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U.S. Nuclear Regulatory Commission
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LaSalle County Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-11 and NPF-18
NRC Docket Nos. 50-373 and 50-374

Subject: High Frequency Supplement to Seismic Hazard Screening Report, 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. 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 Reevaluations, dated May 7, 2013 (ML13106A331)
3. NEI Letter, Final Draft of Industry Seismic Evaluation Guidance, Screening, Prioritization and Implementation Details (SPID) for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic (EPRI 1025287), dated November 27, 2012 (ML12333A168 and ML12333A170)
4. NRC Letter, Endorsement of Electric Power Research Institute Final Draft Report 1025287, Seismic Evaluation Guidance, Screening, Prioritization and Implementation Details (SPID) for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic, dated February 15, 2013 (ML12319A074)
5. Exelon Generation Company, LLC letter to NRC, LaSalle County Station, Units 1 and 2 - Seismic Hazard and Screening Report (CEUS Sites), Response to NRC Request for Information Pursuant to 10CFR50.54(f) Regarding Recommendation 2.1 of Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident, dated March 31, 2014 (RS-14-068) (ML14091A013)

6. NRC Letter, 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, dated May 9, 2014 (ML14111A147)
7. NRC Memorandum, Support Document for Screening and Prioritization Results Regarding Seismic Hazard Re-Evaluation for Operating Reactors in the Central and Eastern United States, dated May 21, 2014 (ML14136A126)
8. NEI Letter, Request for NRC Endorsement of High Frequency Program: Application Guidance for Functional Confirmation and Fragility Evaluation (EPRI 3002004396), dated July 30, 2015 (ML15223A100 / ML15223A102)
9. NRC Letter to NEI: Endorsement of Electric Power Research Institute Final Draft Report 3002004396: "High Frequency Program: Application Guidance for Functional Confirmation and Fragility" dated September 17, 2015 (ML15218A569)
10. NRC Letter, Final Determination of Licensee Seismic Probabilistic Risk Assessments Under the Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation 2.1 "Seismic" of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident, dated October 27, 2015 (ML15194A015)

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued a Request for Information per 10 CFR 50.54(f) (Reference 1) to all power reactor licensees. The required response section of Enclosure 1 of Reference 1 indicated that licensees should provide a Seismic Hazard Evaluation and Screening Report within 1.5 years from the date of the letter for Central and Eastern United States (CEUS) nuclear power plants. By NRC letter dated May 7, 2013 (Reference 2), the date to submit the report was extended to March 31, 2014.

By letter dated May 9, 2014 (Reference 6), the NRC transmitted the results of the screening and prioritization review of the seismic hazards reevaluation report for LaSalle County Station, Units 1 and 2 submitted on March 31, 2014 (Reference 5). In accordance with the screening, prioritization, and implementation details report (SPID) (References 3 and 4), and Augmented Approach guidance (Reference 2), the reevaluated seismic hazard is used to determine if additional seismic risk evaluations are warranted for a plant. Specifically, the reevaluated horizontal ground motion response spectrum (GMRS) at the control point elevation is compared to the existing safe shutdown earthquake (SSE) or Individual Plant Examination for External Events (IPEEE) High Confidence of Low Probability of Failure (HCLPF) Spectrum (IHS) to determine if a plant is required to perform a high frequency confirmation evaluation. As noted in the May 9, 2014 letter from the NRC (Reference 6) on page 2 of Enclosure 2, LaSalle County Station, Units 1 and 2 is to conduct a limited scope High Frequency Evaluation (Confirmation).

Within the May 9, 2014 letter (Reference 6), the NRC acknowledged that these limited scope evaluations will require additional development of the assessment process. By Reference 8, the Nuclear Energy Institute (NEI) submitted an Electric Power Research Institute (EPRI) report entitled, High Frequency Program: Application Guidance for Functional Confirmation and Fragility Evaluation (EPRI 3002004396) for NRC review and endorsement. NRC endorsement was provided by Reference 9. Reference 10 provided the NRC final seismic hazard evaluation

screening determination results and the associated schedules for submittal of the remaining seismic hazard evaluation activities.

The High Frequency Evaluation Confirmation Report for LaSalle County Station, Units 1 and 2, provided in the enclosure to this letter, shows that all high frequency susceptible equipment evaluated within the scoping requirements and using evaluation criteria of Reference 8 for seismic demands and capacities, are acceptable.

Therefore, no additional modifications or evaluations are necessary.

This transmittal completes the scope of work described in Section 4.2 of Reference 5, for LaSalle County Station, Units 1 and 2.

This letter closes the associated regulatory Commitment No. 1 contained in Enclosure 2 of Reference 5 for LaSalle County Station, Units 1 and 2.

This letter contains no new regulatory commitments.

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 1st day of December 2016.

Respectfully submitted,

Glen T. Kaegi
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Enclosure: LaSalle County Station, Units 1 and 2 - Seismic High Frequency Evaluation Confirmation Report

cc: NRC Regional Administrator - Region III
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Enclosure

LaSalle County Station, Units 1 and 2

Seismic High Frequency Evaluation Confirmation Report

(91 pages)

HIGH FREQUENCY CONFIRMATION REPORT

IN RESPONSE TO NEAR TERM TASK FORCE (NTTF) 2.1 RECOMMENDATION

for the

LASALLE COUNTY STATION, UNIT 1 AND 2
2601 N 21st Rd, Marseilles, IL 61341
Facility Operating License Nos. NPF-11 and NPF-18
NRC Docket Nos. 50-373 and 50-374
Correspondence No.: RS-16-176

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Executive Summary

The purpose of this report is to provide information as requested by the Nuclear Regulatory Commission (NRC) in its March 12, 2012 letter issued to all power reactor licensees and holders of construction permits in active or deferred status [1]. In particular, this report provides information requested to address the High Frequency Confirmation requirements of Item (4), Enclosure 1, Recommendation 2.1: Seismic, of the March 12, 2012 letter [1].

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 [15] 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. Included in the 50.54(f) letter was a request that licensees' perform a "confirmation, if necessary, that SSCs, which may be affected by high-frequency ground motion, will maintain their functions important to safety."

EPRI 1025287, "Seismic Evaluation Guidance: Screening, Prioritization and Implementation Details (SPID) for the resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic" [6] provided screening, prioritization, and implementation details to the U.S. nuclear utility industry for responding to the NRC 50.54(f) letter. This report was developed with NRC participation and was subsequently endorsed by the NRC. The SPID included guidance for determining which plants should perform a High Frequency Confirmation and identified the types of components that should be evaluated in the evaluation.

Subsequent guidance for performing a High Frequency Confirmation was provided in EPRI 3002004396, "High Frequency Program, Application Guidance for Functional Confirmation and Fragility Evaluation," [8] and was endorsed by the NRC in a letter dated September 17, 2015 [3]. Final screening identifying plants needing to perform a High Frequency Confirmation was provided by NRC in a letter dated October 27, 2015 [2].

This report describes the High Frequency Confirmation evaluation undertaken for LaSalle County Station, Unit 1 and 2 (LAS). The objective of this report is to provide summary information describing the High Frequency Confirmation evaluations and results. The level of detail provided in the report is intended to enable NRC to understand the inputs used, the evaluations performed, and the decisions made as a result of the evaluations.

EPRI 3002004396 [8] is used for the LAS engineering evaluations described in this report. In accordance with Reference [8], the following topics are addressed in the subsequent sections of this report:

- Process of selecting components and a list of specific components for high-frequency confirmation
- Estimation of a vertical ground motion response spectrum (GMRS)

- Estimation of in-cabinet seismic demand for subject components
- Estimation of in-cabinet seismic capacity for subject components
- Summary of subject components' high-frequency evaluations

1 Introduction

1.1 PURPOSE

The purpose of this report is to provide information as requested by the NRC in its March 12, 2012 50.54(f) letter issued to all power reactor licensees and holders of construction permits in active or deferred status [1]. In particular, this report provides requested information to address the High Frequency Confirmation requirements of Item (4), Enclosure 1, Recommendation 2.1: Seismic, of the March 12, 2012 letter [1].

1.2 BACKGROUND

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. Included in the 50.54(f) letter was a request that licensees' perform a "confirmation, if necessary, that SSCs, which may be affected by high-frequency ground motion, will maintain their functions important to safety."

EPRI 1025287, "Seismic Evaluation Guidance: Screening, Prioritization and Implementation Details (SPID) for the resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic" [6] provided screening, prioritization, and implementation details to the U.S. nuclear utility industry for responding to the NRC 50.54(f) letter. This report was developed with NRC participation and is endorsed by the NRC. The SPID included guidance for determining which plants should perform a High Frequency Confirmation and identified the types of components that should be evaluated in the evaluation.

Subsequent guidance for performing a High Frequency Confirmation was provided in EPRI 3002004396, "High Frequency Program, Application Guidance for Functional Confirmation and Fragility Evaluation," [8] and was endorsed by the NRC in a letter dated September 17, 2015 [3]. Final screening identifying plants needing to perform a High Frequency Confirmation was provided by NRC in a letter dated October 27, 2015 [2].

On March 31, 2014, LAS submitted a reevaluated seismic hazard to the NRC as a part of the Seismic Hazard and Screening Report [4]. By letter dated October 27, 2015 [2], the NRC transmitted the results of the screening and prioritization review of the seismic hazards reevaluation.

This report describes the High Frequency Confirmation evaluation undertaken for LAS using the methodologies in EPRI 3002004396, "High Frequency Program, Application Guidance for

Functional Confirmation and Fragility Evaluation," as endorsed by the NRC in a letter dated September 17, 2015 [3].

