancy of the support the anchorage screens.
212	2-2202-70B	DIV 2 ATWS PANEL 2202-70B	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
213	2-2202-73A	PANEL - DIV I ATS	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
214	2-2202-73B	PANEL - DIV II ATS	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
215	2-7829-2	Motor Control Center 29-2	Screened	>RLGM	Equipment screens (other than anchorage) for the 0.8g to 1.2g screening lane from EPRI NP-6041. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
216	2-7828-2	Motor Control Center 28-2	Screened	>RLGM	Equipment screens (other than anchorage) for the 0.8g to 1.2g screening lane from EPRI NP-6041. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation supplemented by the Calculation 14Q4237-CAL-002 evaluation of the embedded angle.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
217	2-7828-3	Motor Control Center 28-3	Screened	>RLGM	Equipment screens (other than anchorage) for the 0.8g to 1.2g screening lane from EPRI NP-6041. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation supplemented by the Calculation 14Q4237-CAL-002 evaluation of the embedded angle.
218	2/3-5201	Diesel Fuel Oil Storage Tank:	Screened	>RLGM	Inaccessible. See Section 7.1 for Screening.

Attachment D - DNPS Unit 3 ESEP HCLPF Values and Failure Mode Tabulation

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
6	3-1501-22B	U3 LPCI LOOP II COOLANT INJ INBD ISOL MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
7	3-1501-20A	U3 LPCI LOOP I FULL FLOW BYP TEST INBD MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
8	3-1501-38A	U3 LPCI LOOP I FULL FLOW BYP TEST OTBD MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
9	3-1501-32A	U3 LPCI LOOP I AND II X-TIE MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
10	3-1501-21B	U3 LPCI LOOP II COOLANT INJ OTBD ISOL MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
48	3-2301-3	U3 HPCI TURB STM SUPPLY MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
49	3-2301-64	U3 HPCI TURB SV ABOVE SEAT DRN AOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
50	3-2301-65	U3 HPCI TURB SV ABOVE SEAT DRN VLV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
51	3-2303-STPV	HPCI Turbine Stop Valve	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
52	3-2301-CV1	HPCI Turbine Control Valve	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
53	3-2301	HPCI Turbine	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
54	3-2301-6	U3 HPCI SUCT VLV FROM CST	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
55	3-2301-35	U3 HPCI TORUS SUCT MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
56	3-2301-36	U3 HPCI SUCT ISOL MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
57	3-2302-1	HPCI Booster Pump	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
58	3-2302-2	GEAR UNIT HPCI PUMP ; HPCI Speed Reducer	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Gear Unit included with main HPCI Pump 2-2302. Gear Unit is adequately supported for the RLGM. Gear Unit screened with Pump 3-2302.
59	3-2302	HPCI Main Pump	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
60	3-2301-14	U3 HPCI MN PMP RECIRC TO TORUS MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
61	3-2301-8	U3 HPCI MN PMP DISCH MOV TO FEED HDR	Screened	>RLGM	Meets NP-6041 Table 2-4 restrictions for a 0.8g screening lane.
62	3-2301-48	U3HPCI CLG WTR RETURN TO BOOST PMP SUCT MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
63	3-2301-49	U3 HPCI CLG WTR RETURN TO COND STORAGE MOV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
65	3-2303-AOP	Auxiliary Oil Pump	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. The small vertical pump measures approximately 13" in diameter and 27" tall. Pump is anchored to skid using five approximately 5/8" bolts steel to steel bolts. Very rugged installation, anchorage screened for RLGM.
66	3-2303-TG	Turning Gear	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. R.O.B. with 2-2301 turbine, see parent.
67	3-2320-GSLO	HPCI GLAND SEAL LEAK OFF DRAIN PUMP	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Very small pump, anchored to the floor using four anchor bolts. Anchorage screened for RLGM.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
68	3-2320-GSEF	Gland Seal Exhauster Fan	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Fan casing measures approximately 18" in diameter and approximately 20" in length. Bolted to a plate that is welded on top of 2-2320-GSC using four 3/8" bolts. Unit likely weighs no more than 150 lbs. Anchorage is screened for RLGM.
69	3-2303-MSC	Motor Speed Changer	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Motor Speed Charger included with lubricating and hydraulic oil system. Motor Speed Charger is adequately supported for the RLGM.
70	3-2303-MGU	Motor Gear Unit	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Motor Gear Unit included with lubricating and hydraulic oil system. Motor Gear Unit is adequately supported for the RLGM.
71	3-2386	HPCI TURB SIGNAL CONVERTER	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Small panel measures 42" tall, 30" wide, and 12" deep. Panel is anchored to wall using four 3/8" anchor bolts, one in each corner. Anchorage screened for RLGM.
72	3-2340-1	HPCI Flow Controller	Screened	>RLGM	Instrument contained in 3-0903-3. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 3-0903-3, see parent.
73	3-2303-SOC	Lube Oil Cooler	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Lube oil cooler is 10' long and 1' in diameter. Equipment has three straps around it, two that are welded to the side of the skid and one that is on a plate embedded into the concrete longitudinally supported by a lug. Anchorage screened for RLGM.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
74	3-2320-GSC	HPCI TURBINE GLAND SEAL CONDENSER	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Small condenser, located under grating, is mounted on two short piers (2.375" high) that are 3' apart. It is anchored through the piers into the concrete floor by two ¾" anchors per pier. The anchor bolts, grout-in-place type, are embedded into the concrete slab a distance of 18" and the anchor's core hole is filled with bonding compound. Anchorage screened for RLGM.
75	3-2203-28	Instrument Rack	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
76	3-2203-29	Instrument Rack	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing similar USI A-46 anchorage evaluation.
77	3-2330-124	RELAY HPCI 90 PSI INTERLOCK ; Isolation relay	Equipment Capacity	0.482g	Relay contained in 3-0903-39. Relay in this panel were adequately supported for the RLGM. GE 12HGA11JG52G Relay. Relay HCLPF capacity determined to be 0.63g in Calculation 14Q4237-CAL-003 and did not control capacity.
78	3-2330-125A	RELAY CONTROL GEN-PURPOSE ; Isolation relay	Equipment Capacity	0.482g	Relay contained in 3-0903-33. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A9H Relay. Relay HCLPF capacity determined to be 0.53g in Calculation 14Q4237-CAL-003 and did not control capacity.
79	3-2330-125B	RELAY CONTROL GEN-PURPOSE ; Isolation relay	Functional Capacity	0.37g	Relay contained in 3-0903-39. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay HCLPF capacity determined to be 0.37g in Calculation 14Q4237-CAL-003.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
80	3-2330-126	RELAY CONTROL GEN-PURPOSE ; Isolation relay	Functional Capacity	0.37g	Relay contained in 3-0903-39. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay HCLPF capacity determined to be 0.37g in Calculation 14Q4237-CAL-003.
81	3-2330-104	RELAY CONTROL GEN-PURPOSE ; Turbine Trip relay	Equipment Capacity	0.482g	Relay contained in 3-0903-39. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay HCLPF capacity determined to be 0.53g in Calculation 14Q4237-CAL-003 and did not control capacity.
82	3-0903-39	PANEL HPCI RELAYS ESS 2	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
83	3-0903-3	PANEL REACTOR + CONTAINMENT COOLING	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
84	3-0903-33	PANEL LPCI/CORE	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
97	3-1302	Isolation Condenser assembly	Anchorage	0.369g	Screened based on specific HCLPF analysis for this large Horizontal tank. The HCLPF value is governed by the capacity of the anchor bolts attaching the saddle to the pedestal, and has a value of 0.369g as indicated in Calculation 14Q4237-CAL-004.
98	3-1301-3	U3 ISOLATION CONDENSER RX INLET ISOL VLV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. Valve on large bore line with very rugged yoke. Screens based on similar valves evaluated.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
99	3-1301-10	U3 ISOL CDSR CNTAM DEMIN WTR FILL SV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. Small MOV on small Limitorque operator. Attached to a 4" line. 30" offset. Line well supported adjacent to valve. Valve meets GERS caveats that have a peak spectral acceleration capacity of 22g for the valve operator. Taking a high estimate for in piping demand acceleration, the capacity exceeds the demand.
100	3-1301-17	U3 ISOL CDSR VENT TO MN STM LINE INBD ISOL VLV	Screened	>RLGM	Valve has a 42" offset, yoke is only supported on one side, this is acceptable because they are from the same structure. Valve has a 42" offset but is well supported on all sides. Valve meets GERS caveats that have a peak spectral acceleration capacity of 7g. Taking a high estimate for in piping demand acceleration, the capacity exceeds the demand.
101	3-1301-20	U3 ISOL CDSR VENT TO MN STM LINE OTBD ISOL VLV	Screened	>RLGM	Valve has a 42" offset, yoke is only supported on one side, this is acceptable because they are from the same structure. Valve has a 42" offset but is well supported on all sides. Valve meets GERS caveats that have a peak spectral acceleration capacity of 7g. Taking a high estimate for in piping demand acceleration, the capacity exceeds the demand.