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

1.3 APPROACH

EPRI 3002004396 [8] is used for the LAS engineering evaluations described in this report. Section 4.1 of Reference [8] provided general steps to follow for the high frequency confirmation component evaluation. Accordingly, the following topics are addressed in the subsequent sections of this report:

- LAS SSE and GMRS Information
- Selection of components and a list of specific components for high-frequency confirmation
- Estimation of seismic demand for subject components
- Estimation of seismic capacity for subject components
- Summary of subject components' high-frequency evaluations
- Summary of Results

1.4 PLANT SCREENING

LAS submitted reevaluated seismic hazard information including GMRS and seismic hazard information to the NRC on March 31, 2014 [4]. In a letter dated April 21, 2015, the NRC staff concluded that the submitted GMRS adequately characterizes the reevaluated seismic hazard for the LAS site for 2.1 Seismic [14].

The NRC final screening determination letter concluded [2] that the LAS GMRS to SSE comparison resulted in a need to perform a High Frequency Confirmation in accordance with the screening criteria in the SPID [6].

1.5 REPORT DOCUMENTATION

Section 2 describes the selection of devices. The identified devices are evaluated in Reference [17] for the seismic demand specified in Section 3 using the evaluation criteria discussed in Section 4. The overall conclusion is discussed in Section 5.

Table B-1 lists the devices identified in Section 2 and provides the results of the evaluations performed in accordance with Section 3 and Section 4.

2 Selection of Components for High-Frequency Screening

The fundamental objective of the high frequency confirmation review is to determine whether the occurrence of a seismic event could cause credited FLEX/mitigating strategies equipment to fail to perform as necessary. An optimized evaluation process is applied that focuses on achieving a safe and stable plant state following a seismic event. As described in Reference [8], this state is achieved by confirming that key plant safety functions critical to immediate plant safety are preserved (reactor trip, reactor vessel inventory and pressure control, and core cooling) and that the plant operators have the necessary power available to achieve and maintain this state immediately following the seismic event (AC/DC power support systems).

Within the applicable functions, the components that would need a high frequency confirmation are contact control devices subject to intermittent states in seal-in or lockout (SILO) circuits. Accordingly, the objective of the review as stated in Section 4.2.1 of Reference [8] is to determine if seismic induced high frequency relay chatter would prevent the completion of the following key functions.

2.1 Reactor Trip/SCRAM

The reactor trip/SCRAM function is identified as a key function in Reference [8] to be considered in the High Frequency Confirmation. The same report also states that "the design requirements preclude the application of SILO circuits that prevent reactor trip/SCRAM functions" and that "No high-frequency review of the reactor trip/SCRAM systems is necessary."

2.2 Reactor Vessel Inventory Control

The reactor coolant system/reactor vessel inventory control systems were reviewed for contact control devices in SILO circuits that would create a Loss of Coolant Accident (LOCA). The focus of the review was contact control devices that could lead to a significant leak path. Check valves in series with active valves would prevent significant leaks due to misoperation of the active valve; therefore, SILO circuit reviews were not required for those active valves.

The process/criteria for assessing potential reactor coolant leak path valves is to review all P&ID's attached to the Reactor Coolant System (RCS) and include all active isolation valves and any active second valve upstream or downstream that is assumed to be required to be closed during normal operation or close upon an initiating event (LOCA or Seismic). A table with the valves and associated P&ID is included in Table B-2 of this report.

Manual valves that are normally closed are assumed to remain closed and a second simple check valve is assumed to function and not be a Multiple Spurious Failure.

On BWR's the instrument lines that are 1" or less, in general, are assumed to have restricting orifices that are designed to mitigate any leakage due to make up.

Table B-2 only lists the Unit 2 valves. Unit 1 has equivalent valves. For example, Unit 2 valve 2B21-F013C is equivalent to Unit 1 valve 1B21-F013C.

Active Function: A function that requires mechanical motion or a change of state (e.g., the closing of a valve or relay or the change in state of a transistor).

Simple Check Valve: A valve which closes upon reverse fluid flow only.

Table B-2 contains a list of valves analyzed and the resultant devices selected which are also identified below. Devices controlling the valves listed in Table B-1 were selected based on the analysis detailed below.

Main Steam System Valves

Automatic Depressurization Valves 1B21-F013C/D/E/R/S/U/V, 2B21-F013C/D/E/R/S/U/V; Safety Relief Valves 1B21-F013F/H/K/L/M/P, 2B21-F013F/H/K/L/M/P.

Electrical control for the solenoid-operated pilot valves is via relays controlled by the Auto Depressurization Logic (A/B Solenoids of 1/2B21-F013C/D/E/R/S/U/V), the Low-Low Setpoint Relief Logic (B/C Solenoids of 1/2B21-F013C/D/E/K/P/S/U), or reactor pressure (C Solenoids of 1/2B21-F013F/H/L/M/R/V) [32, pp. 7.3-7].

The Auto Depressurization Logic can seal in via contacts on 1/2B21C-K4A/B, 1/2B21C-K8A/B [33, 34, 35, 36]. The input logic to 1/2B21C-K4A/B and 1/2B21C-K8A/B is via several diverse contacts. It is unlikely that coincident chatter would occur simultaneously in each of these input contacts in a way that would cause 1/2B21C-K4A/B and 1/2B21C-K8A/B to both seal in, and for this reason these input devices are not included in the analysis. Relays 1/2B21C-K7A/B and 1/2B21C-K6A/B are slaves to 1/2B21C-K4A/B and 1/2B21C-K8A/B and do not seal-in on their own, thus do not meet selection criteria.

Any chatter which could energize the coil of the Low-Low Setpoint Relief auxiliary relay associated with the B/C Solenoid-operated pilot valve, and also seal in the Low-Low Setpoint Relief Logic, could cause the valve to open and remain open [37, 38, 39, 40]. This could happen if a combination of two of the following relays chatter simultaneously: 1/2B21C-K54A/B, 1/2B21C-K55A/B, 1/2B21C-K56A/B, 1/2B21C-K57A/B, 1/2B21C-K66A/B, 1/2B21C-K68A/B, 1/2B21C-K69A/B, 1/2B21C-K70A/B, 1/2B21C-K71A/B, 1/2B21C-K72A/B, 1/2B21C-K75A/B, 1/2B21C-K76A/B; or the pressure switches PS-1/2BN21-N039C/CC, PS-1/2BN21-N039D/DD, PS-1/2BN21-N039E/EE, PS-1/2BN21-N039K/KK, PS-1/2BN21-N039P/PP, PS-1/2BN21-N039S/SS, PS-1/2BN21-N039U/UU, or PS-1/2BN21-N060U/UU [41, 42, 43, 44, 45, 46, 47, 48] (U1), [49, 50, 51, 52, 53, 54, 55, 56] (U2).

Chatter in the pressure switch of the pressure-controlled C Solenoids may cause the valve to momentarily open, however there is no seal-in of this pressure signal and the valves would reclose after the period of strong shaking [42, 43, 44, 45, 50, 51, 52, 53]. Thus none of these pressure switches meet the selection criteria.

Main Steam Isolation Valves 1B21-F022A/B/C/D, 1B21-F028A/B/C/D, 2B21-F022A/B/C/D, 2B21-F028A/B/C/D.

The solenoid-operated pilot valves of these normally-open valves are energized to keep the valves open. Chatter in the auxiliary relays controlling these valves [57, 58, 59, 60, 61, 62, 63,

64] (U1), [65, 66, 67, 68, 69, 70, 71, 72] (U2), or in the Primary Containment and Reactor Vessel Isolation Logic [73, 74, 75, 76, 77, 78, 79, 80] could cause the valves to close, which is a beneficial effect. If an isolation signal is generated, no relay chatter would cause these valves to remain open after the period of strong shaking. For this reason, no devices controlling these valves meet the selection criteria.

Main Steam Drain Valves 1B21-F016, 1B21-F019, 1B21-F067A/B/C/D, 2B21-F016, 2B21-F019, 2B21-F067A/B/C/D.

These motor-operated valves are normally open and chatter in the opening control circuit is blocked by open rugged limit and torque switches [81, 82, 83, 84]. Chatter in the closing contactor auxiliary contacts or the isolate signal relay contacts could cause valve closure, however this effect is beneficial as far as leak-path is concerned. All other contact devices in the closing circuit are rugged.

Feedwater and Zinc System Valves

Valves 1B21-F011A/B, 2B21-F011A/B.

Based on the P&ID [85, 86], these are normally open manual valves without electrical controls. This removes these valves from consideration as a potential RCS leak path resulting from high-frequency seismic effects.

Nuclear Boiler and Reactor Recirculation Valves

Reactor Recirculation Pump Discharge Valves 1B33-F067A/B, 2 B33-F067A/B.

These valves are normally open and chatter in the opening control circuit is blocked by open rugged limit and torque switches [87, 88]. Chatter in the closing contactor auxiliary contacts could cause valve closure, however this effect is beneficial as far as leak-path is concerned. Chatter of other devices in the close circuit would only have a temporary effect on valve closure and thus does not meet the selection criteria [89, 90, 91, 92].

Reactor Recirculation Flow Control Valves 1B33-F060A/B, 2 B33-F060A/B.

These valves are controlled by hand switches via a solid-state positioning system [93, 94, 95, 96]. There are no vulnerable SILO contact devices which may hold these valves in the open position.

Reactor Recirculation Pump Suction Valves 1B33-F023A/B, 2 B33-F023A/B.