102	3-4399-74	U3 ISOL CDSR CLEAN DEMIN WTR FILL VLV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. Small MOV on small Limitorque operator. Attached to a 4" line. 28" offset. Line well supported adjacent to valve. Noted that it is a small Limitorque SMB000 operator) with a maximum weight = 160 lbs. (including hand wheel) < 200 lbs. limitation. Valve meets GERS caveats that have a peak spectral acceleration capacity of 22g for the valve operator. Taking a high estimate for in piping demand acceleration, the capacity exceeds the demand.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
103	3-0595-115A	RELAY ISO COND	Equipment Capacity	0.482g	Relay contained in 3-0903-40. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay HCLPF capacity determined to be 1.07g in Calculation 14Q4237-CAL-003 and does not control capacity.
104	3-0595-115B	RELAY ISO COND	Equipment Capacity	0.482g	Relay contained in 3-0903-41. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay capacity determined to be 1.07g in Calculation 14Q4237-CAL-003 and does not control capacity.
105	3-0595-116A	RELAY ISO COND	Equipment Capacity	0.482g	Relay contained in 3-0903-40. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay HCLPF capacity determined to be 1.07g in Calculation 14Q4237-CAL-003 and does not control capacity.
106	3-0595-116B	RELAY ISO COND OUTBOARD VALVE CONTROL	Equipment Capacity	0.482g	Relay contained in 3-0903-41. Relay in this panel were adequately supported for the RLGM. GE 12HFA151A2H Relay. Relay HCLPF capacity determined to be 1.07g in Calculation 14Q4237-CAL-003 and does not control capacity.
107	3-0903-40	PANEL PCIS RELAYS INBOARD PCIS 1	Anchorage	0.392g	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on the HCLPF performed for 3-0903-41 which is a similar panel with similar anchorage. The HCLPF in Calculation 14Q4237-CAL-002 for the similar panel was shown to be 0.392g without considering the top anchorage.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
108	3-0903-41	PANEL PCIS RELAYS OUTBOARD PCIS 2	Anchorage	0.392g	Meets NP-6041 Table 2-4 caveats. The anchorage HCLPF in Calculation 14Q4237-CAL-002 was shown to be 0.392g without considering the top anchorage. Interaction HCLPF from Block Wall calculated in Calculation 14Q4237-CAL-002 to be 3.38g and did not control the capacity.
116	3-83125-3-Batt	125 VDC Battery	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.800g and did not control the capacity.
117	3-83125-3-Charg	125 VDC Charger 3	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF for anchorage calculated in Calculation 14Q4237-CAL-002 to be 0.657g and did not control capacity.
118	3-83125-3-Bus	125 VDC Battery Bus 3	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.665g and did not control capacity.
119	3-83125-3A	125 VDC Turbine Building Bus 3A	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.665g and did not control capacity.
120	3-83125-3A-1	125 VDC Turbine Building Bus 3A-1	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.665g and did not control capacity.
121	3-83125-3B	125 VDC Turbine Building Bus 3B	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.665g and did not control capacity.
122	3-83125-3B-1	125 VDC Turbine Building Bus 3B-1	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.665g and did not control capacity.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
123	3-83125-3-Dist	Unit 3 125 VDC Reactor Building Distribution Panel	Equipment Capacity	0.356g	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. This panel was braced at the top as a result of USI A-46 and IPEEE evaluations. Frequency of the braced assembly a minimum of 15 Hz. The peak seismic demand spectral acceleration at 15 Hz. and above is 1.702g < 1.8g, therefore screens. It is noted that this screening lane is appropriate since all caveats have been satisfied. Anchorage screens by inspection since without the braces and a seismic input of 1.752g the anchorage was only about 15% overstressed. Therefore, with the addition of the top braces the anchorage also screens.
129	3-83250-3-Batt	250 VDC Battery	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.871g and did not control capacity.
130	3-83250-3-Charg	Unit 3 VDC Charger	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Charger is anchored using four sets of two anchor bolts spaced more than 5" apart, with the exception of the front right set, which are only spaced 4" apart. The current anchorage configuration is deemed by the SRT to be adequate given the high margin for similar equipment item, which has less rigorous anchorage and identical dimensions.