These motor-operated valves are normally open and chatter in the opening control circuit is blocked by open rugged limit and torque switches [97, 98, 99, 100]. Chatter in the closing contactor auxiliary contacts could cause valve closure, however this effect is beneficial as far as leak-path is concerned. All other contact devices in the closing circuit are rugged.

Residual Heat Removal System Valves

Containment Spray Valves 1E12-F016A/B, 1E12-F017A/B, 2E12-F016A/B, 2E12-F017A/B.

These motor-operated valves are normally closed and controlled by hand switches with permissive contacts in the opening circuit [101, 102, 103, 104, 105, 106]. Chatter in the auxiliary contact of the 42-O opening contactor could bypass the permissive and control switch and seal-in the contactor, which would open the valve. Chatter in the opening permissive contacts are blocked by a rugged control switch. Chatter in the closing circuit is blocked by open and rugged limit and torque switches.

Residual Heat Removal Suction Cooling Isolation Valves 1E12-F008, 1E12-F009, 2E12-F008, 2E12-F009.

These motor-operated valves are normally closed and controlled by hand switches with an isolate signal permissive contact in the opening circuit [107, 108, 109, 110]. In the absence of an isolation signal, chatter in the auxiliary contact of the 42-O opening contactor could bypass the control switch and seal-in the contactor, which would open the valve. The inboard isolation valve, 1/2E12-F009, also has an interposing auxiliary relay CR1. Chatter in the contact of this relay could also lead to seal-in of the opening contactor. Chatter in the closing circuit is blocked by open and rugged limit and torque switches.

Reactor Water Clean-Up System Valves

Reactor Water Clean-Up System Isolation Valves 1G33-F001, 2G33-F001; Reactor Water Clean-Up Vessel Drain Line Recirculation Valves 1G33-F101, 2G33-F101.

Per the P&ID these motor-operated valves are normally open [111, 112]. Chatter in the opening control circuit is blocked by open rugged limit and torque switches [113, 114, 115, 116]. Chatter in the closing contactor auxiliary contacts could cause valve closure, however this effect is beneficial as far as leak-path is concerned. All other contact devices in the closing circuit are rugged.

Reactor Water Clean-Up Line Suction Inside Containment Valves 1G33-F102, 2G33-F102.

These are normally-open motor operated valves controlled by rugged hand switches [113, 115]. There is no seal-in associated with the control of these valves.

Reactor Core Isolation Cooling System Valves

Reactor Core Isolation Cooling Isolation Valves 1E51-F063, 1E51-F008, 2E51-F063, 2E51-F008.

These normally-open motor-operated valves are required to remain open to supply steam to the RCIC Turbine, which powers the AC-Independent Core Cooling System credited in Section 2.4 below, and for the Phase 1 FLEX Response. There is no seal-in in the opening circuit, and closure, if needed, is not blocked by SILO [117, 118, 119, 120]. Inadvertent closure of these valves is covered in the RCIC chatter analysis in Section 5.3.7 of Ref. [18].

2.3 REACTOR VESSEL PRESSURE CONTROL

The reactor vessel pressure control function is identified as a key function in Reference [8] to be considered in the High Frequency Confirmation. The same report also states that "required post event pressure control is typically provided by passive devices" and that "no specific high frequency component chatter review is required for this function."

2.4 CORE COOLING

The core cooling systems were reviewed for contact control devices in seal-in and lockout circuits that would prevent at least a single train of non-AC power driven decay heat removal from functioning. LaSalle credits their steam turbine-driven Reactor Core Isolation Cooling (RCIC) Pump to provide core decay-heat cooling.

The selection of contact devices for the Safety Relief Valves (SRVs) overlaps with the RCS/Reactor Vessel Inventory Control Category. Refer to Section 2.2 for more information on the analysis of contact devices for these valves.

The selection of contact devices for RCIC was based on the premise that RCIC operation is desired, thus any SILO which would lead to RCIC operation is beneficial and thus does not meet the criteria for selection. Only contact devices which could render the RCIC system inoperable were considered.

The largest vulnerability to RCIC operation following a seismic event is contact chatter leading to a false RCIC Isolation Signal or false Turbine Trip. A false steam line break trip has the potential to delay RCIC operation while confirmatory inspections are being made. Chatter in the contacts of the RCIC Isolation Signal Relay 1/2E51A-K15, the Steam Line High Differential Pressure Time Delay Relay 1/2E51A-K47, the Leak Detection Relay 1/2E31A-K2A, or the Turbine Exhaust Diaphragm High Pressure Relay 1/2E51A-K29; or coincident chatter in the Reactor Pressure Relays 1/2E51A-K54 and 1/2E51A-K55; may lead to a RCIC Isolation Signal and seal-in of 1/2E51A-K15 [19, 20]. This would cause the RCIC Isolation Valves to close and the RCIC Trip and Throttle Valve to trip. Similar chatter in the devices that drive those relays could also lead to seal-in: 1/2E31-N022A, 1/2E31-N022C, 1/2E51-N012A, 1/2E51-N012C and 1/2E31-R001C [19, 21, 20, 22, 23, 24]. (The four-second time delay associated with 1/2E51A-K47 will block chatter on differential pressure switch 1/2E31-N013AA, so it is excluded.) The same rationale applies to the identical Division 3 devices: 1/2E51A-K33, 1/2E51A-K48, 1/2E51A-K32, 1/2E31A-K2B, 1/2E51A-K39, 1/2E51A-K57, 1/2E51A-K58, 1/2E31-N022B, 1/2E31-N022D, 1/2E51-N012B, 1/2E51-N012D and 1/2E31-R002C [25, 26, 27, 28].

Any chatter that may lead to the energization of the Trip and Throttle Valve Remote Trip Circuit is considered as SILO as it will close the valve and require a manual reset prior to restoration of the RCIC system. Chatter in Turbine Trip Auxiliary Relay 1/2E51A-K8, or in the devices which control this relay; the Turbine Exhaust High Pressure Relay 1/2E51A-K6, the Pump Suction Low Pressure Relay 1/2E51A-K7, and the Isolation Signal Relays 1/2E51A-K15, and 1/2E51A-K60 [15]; could cause seal-in of K8 resulting in a turbine trip. Similar chatter in the contact devices that drive those relays (and not already covered in the RCIC Isolation Signal analysis) could also lead to a turbine trip: 1/2E51-N009A, 1/2E51-N009B, and 1/2E51-N006 [29, 30].

LaSalle's ESEL development is documented in ML14353A085 [31]. The contact devices selected as part of that effort appear in Table B-1. For more information on the ESEL selection process and the complete ESEL refer to Ref. [31].

2.5 AC/DC Power Support Systems

The AC and DC power support systems were reviewed for contact control devices in SILO circuits that prevent the availability of DC and AC power sources. The following AC and DC power support systems were reviewed:

- Emergency Diesel Generators,
- Battery Chargers,
- Uninterruptable Power Supplies,
- EDG Ancillary Systems, and
- Switchgear, Load Centers, and MCCs.

Electrical power, especially DC, is necessary to support achieving and maintaining a stable plant condition following a seismic event. DC power relies on the availability of AC power to recharge the batteries. The availability of AC power is dependent upon the Emergency Diesel Generators and their ancillary support systems. EPRI 3002004396 [8] requires confirmation that the supply of emergency power is not challenged by a SILO device. The tripping of lockout devices or circuit breakers is expected to require some level of diagnosis to determine if the trip was spurious due to contact chatter or in response to an actual system fault. The actions taken to diagnose the fault condition could substantially delay the restoration of emergency power.

In order to ensure contact chatter cannot compromise the emergency power system, control circuits were analyzed for the Emergency Diesel Generators (EDG), Battery Chargers, Vital AC Inverters, and Switchgear/Load Centers/MCCs as necessary for Power Supply from EDGs to Battery Chargers and EDG Ancillary Systems. General information on the arrangement of safety-related AC and DC systems, as well as operation of the EDGs, was obtained from LaSalle's UFSAR [32]. LaSalle has five (5) EDGs which provide emergency power to their Class 1E loads on their two (2) units. The overall emergency power distribution is shown on the station One-Line Diagrams [121, 122, 123, 124, 125, 126].

The analysis necessary to identify contact devices in this category relies on conservative worse-case initial conditions and presumptions regarding event progression. The analysis considers the reactor is operating at power with no equipment failures or LOCA prior to the seismic event. The Emergency Diesel Generators are not operating but are available. The seismic event is presumed to cause a Loss of Offsite Power (LOOP) and a normal reactor SCRAM.

In response to bus undervoltage relaying detecting the LOOP, the Class 1E control systems must automatically shed loads, start the EDGs, and sequentially load the diesel generators as designed. Ancillary systems required for EDG operation as well as Class 1E battery chargers and inverters must function as necessary. The goal of this analysis is to identify any vulnerable contact devices which could chatter during the seismic event, seal-in or lock-out, and prevent these systems from performing their intended safety-related function of supplying electrical power during the LOOP.

The following sections contain a description of the analysis for each element of the AC/DC Support Systems. Contact devices are identified by description in this narrative and apply to both divisions. The contact devices selected as part of that effort appear in Table B-1.

Emergency Diesel Generators

The analysis of the Emergency Diesel Generators, DG0, DG1A, DG1B, DG2A, and DG2B, is divided into two sections, generator protective relaying and diesel engine control. General descriptions of these systems and controls appear in the UFSAR [32].

Generator Protective Relaying

The DG 0 Circuit Breaker ACB1413 (ACB2413) is tripped by DG Lockout Relay 86DG0. If this lockout relay is tripped the circuit breaker will not close automatically during the LOOP [127, 128]. The Diesel Generator Lockout Relay 86DG0 may be tripped by chatter in both engine and generator-related fault circuits. Chatter in engine-related fault circuits are covered below. Chatter in the following generator protective and auxiliary relays may trip the lockout relay: Differential Overcurrent 87, 87X; Neutral Ground 59, K59X1; Frequency 81, 81X; Overcurrent with Voltage Restraint 51V, 51VX; Reverse Power 32, K32X; and Field Excitation 40, K25 [129, 130]. The lockout relays for the DG 1A and DG 2A circuit breakers have identical control logic as DG 0 and are susceptible to chatter in the same devices [131, 132, 133, 134, 135, 136].

The DG 1B Circuit Breaker ACB1433 and DG 2B Circuit Breaker ACB2433 are tripped by the Engine Lockout Relay K15, the Generator Lockout Relay K1, and the 86-N Normal Power Feed Lockout Relay [137, 138]. The engine lockout relay is covered below. The generator lockout relay may be tripped by chatter in the following protective relays: Differential Overcurrent K30A/B/C; Reverse Power K32; and Overcurrent with Voltage Restraint K35A/B/C coincident with Time Delay Relay K6 [139, 140]. The normal feed lockout relay may be tripped by chatter in the overcurrent relays 51 (A/B/C) [141, 142].

Diesel Engine Control

Tripping of the DG 0 Lockout Relay trips the generator breaker and energizes the engine shutdown solenoid [143, 144]. The engine fault devices that may trip the lockout relays are: Failure to Start K39, K9; Engine Overspeed S8, K10; Oil Pressure K11; and Oil Temperature S11, K12 [130]. The oil pressure switch changes state during engine start. Time delay relay K33 blocks the oil pressure fault during engine start. Chatter in K33 may cause engine shutdown due to an erroneous oil pressure fault. Other than devices which could trip the lockout breaker, there are no SILO devices which would prevent diesel start after the period of strong shaking ends. The control logic for DG 1A and DG 2A is identical to DG 0 and is sensitive to chatter in the same devices [145, 132, 133, 146, 135, 133].

Tripping of either the generator or engine lockout relays on DG 1B or DG 2B will energize the engine shutdown relay. The engine fault devices which could trip the engine lockout relay on DG 1B or DG 2B are identical in design and nomenclature as the other three diesel generators [147, 148].

Battery Chargers

The Control Circuits for Battery Chargers contain a high voltage shutdown circuit [149] which is intended to protect the batteries and DC loads from output overvoltage due to charger failure [150, 151, 152, 153, 154, 155, 156, 157]. Chatter in the contacts of these output relays may disable the battery chargers, and for this reason meet the selection criteria.

Uninterruptable Power Supplies

Analysis of schematics for the Uninterruptable Power Supplies [158, 159, 160, 161, 162, 163] did not indicate any SILO contact devices.

EDG Ancillary Systems

In order to start and operate the Emergency Diesel Generators, a number of components and systems are required. For the purpose of identifying electrical contact devices, only systems and components which are electrically controlled are analyzed. Information in the UFSAR [32] was used as appropriate for this analysis.

Starting Air

Based on Diesel Generator availability as an initial condition the passive air reservoirs are presumed pressurized and the only active components in this system required to operate are the air start solenoids [164, 165, 166, 32, pp. 9.5-37], which are covered under the EDG engine control analysis in Section above.

Combustion Air Intake and Exhaust

The combustion air intake and exhaust for the Diesel Generators are passive systems [164, 165, 166, 32, pp. 9.5-42] which do not rely on electrical control.

Lube Oil

The Diesel Generators utilize engine-driven mechanical lubrication oil pumps [167, 32, pp. 9.5-40] which do not rely on electrical control.

Fuel Oil

The Diesel Generators utilize self-driven pumps to supply fuel oil to the engines from the day tanks; and the system requires no electrical power to supply fuel to the diesel engine during starting and initial operation [32, pp. 9.5-31]. The day tanks are re-supplied using AC-powered Diesel Oil Transfer Pumps [168, 169]. Chatter analysis of the control circuits for the fuel oil transfer pumps [170, 171, 172] concluded they do not include SILO devices.

Cooling Water

The Diesel Generator Cooling Water System consists of two loops, engine water and cooling water [32, pp. 9.5-34]. Engine driven pumps are credited for engine water when the engine is operating. These mechanical pumps do not rely on electrical control. Cooling water flow is provided by the Diesel Generator Cooling Water Pumps [173, 174, 175, 176, 175, 177]. These pumps are controlled by the DG start circuit via the speed switch auxiliary relay K18. This control circuit is covered in Section above.

Ventilation

Ventilation for each EDG room is achieved via a vent fan [32, pp. 9.4-34]. These components are controlled by room temperature [178, 179, 180]. Strong shaking may temporarily prevent fan operation however there is no SILO associated with this circuit and fan operation would occur normally after the period of strong shaking.

Switchgear, Load Centers, and MCCs

Power distribution from the EDGs to the necessary electrical loads (Battery Chargers, Uninterruptable Power Supplies, Cooling Water Pumps, Fuel Oil Pumps, and EDG Ventilation

Fans) was traced to identify any SILO devices which could lead to a circuit breaker trip and interruption in power. This effort excluded the EDG output circuit breakers, which are covered in Section above, as well as component-specific contactors and their control devices, which are covered in the analysis for each component above.

The medium- and low-voltage circuit breakers in 4160V Busses and 480V AC Load Centers which are supplying power to loads identified in this section (battery chargers, EDG ancillary systems, etc.) have been identified for evaluation. These were breakers in the following switchgear cubicles/compartments: 141Y Cubicle 9; 135X Compartments 102B, 103A, 103C and 103D; 135Y Compartments 202B and 204B; 142Y Cubicle 9; 136X Compartments 302B, 303A, and 304D; 136Y Compartments 402B and 404B; 143 Cubicle 5; 241Y Cubicle 4; 235X Compartments 102A, 102C, 102D, and 103B; 235Y Compartments 201C and 203B; 242Y Cubicle 5; 236X Compartments 301B, 302C, and 303B; 236Y Compartments 401C and 403B; and 243 Cubicle 5 [181, 182, 183, 184, 185, 186, 187] (U1), [188, 189, 190, 191, 192, 193, 194] (U2). DC Distribution uses vulnerable Low Voltage Power Circuit Breakers in the following compartments: 1DC08E Compartment 3B, 1DC15E Compartment 3B, 1DC02E Compartment 2B, and 1E22-P301A CB-6 and CB-9 (2DC08E-3B, 2DC15E-3B, 2DC02E-2B, and 2E22-P301A CB-6 and CB-9); for the Distribution Panel and MCC Feeds [195, 196, 197, 198, 199, 200, 201, 202]. The circuit breakers that feed the battery charger outputs to the DC Buses (1DC08E-2A, 1DC15E-2A, 1DC15E-2D, 1DC02E-1A, 2DC08E-2A, 2DC15E-2A, 2DC15E-2D, 2DC02E-1A) use rugged Molded-Case Circuit Breakers per the walkdown described in Attachment 9.2, and thus are not selected for seismic evaluation. MCCBs in low voltage Motor Control Center Buckets were considered rugged as well.

The only circuit breakers affected by protective relaying (not already covered) were those that distribute power from the 4160V Busses to the 4160/480V step-down transformers. An analysis of the control circuits for these circuit breakers indicates that chatter in the 51 Phase Overcurrent Relays or the 51G Ground Overcurrent Relay or 51N Neutral Overcurrent Relays in the trip circuits of these breakers could cause circuit breaker tripping [203, 204, 205, 206, 207, 208].

2.6 SUMMARY OF SELECTED COMPONENTS

The investigation of high-frequency contact devices as described above was performed in Ref. [18]. A list of the contact devices requiring a high frequency confirmation is provided in Appendix B, Table B-1. The identified devices are evaluated in Ref. [17] per the methodology/description of Section 3 and 4. Results are presented in Section 5 and Table B-1.

3 Seismic Evaluation

3.1 Horizontal Seismic Demand

Per Reference [8], Sect. 4.3, the basis for calculating high-frequency seismic demand on the subject components in the horizontal direction is the LAS horizontal ground motion response spectrum (GMRS), which was generated as part of the LAS Seismic Hazard and Screening Report [4] submitted to the NRC on March 31, 2014, and accepted by the NRC on April 21, 2015 [14].

It is noted in Reference [8] that a Foundation Input Response Spectrum (FIRS) may be necessary to evaluate buildings whose foundations are supported at elevations different than the Control Point elevation. However, for sites founded on rock, per Ref. [8], "The Control Point GMRS developed for these rock sites are typically appropriate for all rock-founded structures and additional FIRS estimates are not deemed necessary for the high frequency confirmation effort."

The applicable buildings at LAS are founded on rock; therefore, the Control Point GMRS is representative of the input at the building foundation.

The horizontal GMRS values are provided in Table 3-2.

3.2 Vertical Seismic Demand

As described in Section 3.2 of Reference. [8], the horizontal GMRS and site soil conditions are used to calculate the vertical GMRS (VGMRS), which is the basis for calculating high-frequency seismic demand on the subject components in the vertical direction.

The site's soil mean shear wave velocity vs. depth profile is provided in Reference. [4], Table 2.3.2-1 and reproduced below in Table 3-1.