131	3-83250-3-MCC	Unit 3 VDC MCC 3	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.765g and did not control capacity.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
132	3-83250-3A	Unit 3 250 VDC MCC 3A	Equipment Capacity	0.356g	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. This panel was braced at the top as a result of USI A-46 and IPEEE evaluations. Frequency of the braced assembly a minimum of 15 Hz. The peak seismic demand spectral acceleration at 15 Hz. and above is 1.702g < 1.8g, therefore screens. It is noted that this screening lane is appropriate since all caveats have been satisfied. Anchorage screens by inspection since without the braces and a seismic input of 1.752g the anchorage was only about 15% overstressed. Therefore, with the addition of the top braces the anchorage also screens.
133	3-83250-3B	Unit 3 250 VDC MCC 3B	Equipment Capacity	0.356g	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. This panel was braced at the top as a result of USI A-46 and IPEEE evaluations. Frequency of the braced assembly a minimum of 15 Hz. The peak seismic demand spectral acceleration at 15 Hz. and above is 1.702g < 1.8g, therefore screens. It is noted that this screening lane is appropriate since all caveats have been satisfied. Anchorage screens by inspection since without the braces and a seismic input of 1.752g the anchorage was only about 15% overstressed. Therefore, with the addition of the top braces the anchorage also screens.
155	3-0903-49	ESS Bus ; PANEL 120/240 VAC ESS SERV DIST PNL	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on size and weight of cabinet and anchorage similarity to other assemblies that screened based on existing calculations.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
156	3-0903-63	ESS Uninterruptible Power Supply and Static Switch	Screened	>RLGM	There are two separate components shared by this equipment ID number, a wall-mounted panel and a floor mounted assembly consisting of 3 cabinets. The wall-mounted cabinet has dimensions of 46.5" tall, 13.5" deep, and 28.5" wide. Meets NP-6041 Table 2-4 caveats. Wall mounted portion of 2-0902-63 anchorage screens for RLGM based on low seismic input at EL. 517 (ground spectra) and high margin for other similarly anchored cabinets. Floor mounted cabinet screens due to the robust anchorage and low seismic input.
157	3-0903-50	Instrument Bus	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on size and weight of cabinet and anchorage similarity to other assemblies that screened based on existing calculations. Noted that there is insufficient spacing to wall behind equipment. However, cabinet does not contain relays required for ESEP and therefore, interaction is judged acceptable.
158	3-0640-29A	3A RPV NR LVL	Screened	>RLGM	Instrument contained in 3-0903-5. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 3-0903-5, see parent.
159	3-0646	U3 REACTOR NARROW RANGE LVL FW CONTROL	Screened	>RLGM	Instrument contained in 3-2203-5. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 2-2203-5, see parent.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
160	3-0263-156	U3 REACTOR WIDE RANGE PRESSURE	Screened	>RLGM	Instrument contained in 3-0903-3. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 3-0903-3, see parent.
161	3-0263-152A	U3 REACTOR WIDE RANGE PRESSURE	Screened	>RLGM	Instrument contained in 3-2203-5. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 3-2203-5, see parent.
162	3-2203-5	Instrument Rack that transmitter 3-263-152A & 3-0646-A are located on	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
163	3-8540-2/4	U3 PRI CNMT MR DW PRESS & M-U FLOW	Screened	>RLGM	Instrument contained in 3-0903-3. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 3-0903-3, see parent.
164	3-1625	U3 DRYWELL MEDIUM RANGE PRESS	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Small transmitter mounted to the wall using four 3/8" expansion anchors. Very rugged installation, anchorage screened for RLGM.
165	3-1602-3	U3 TORUS NARROW RANGE LEVEL	Screened	>RLGM	Instrument contained on Panel 3-0903-3. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 3-0903-3, see parent.
166	3-1626	U3 TORUS NARROW RANGE LEVEL	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Small transmitter welded on both sides to the 2" leg of a 6" channel. The channel is then welded to a beam of the platform. Very rugged installation, anchorage screened for RLGM.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
167	3-1640-200	U3 TORUS TEMP MON	Screened	>RLGM	Instrument contained on Panel 3-0903-36. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 3-0903-36, see parent.
168	3-0903-36	Main Control Room Panel ; PANEL IRM/SRM	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
169	3-1340-2	U3 ISOLATION CONDENSER SHELL SIDE	Screened	>RLGM	Instrument contained in 3-0903-3. Instruments in this panel were adequately supported for the RLGM. Instrument ROB with Panel 3-0903-3, see parent.