Table 3-1: Soil Mean Shear Wave Velocity Vs. Depth Profile

Layer	Depth (ft)	Depth (m)	Thickness, d_i (ft)	Vs_i (ft/sec)	d_i/Vs_i	$\Sigma [d_i/Vs_i]$	Vs30 (ft/s)
1	5.5	1.7	5.5	663	8.30E-03	8.30E-03	815
2	11	3.4	5.5	663	8.30E-03	1.66E-02	
3	16.5	5.0	5.5	663	8.30E-03	2.49E-02	
4	22	6.7	5.5	663	8.30E-03	3.32E-02	
5	27.6	8.4	5.5	663	8.30E-03	4.15E-02	
6	33.1	10.1	5.5	663	8.30E-03	4.98E-02	
7	38.6	11.8	5.5	663	8.30E-03	5.81E-02	
8	44.1	13.4	5.5	663	8.30E-03	6.64E-02	
9	49.6	15.1	5.5	663	8.30E-03	7.47E-02	
10	55.1	16.8	5.5	663	8.30E-03	8.30E-02	
11	60.6	18.5	5.500	663	8.30E-03	9.13E-02	
12	66.1	20.1	5.500	663	8.30E-03	9.95E-02	
13	72.1	22.0	6.000	1694	3.54E-03	1.03E-01	
14	78.1	23.8	6.000	1694	3.54E-03	1.07E-01	
15	84.2	25.7	6.000	1694	3.54E-03	1.10E-01	
16	90.2	27.5	6.000	1694	3.54E-03	1.14E-01	
17	96.2	29.3	6.000	1694	3.54E-03	1.17E-01	
18	102.0	31.1	6.000	1694	3.54E-03	1.21E-01	

Using the shear wave velocity vs. depth profile, the velocity of a shear wave traveling from a depth of 30m (98.43ft) to the surface of the site (Vs30) is calculated per the methodology of Reference [8], Section 3.5.

- The time for a shear wave to travel through each soil layer is calculated by dividing the layer depth (d_i) by the shear wave velocity of the layer (Vs_i).
- The total time for a wave to travel from a depth of 30m to the surface is calculated by adding the travel time through each layer from depths of 0m to 30m ($\Sigma[d_i/Vs_i]$).
- The velocity of a shear wave traveling from a depth of 30m to the surface is therefore the total distance (30m) divided by the total time;
  i.e., $Vs30 = (30m)/\Sigma[d_i/Vs_i]$.
- Note: The shear wave velocity is calculated based on time it takes for the shear wave to travel 31.1m (102.0ft) instead of 30m (98.43ft). This small change in travel distance will have no impact on identifying soil class type.

The site's soil class is determined by using the site's shear wave velocity (Vs30) and the peak ground acceleration (PGA) of the GMRS and comparing them to the values within Reference [8], Table 3-1. Based on the PGA of 0.317g and the shear wave velocity of 815ft/s, the site soil class is C-Soft.

Once a site soil class is determined, the mean vertical vs. horizontal GMRS ratios (V/H) at each frequency are determined by using the site soil class and its associated V/H values in Reference [8], Table 3-2.

The vertical GMRS is then calculated by multiplying the mean V/H ratio at each frequency by the horizontal GMRS acceleration at the corresponding frequency. It is noted that Reference [8], Table 3-2 values are constant between 0.1Hz and 15Hz.

The V/H ratios and VGMRS values are provided in Table 3-2 of this report.

Figure 3-1 below provides a plot of the horizontal GMRS, V/H ratios, and vertical GMRS for LAS.

Table 3-2: Horizontal and Vertical Ground Motions Response Spectra

Frequency (Hz)	HGMRS (g)	V/H Ratio	VGMRS (g)
100	0.317	0.94	0.298
90	0.324	1.01	0.327
80	0.331	1.09	0.361
70	0.341	1.18	0.402
60	0.354	1.24	0.439
50	0.373	1.28	0.477
45	0.389	1.3	0.505
40	0.404	1.23	0.497
35	0.426	1.13	0.481
30	0.454	1.03	0.468
25	0.486	0.91	0.442
20	0.507	0.79	0.401
15	0.574	0.7	0.402
12.5	0.635	0.7	0.445
10	0.695	0.7	0.487
9	0.686	0.7	0.480
8	0.664	0.7	0.465
7	0.627	0.7	0.439
6	0.572	0.7	0.400
5	0.517	0.7	0.362
4	0.491	0.7	0.344
3.5	0.480	0.7	0.336
3	0.461	0.7	0.323
2.5	0.428	0.7	0.300
2	0.403	0.7	0.282
1.5	0.330	0.7	0.231
1.25	0.284	0.7	0.199
1	0.232	0.7	0.162
0.9	0.214	0.7	0.150
0.8	0.193	0.7	0.135
0.7	0.169	0.7	0.118
0.6	0.143	0.7	0.100
0.5	0.118	0.7	0.083
0.4	0.094	0.7	0.066
0.35	0.082	0.7	0.058
0.3	0.071	0.7	0.049
0.25	0.059	0.7	0.041
0.2	0.047	0.7	0.033
0.15	0.035	0.7	0.025
0.125	0.029	0.7	0.021
0.1	0.024	0.7	0.016

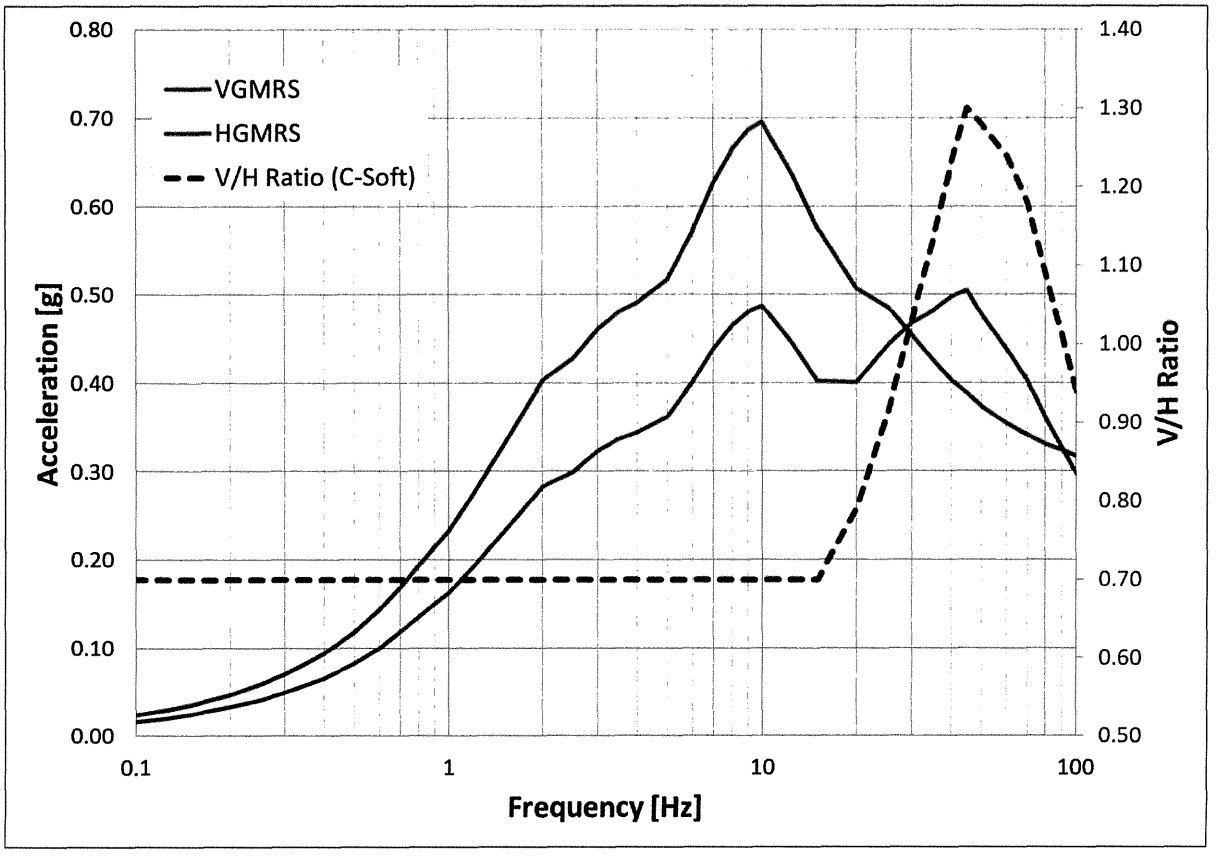

Figure 3-1 Plot of the Horizontal and Vertical Ground Motions Response Spectra and V/H Ratios

3.3 COMPONENT VERTICAL SEISMIC DEMAND

The component vertical demand is determined using the peak acceleration of the VGMRS between 15 Hz and 40 Hz and amplifying it using the following two factors:

- Vertical in-structure amplification factor AF_{SV} to account for seismic amplification at floor elevations above the host building's foundation
- Vertical in-cabinet amplification factor AF_c to account for seismic amplification within the host equipment (cabinet, switchgear, motor control center, etc.)

The in-structure amplification factor AF_{SV} is derived from Figure 4-4 in Reference [8]. The in-cabinet vertical amplification factor, AF_c is derived in Reference [8] and is 4.7 for all cabinet types.

3.4 COMPONENT HORIZONTAL SEISMIC DEMAND

Per Reference [8] the peak horizontal acceleration is amplified using the following two factors to determine the horizontal in-cabinet response spectrum:

- Horizontal in-structure amplification factor AF_{SH} to account for seismic amplification at floor elevations above the host building's foundation.
- Horizontal in-cabinet amplification factor AF_c to account for seismic amplification within the host equipment (cabinet, switchgear, motor control center, etc.).

The in-structure amplification factor AF_{SH} is derived from Figure 4-3 in Reference [8]. The in-cabinet horizontal amplification factor, AF_c is associated with a given type of cabinet construction. The three general cabinet types are identified in Reference [8] and Appendix I of EPRI NP-7148-SL [13] assuming 5% in-cabinet response spectrum damping. EPRI NP-7148-SL [13] classified the cabinet types as high amplification structures such as switchgear panels and other similar large flexible panels, medium amplification structures such as control panels and control room benchboard panels and low amplification structures such as motor control centers.

All of the electrical cabinets containing the components subject to high frequency confirmation (see Table B-1 in Appendix B) can be categorized into one of the in-cabinet amplification categories in Reference [8] as follows:

- LAS Motor Control Centers are typical motor control center cabinets consisting of a lineup of several interconnected sections. Each section is a relatively narrow cabinet structure with height-to-depth ratios of about 4.5 that allow the cabinet framing to be efficiently used in flexure for the dynamic response loading, primarily in the front-to-back direction. This results in higher frame stresses and hence more damping which lowers the cabinet response. In addition, the subject components are not located on large unstiffened panels that could exhibit high local amplifications. These cabinets qualify as low amplification cabinets.
- LAS Switchgear cabinets are large cabinets consisting of a lineup of several interconnected sections typical of the high amplification cabinet category. Each section is a wide box-type structure with height-to-depth ratios of about 1.5 and may include wide stiffened panels. This results in lower stresses and hence less damping which increases the enclosure response. Components can be mounted on the wide panels, which results in the higher in-cabinet amplification factors.

- LAS Control cabinets are in a lineup of several interconnected sections with moderate width. Each section consists of structures with height-to-depth ratios of about 3 which results in moderate frame stresses and damping. The response levels are mid-range between MCCs and switchgear and therefore these cabinets can be considered in the medium amplification category.

4 Contact Device Evaluations

Per Reference [8], seismic capacities (the highest seismic test level reached by the contact device without chatter or other malfunction) for each subject contact device are determined by the following procedures:

(1) If a contact device was tested as part of the EPRI High Frequency Testing program [7], then the component seismic capacity from this program is used.

(2) If a contact device was not tested as part of [7], then one or more of the following means to determine the component capacity were used:

  (a) Device-specific seismic test reports (either from the station or from the SQURTS testing program.

  (b) Generic Equipment Ruggedness Spectra (GERS) capacities per [9], [10], [11], and [12].

  (c) Assembly (e.g. electrical cabinet) tests where the component functional performance was monitored.

(3) The existing station procedure is used for contact devices where operator action can resolve any inadvertent actuation of the essential components.

The high-frequency capacity of each device was evaluated with the component mounting point demand from Section 3 using the criteria in Section 4.5 of Reference [8].

A summary of the high-frequency evaluation conclusions is provided in Table B-1 in Appendix B of this report.

5 Conclusions

5.1 General Conclusions

LAS has performed a High Frequency Confirmation evaluation in response to the NRC's 50.54(f) letter [1] using the methods in EPRI report 3002004396 [8].

The evaluation identified a total of 363 components that required seismic high frequency evaluation. As summarized in Table B-1 in Appendix B, 360 of the devices have adequate seismic capacity. The remaining 3 devices are adequate despite their seismic capacities' being less than seismic demand because any chatter in these 3 devices can be resolved by LAS operator actions.

5.2 Identification of Follow-up Actions

No follow-up actions were identified.

6 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, ADAMS Accession Number ML12053A340

2 NRC (W. Dean) Letter to the Power Reactor Licensees on the Enclosed List. "Final Determination of Licensee Seismic Probabilistic Risk Assessments Under the Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation 2.1 "Seismic" of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident." October 27, 2015, ADAMS Accession Number ML15194A015

3 NRC (J. Davis) Letter to Nuclear Energy Institute (A. Mauer). "Endorsement of Electric Power Research Institute Final Draft Report 3002004396, 'High Frequency Program: Application Guidance for Functional Confirmation and Fragility.'" September 17, 2015, ADAMS Accession Number ML15218A569

4 Seismic Hazard and Screening Report in Response to the 50.54(f) Information Request Regarding Fukushima Near-Term Task Force Recommendation 2.1: Seismic for LaSalle County Station, Unit 1 and 2 dated March 31, 2014, ADAMS Accession Number ML14091A013

5 EPRI 1015109, "Program on Technology Innovation: Seismic Screening of Components Sensitive to High-Frequency Vibratory Motions." October 2007

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

7 EPRI 3002002997, "High Frequency Program: High Frequency Testing Summary." September 2014

8 EPRI 3002004396, "High Frequency Program: Application Guidance for Functional Confirmation and Fragility Evaluation." July 2015

9 EPRI NP-7147-SL, "Seismic Ruggedness of Relays." August 1991

10 EPRI NP-7147-SLV2, Addendum 1, "Seismic Ruggedness of Relays", September 1993

11 EPRI NP-7147-SLV2, Addendum 2, "Seismic Ruggedness of Relays", April 1995

12 EPRI NP-7147 SQUG Advisory 2004-02. "Relay GERS Corrections." September 10, 2004

13 EPRI NP-7148-SL, "Procedure for Evaluating Nuclear Power Plant Relay Seismic Functionality", 1990

14 NRC (F. Vega) Letter to LaSalle County Station (B. Hanson), "LaSalle County Station, Units 1 and 2 – Staff Assessment of Information Provided Pursuant to Title 10 of the Code of Federal Regulations Part 50, Section 50.54(f), Seismic Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (TAC NOS. MF3881 and MF3882)" April 21, 2015, ADAMS Accession Number ML15013A132

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185 LaSalle Drawing 1E-1-4000BQ Rev. F, Key Diagram 480V Switchgear
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190 LaSalle Drawing 1E-2-4000BP Rev. G, Key Diagram 480V Switchgear 235Y (2AP20E)
191 LaSalle Drawing 1E-2-4000AM Rev. E, Key Diagram 4160V Switchgear
192 LaSalle Drawing 1E-2-4000BQ Rev. D, Key Diagram 480V Switchgear 236X (2AP21E)
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196 LaSalle Drawing 1E-1-4000FC Rev. O, Key Diagram 125V DC Distribution Essential Division 2
197 LaSalle Drawing 1E-1-4000EB Rev. J, Key Diagram 250V DC Bus NO1 1DC02E and MCC 121X 1DC05E
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201 LaSalle Drawing 1E-2-4000EB Rev. M, Key Diagram 250V DC Bus NO. 1 2DC02E and MCC 221X 2DC05E
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203 LaSalle Drawing 1E-1-4005BC Rev. H, Schematic Diagram 4160V Switchgear 141Y Feed to Transformer 135X and 136Y System AP Part 27
204 LaSalle Drawing 1E-1-4005BD Rev. H, Schematic Diagram 4160V Switchgear 142Y Feed to Transformer 136X and 136Y System AP Part 28
205 LaSalle Drawing 1E-1-4223AF Rev. G, Schematic Diagram 4160V Switchgear 143 Feed to Transformer 143-1 System HP (E22B) Part 6

206 LaSalle Drawing 1E-2-4005BC Rev. G, Schematic Diagram 4160V Switchgear 241Y Feed to Transformers 235X and 235Y System AP Part 27
207 LaSalle Drawing 1E-2-4005BD Rev. J, Schematic Diagram 4160V Switchgear 242Y Feed to Transformers 236X and 236Y System AP Part 28
208 LaSalle Drawing 1E-2-4223AF Rev. E, Schematic Diagram 4160V Switchgear 243 Feed to Transformer 2E22-S003 System HP (E22B) Part 6

A Representative Sample Component Evaluations

The following sample calculation is extracted from Reference [17].

Notes:

1. Reference citations within the sample calculation are per the Ref. [17] reference section shown on the following page.

2. This sample calculation contains evaluations of sample high-frequency-sensitive components per the methodologies of both the EPRI high-frequency guidance [8] and the flexible coping strategies guidance document NEI 12-06 [16].

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3.15. Calculation CQD-003648, Dated 09/03/1982, "Review of Seismic Qualification Reports for ITE Switchgear Units 1,2 AP01E, 02E, 04E, 06E, 08E, and 09E."
3.16. Calculation CQD-013254, Dated 03/28/1984, "Seismic Qualification of Battery Charger Model 3SD-260-200 (Tag Nos. 1,2DC03E)."
3.17. Calculation CQD-012383, Dated 02/14/1984, "Seismic Qualification of Battery Charger Tag #1,2DC09E Model #3SD-130-200."
3.18. Calculation CQD-028932, Dated 12/10/1990, "Seismic Qualification of Diesel Generator Control Panels E22-P301A&B."
3.19. Calculation L-003904, Rev. 1, "Seismic Evaluation for Yokogawa DX Advanced Series Recorders and Seismic Mounting Evaluation in Control Room Panels."
3.20. Calculation EMD-033330, Dated 05/01/1981, "Seismic Qualification of HPCS Switchgear – Metal Clad E22-S004."
3.21. Calculation EMD-006881, Dated 01/12/1977, "Seismic Certification – 480 V Unit Substation Transformer."
3.22. Calculation EMD-028572, Dated 02/24/1981, "Seismic Qualification of Division I Leak Detection Vertical Board (H13-P632)."
3.23. Calculation EMD-028565, Dated 02/24/1981, "Seismic Qualification of Low Low Set/Safety Relief Valve Division II Vertical Board (H13-P645)."
3.24. Calculation CQD-000821, Dated 02/12/1982, "Seismic Qualification of HPCS Diesel Generator Protection Logic Vertical Board, Eq. #1,2H22-P028."
3.25. Calculation EMD-011085, Dated 11/23/1977, "Review of Seismic Qualification Report for D.C. Distribution Equipment."
3.26. LOR-0DG03J-5-1, Rev. 3, "Diesel Generator 0 Loss of Field (Forty)."
3.27. LOR-1DG03J-5-1, Rev. 3, "Diesel Generator 1A Loss of Field (Forty)."
3.28. LOR-2DG03J-5-1, Rev. 3, "Diesel Generator 2A Loss of Field (Forty)."