170	3-1341	U3 ISOLATION CDSR SHELL SIDE	Equipment Capacity	0.356g	Transmitter mounted directly to a wall of rack. Affixed to wall with a 3" channel bolted to the column with two 1/4" bolts cantilevered out from wall 9" and up 7". The equipment is then U-bolted to the 1.5" nominal pipe that extends the 7" up from the 3" channel (pipe welded all around) using two U-bolts. Transmitter meets GERS caveats that has a peak spectral acceleration capacity of 10g. Taking a high estimate for demand acceleration, the capacity exceeds the demand. HCLPF calculated in 14Q4237-CAL-002 for the anchorage and was calculated to be 1.116g and did not control the capacity.
171	3-0903-5	Main Control Room Panel	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
173	3-1549-B	U3 LPCI LOOP II MAIN SUPPLY HDR	Screened	>RLGM	Instrument contained on rack 3-2203-19B. Instruments on this rack were adequately supported for the RLGM. Instrument ROB with Rack 3-2203-19B, see parent.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
174	3-2203-19B	INSTRUMENT RACK (LPCI)	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable similar existing USI A-46 anchorage evaluation.
183	3-0202-4A	3A RECIRC PMP SUCT VLV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
184	3-0202-5A	3A RECIRC PMP DISCH VLV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
185	3-0202-4B	3B RECIRC PMP SUCT VLV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
186	3-0202-5B	3B RECIRC PMP DISCH VLV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
187	3-0903-4	Main Control Room Panel ; PANEL SHUTDOWN HO COOLING CLEANUP + RECIRC	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
188	3-7339	Bus 39	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable similar USI A-46 anchorage evaluation.
189	3-7838-7	MOTOR CONTROL CENTER 38-7	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.649g and did not control capacity.
190	3-7839-7	MOTOR CONTROL CENTER 39-7	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.649g and did not control capacity.
197	3-1103	3-1103 UNIT 3 STANDBY LIQUID CONTROL TANK	Screened	>RLGM	Tank screened for RLGM based on review of design basis analysis 002316 (CQD) and scaling of the acceptance criteria for the analysis for the applicable failure modes.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
198	3-1102-A	3A STANDBY LIQUID CONTROL PUMP	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. Relatively small pump anchored using 6 anchor bolts. Very well anchored. Pump will respond rigidly with about a 2g horizontal input based on the RLGM input. Capacity Vs. Demand and Anchorage screens by inspection and engineering judgment, pump is seismically rugged.
199	3-1107-A	3A STANDBY LIQUID ACCUMULATOR	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. Small accumulator light weight that is U-bolted to the support. Measured 16" in height and 8" in diameter. Very well supported, screens by inspection.
200	3-1106-A	3A SBLC DISCH HDR SQUIB VLV	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats for Screening Lane 2. Relatively small Valve is located on an approximately 2" nominal pipe. The valve measures 6" in diameter and 15" long. Capacity Vs. Demand screens by inspection and engineering judgment, valve is seismically rugged.
201	3-7838-1	MOTOR CONTROL CENTER 38-1	Equipment Capacity	0.482g	Meets NP-6041 Table 2-4 caveats. Anchorage HCLPF calculated in Calculation 14Q4237-CAL-002 to be 0.649g and did not control capacity.
219	3-0903-18	Panel 903-18	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats.
220	3-0903-19	PANEL PROCESS INSTRUMENTATI ON	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on comparison to existing USI A-46 anchorage evaluation for similar panels.
221	3-0903-32	PANEL LPCI/CORE SPRAY AUTO BLOWDOWN ESS 1	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
222	3-1503A	3A LPCI/CONTAINM ENT COOLING HEAT EXCHANGER	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Equipment support was modified as a result of the USI A-46 and IPEEE evaluations. Due to the high safety factors in the braces to the wall and the redundancy of the support the anchorage screens.

ESEL Item #	Equipment ID	DESCRIPTION	Failure Mode	HCLPF (compared to RLGM)	Notes
223	3-1503B	3B LPCI/CONTAINMENT COOLING HEAT EXCHANGER	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Equipment support was modified as a result of the USI A-46 and IPEEE evaluations. Due to the high safety factors in the braces to the wall and the redundancy of the support the anchorage screens.
224	3-2203-70B	PANEL LOCAL ATWS TRIP UNIT LOGIC PL2203-70B	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
225	3-2203-73A	PANEL - DIV I ATS	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
226	3-2203-73B	PANEL - DIV II ATS	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
227	3-7839-2	Motor Control Center 39-2	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.
228	3-7838-2	Motor Control Center 38-2	Screened	>RLGM	Meets NP-6041 Table 2-4 caveats. Anchorage screened for RLGM based on scaling of applicable existing USI A-46 anchorage evaluation.