4. Station Drawings
4.1. Drawing 1E-1-4201AC, Rev AC, "Schematic Diagram Auto Depressurization System "NB" (B21C) Part 3."
4.2. Drawing 1E-1-4201AN, Rev C, "Schematic Diagram Auto Depressurization System "NB" (B21C) Part 13."
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4.4. Drawing 1E-1-4201AP, Rev D, "Schematic Diagram Auto Depressurization System "NB" (B21C) Part 14."
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4.6. Drawing 1E-1-4201AE, Rev Z, "Schematic Diagram Auto Depressurization System "NB" (B21C) Part 5."
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4.10. Drawing 1E-1-4201AK, Rev H, "Schematic Diagram Auto Depressurization System "NB" (B21C) Part 10."
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4.16. Drawing 1E-2-4201AE, Rev T, "Schematic Diagram Auto Depressurization System "NB" (B21C) Part 5."
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4.20. Drawing 1E-2-4201AK, Rev E, "Schematic Diagram Auto Depressurization System "NB" (B21C) Part 10."
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4.22. Drawing NB-132, Rev 0, "2 IN AND UNDER AS-BUILT (SUB 2)."
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4.24. Drawing NB-134, Rev 0, "2 IN AND UNDER AS-BUILT (SUB 2)."
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4.29. Drawing NB-083, Rev 0, "2 IN AND UNDER AS-BUILT."
4.30. Drawing 1E-1-3445, Rev AW, "Electrical Installation Auxiliary Building Auxiliary Equipment Room Plan El 731-0 Col 12-15 And J-N."
4.31. Drawing 1E-2-3445, Rev. AF, "Electrical Installation Auxiliary Equipment Room Plan Elevation 731-0 Columns 15-18 And J-N."
4.32. Drawing M-Index, Rev. AK, "General Arrangement Index."
4.33. Drawing M-7, Rev. AD, "General Arrangement Main Floor Plan."
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4.45. Drawing 1E-2-4220BH, Rev. N, "Schematic Diagram Residual Heat Removal System RH E12 Part 32 Critical Control Room Drawing."
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4.47. Drawing 1E-2-4220BC, Rev. N, "Schematic Diagram Residual Heat Removal System RH E12 Part 27 Critical Control Room Drawing."
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4.49. Drawing 1E-2-4228AK, Rev. M, "Schematic Diagram Reactor Water Cleanup System "RT" (G33) Part 10."
4.50. Drawing 1E-0-4412AH, Rev. R, "Schematic Diagram Diesel Generator "0" Generator/Engine Control System "DG" Part 8."
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4.52. Drawing 1E-0-4401S, Rev. V, "Relaying and Metering Diagram Standby Diesel Generator "0"."
4.53. Drawing 1E-1-4005BC, Rev. H, "Schematic Diagram 141Y Feed to Transformer 135X & 135Y System "AP" Part 27."
4.54. Drawing 1E-1-4009AH, Rev. R, "Schematic Diagram Diesel Generator 1A Generator/Engine Control System "DG" Part 8."
4.55. Drawing 1E-1-4009AG, Rev. Q, "Schematic Diagram Diesel Generator "1A" Generator/Engine Control System "DG" Part 7."
4.56. Drawing 1E-1-4000QB, Rev. T, "Relaying & Metering Diagram Standby Diesel Generator "1A"."
4.57. Drawing 1E-1-4005BD, Rev. H, "Schematic Diagram 4160V Switchgear 142Y Feed to Transformer 136X & 136Y System "AP" Part 28."
4.58. Drawing 1E-1-4223AL, Rev. R, "Schematic Diagram HPCS DG-1B Generator/Engine Control System "HP" (E22B) Part 11."
4.59. Drawing 1E-1-4223AG, Rev. L, "Schematic Diagram H.P.C.S Diesel Generator 1B Protective Relaying System HP (E22B) PT. 7."
4.60. Drawing 1E-1-4000PK, Rev. P, "Relaying & Metering Diagram 4160V SWGR. 143."
4.61. Drawing 1E-1-4223AF, Rev. G, "Schematic Diagram 4160V Switchgear 143 Feed to Transformer 143-1 System "HP" (E22B) Part 6."
4.62. Drawing 1E-2-4005BC, Rev. G, "Schematic Diagram 4160V Switchgear 241Y Feed to Transformer 235X & 235Y System "AP" Part 27."
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4.64. Drawing 1E-2-4009AG, Rev. Q, "Schematic Diagram Diesel Generator "2A" Generator/Engine Control System "DG" Part 7."
4.65. Drawing 1E-2-4000QB, Rev. U, "Relaying and Metering Diagram Standby Diesel Generator 2A."

4.66. Drawing 1E-2-4005BD, Rev. J, "Schematic Diagram 4160V Switchgear Feed to Transformer 236X & 236Y System "AP" Part 28."
4.67. Drawing 1E-2-4223AG, Rev. L, "Schematic Diagram H.P.C.S Diesel Generator 2B Protective Relaying System HP (E22B) PT.7."
4.68. Drawing 1E-2-4000PK, Rev. K, "Relaying and Metering 4160V Switchgear 243."
4.69. Drawing 1E-2-4223AF, Rev. E, "Schematic Diagram 4160V Switchgear 243 Feed to Transformer 2E22-S003 System "HP" (E22B) Part 6."

5. S&A Documents
5.1. 14Q4238-CAL-005, Rev. 1, "ESEP HCLPFs for Relays."
5.2. 14Q4238-RPT-005, Rev. 1, "LaSalle ESEP SEWS."
5.3. 15C0348-RPT-001, Rev. 1, "Selection of Relays and Switches for High Frequency Seismic Evaluation."

6. Miscellaneous Documents
6.1. TE Connectivity Qualification Test Report, Rev E, "Nuclear Environmental Qualification Test Report On Agastat EGP, EML, and ETR Control Relays By Control Products Division Amerace Corporation." (See Attachment H for select pages)
6.2. Barksdale Control Products Information Sheet, 2013, "Series B1S, B2S, B1T, B2T." (See Attachment M for select pages)
6.3. Report 60891, Rev. 1, "Seismic Qualification Report for Barksdale Pressure Switch P/N B2T-M12SS." (See Attachment N for select pages)
6.4. General Electric GEH-2058L, "Instruction Auxiliary Relays Hand Reset with Target Types HEA61 and HEA62."
6.5. General Electric GEK-28008D, "Instruction Auxiliary Relays HMA11A-B-C-D-E-F."
6.6. Report No. 50090.1, Rev. 2, "Seismic Test Report for a GE Overvoltage Relay and ABB Overcurrent Relay." (See Attachment O for select pages)
6.7. Report No. 50093.1, Rev. 0, "Seismic Qualification Report for G.E. Power Directional Relay." (See Attachment P for select pages)
6.8. General Electric GEK-45484B, "Instructions Multi-Contact Auxiliary Relay Type HFA151"
6.9. Report No. 50084.7, Rev. 3, "Seismic Qualification Report for an Airpax Tachometer, UE Pressure Switch, Ashcroft Pressure Gauge, McDonnel & Miller Liquid Level Switch, Fumas Relay, Struthers-Dunn Relays, Agastat Time Delay Relays and a GE Relay." (See Attachment Q for select pages)

8 ANALYSIS (cont'd)

8.2 High-Frequency Seismic Demand

Calculate the high-frequency seismic demand on the relays per the methodology from Ref. 1.1.

Sample calculation for the high-frequency seismic demand of relay components 1E51A-K32 and 1E51A-K33 is presented below. A table that calculates the high-frequency seismic demand for all of the subject relays listed in Section 1, Table 1.1 of this calculation is provided in Attachment A of this calculation.

8.2.1 Horizontal Seismic Demand

The horizontal site-specific GMRS for LaSalle County Generating Station (LAS) is per Ref. 2.1. GMRS data can be found in Attachment B of this calculation. A plot of GMRS can be found in Attachment C of this calculation.

Determine the peak acceleration of the horizontal GMRS between 15 Hz and 40 Hz.

Peak acceleration of horizontal GMRS between 15 Hz and 40 Hz (Ref. 2.1; see Attachment B of this calculation): $SA_{GMRS} := 0.574g$ (at 15 Hz)

Calculate the horizontal in-structure amplification factor based on the distance between the plant foundation elevation and the subject floor elevation.

Grade Elevation (Ref. 3.1, Sect. 2.4.2.3): $EL_{grade} := 710ft$

Reactor Building Embedment Depth (Ref. 3.1, Section 3.7.1.4) $embed_{rb} := 44ft$

Auxiliary Building Embedment Depth (Ref. 3.1, Section 3.7.1.4) $embed_{ab} := 54ft$

Foundation Elevation (Reactor Building): $El_{found.rb} := EL_{grade} - embed_{rb} = 666.00 \cdot ft$

Foundation Elevation (Auxiliary Building): $El_{found.ab} := EL_{grade} - embed_{ab} = 656.00 \cdot ft$

Relay floor elevation (Table 1.1): $EL_{relay} := 731ft$

Relay components 1E51A-K32 and 1E51A-K33 are both located in the Auxiliary Building at elevation 731'-0".

Distance between relay floor and foundation: $h_{relay} := EL_{relay} - El_{found.ab} = 75.00 \cdot ft$

8 ANALYSIS (cont'd)

8.2 High-Frequency Seismic Demand (cont'd)

8.2.1 Horizontal Seismic Demand (cont'd)

Work the distance between the relay floor and foundation with Ref. 1.1, Fig. 4-3 to calculate the horizontal in-structure amplification factor.

Slope of amplification factor line, $0ft < h_{relay} < 40ft$

$$m_h := \frac{2.1 - 1.2}{40ft - 0ft} = 0.0225 \cdot \frac{1}{ft}$$

Intercept of amplification factor line:

$$b_h := 1.2$$

Horizontal in-structure amplification factor:

$$AF_{SH}(h_{relay}) := \begin{cases} (m_h \cdot h_{relay} + b_h) & \text{if } h_{relay} \le 40ft \\ 2.1 & \text{otherwise} \end{cases}$$

$$AF_{SH}(h_{relay}) = 2.10$$

Calculate the horizontal in-cabinet amplification factor based on the type of cabinet that contains the subject relay.

Type of cabinet (per Ref. 4.1) (enter "MCC", "Switchgear", "Control Cabinet", or "Rigid"):

$$cab := \text{"Rigid"}$$

Horizontal in-cabinet amplification factor (Ref. 1.1, p. 4-13):

$$AF_{c.h}(cab) := \begin{cases} 3.6 & \text{if } cab = \text{"MCC"} \\ 7.2 & \text{if } cab = \text{"Switchgear"} \\ 4.5 & \text{if } cab = \text{"Control Cabinet"} \\ 1.0 & \text{if } cab = \text{"Rigid"} \end{cases}$$

$$AF_{c.h}(cab) = 1.0$$

Note: Per Ref. 3.3 and 3.4, the relay enclosures 1H13-P618, 1H13-P621, 2H13-P618, and 2H13-P621 are rigid in the 1Hz to 35Hz range. The sample relay components 1E51A-K32 and 1E51A-K33 are mounted within host 1H13-P618. Therefore, the in-cabinet amplification factor for the sample relay components is 1.0.

Multiply the peak horizontal GMRS acceleration by the horizontal in-structure and in-cabinet amplification factors to determine the in-cabinet response spectrum demand on the relays.

Horizontal in-cabinet response spectrum (Ref. 1.1, p. 4-12, Eq. 4-1a and p. 4-15, Eq. 4-4):

$$ICRS_{c.h} := AF_{SH}(h_{relay}) \cdot AF_{c.h}(cab) \cdot SA_{GMRS} = 1.205 \cdot g$$

Note that the horizontal seismic demand is same for both relay components 1E51A-K32 and 1E51A-K33.

8 ANALYSIS (cont'd)

8.2 High-Frequency Seismic Demand (cont'd)

8.2.2 Vertical Seismic Demand

Determine the peak acceleration of the horizontal GMRS between 15 Hz and 40 Hz.

Peak acceleration of horizontal GMRS between 15 Hz and 40 Hz (see Sect. 8.2.1 of this calculation) $SA_{GMRS} = 0.574 \cdot g$ (at 15 Hz)

Obtain the peak ground acceleration (PGA) of the horizontal GMRS from Ref. 2.1 (see Attachment B of this calculation).

$$PGA_{GMRS} := 0.317g$$

Calculate the shear wave velocity traveling from a depth of 30m to the surface of the site (V_{s30}) from Ref. 1.1, p. 3-5 and Attachment D.

Shear Wave Velocity:

$$V_{s30} = \frac{(30m)}{\Sigma\left(\frac{d_i}{V_{si}}\right)}$$

where,
d_i: Thickness of the layer (ft)
V_{si}: Shear wave velocity of the layer (ft/s)

Per Attachment D, the sum of thickness of the layer over shear wave velocity of the layer is 0.1208 sec.

Shear Wave Velocity:

$$V_{s30} := \frac{30m}{0.1208sec} = 815 \cdot \frac{ft}{sec}$$

8 ANALYSIS (cont'd)

8.2 High-Frequency Seismic Demand (cont'd)

8.2.2 Vertical Seismic Demand (cont'd)

Work the PGA and shear wave velocity with Ref. 1.1, Table 3-1 to determine the soil class of the site. Based on the PGA of 0.317g and shear wave velocity of 815ft/sec at LaSalle County Generating Station (LAS), the site soil class is C-Soft.

Work the site soil class with Ref. 1.1, Table 3-2 to determine the mean vertical vs. horizontal GMRS ratios (V/H) at each spectral frequency. Multiply the V/H ratio at each frequency between 15Hz and 40Hz by the corresponding horizontal GMRS acceleration at each frequency between 15Hz and 40Hz to calculate the vertical GMRS.

See Attachment B for a table that calculates the vertical GMRS (equal to (V/H) x horizontal GMRS) between 15Hz and 40Hz.

Determine the peak acceleration of the vertical GMRS (SA_{VGMRS}) between frequencies of 15Hz and 40Hz. (By inspection of Attachment B, the SA_{VGMRS} occurs at 40Hz.)

V/H ratio at 40Hz (See Attachment B of this calculation): $VH := 1.23$

Horizontal GMRS at frequency of peak vertical GMRS (at 40Hz) (See Attachment B of this calculation): $HGMRS := 0.404g$

Peak acceleration of vertical GMRS between 15 Hz and 40 Hz: $SA_{VGMRS} := VH \cdot HGMRS = 0.497 \cdot g$ (at 40 Hz)

A plot of horizontal and vertical GMRS is provided in Attachment C of this calculation.

8 ANALYSIS (cont'd)

8.2 High-Frequency Seismic Demand (cont'd)

8.2.2 Vertical Seismic Demand (cont'd)

Calculate the vertical in-structure amplification factor based on the distance between the plant foundation elevation and the subject floor elevation.

Distance between relay floor and foundation (see Sect. 8.2.1 of this calculation): $h_{relay} = 75.00 \cdot ft$

Work the distance between the relay floor and foundation with Ref. 1.1, Fig. 4-4 to calculate the vertical in-structure amplification factor.

Slope of amplification factor line: $m_V := \frac{2.7 - 1.0}{100ft - 0ft} = 0.017 \cdot \frac{1}{ft}$

Intercept of amplification factor line: $b_V := 1.0$

Vertical in-structure amplification factor: $AF_{SV} := m_V \cdot h_{relay} + b_V = 2.275$

Per Ref. 3.2, the host component 1H13-P618 is rigid in the 1Hz to 35Hz range. The sample relay components 1E51A-K32 and 1E51A-K33 are mounted within host 1H13-P618. Therefore, the vertical in-cabinet amplification for sample relay components is 1.0.

Vertical in-cabinet amplification factor: $AF_{c.v} := 1.0$

Multiply the peak vertical GMRS acceleration between by the vertical in-structure and in-cabinet amplification factors to determine the in-cabinet response spectrum demand on the relay.

Vertical in-cabinet response spectrum (Ref. 1.1, p. 4-12, Eq. 4-1b and p. 4-15, Eq. 4-4):

$ICRS_{c.v} := AF_{SV} \cdot AF_{c.v} \cdot SA_{VGMRS} = 1.13 \cdot g$

Note that the vertical seismic demand is same for both relay components 1E51A-K32 and 1E51A-K33.

8 ANALYSIS (cont'd)

8.3 High-Frequency Seismic Capacity for Ref. 1.1 Relays

A sample calculation for the high-frequency seismic capacity of 1E51A-K32 and 1E51A-K33 relay components are presented here. A table that calculates the high-frequency seismic capacities for all of the Ref. 1.1 subject relays listed in Section 1, Table 1.1 of this calculation is provided in Attachment A of this calculation.

8.3.1 Seismic Test Capacity

The high frequency seismic capacity of a relay can be determined from the Ref. 1.2 high-frequency testing program or other broad banded low frequency capacity data such as the Generic Equipment Ruggedness Spectra (GERS). Per Ref. 1.1, Sect. 4.5.2, a conservative estimate of the high-frequency (i.e., 20Hz to 40Hz) capacity can be made by extending the low frequency GERS capacity into the high frequency range to a roll off frequency of about 40Hz. Therefore, if the high frequency capacity was not available for a component, a SA_T value equal to the GERS spectral acceleration from 4 to 16 Hz could be used.

For the relay component 1E51A-K32, this model of relay was not tested as part of the Ref. 1.2 high-frequency testing program; therefore, GERS spectral acceleration from Ref. 1.6, Table 3-1 is used as the seismic test capacity.

For the relay component 1E51A-K33, this model of relay was tested as part of the Ref. 1.2 high-frequency testing program; therefore, test result from Ref. 1.2 is used as the seismic test capacity.

Seismic test capacity (SA*):

$$SA' := \begin{pmatrix} 5.10 \\ 15.80 \end{pmatrix} g \qquad \begin{pmatrix} \text{1E51A-K32 (Ref. 1.6, Table 3-1)} \\ \text{1E51A-K33 (Ref. 1.2, Table 5-12)} \end{pmatrix}$$

8.3.2 Effective Spectral Test Capacity

Relay 1E51A-K33 was tested as part of Ref. 1.2 and tested to the relay's fragility threshold. Per Ref. 1.1, p. 4-16, add half of the test level increment of 1.25g to the seismic test capacity to calculate the effective spectral test capacity.

GERS spectral acceleration for the relay component 1E51A-K32 is used as the seismic test capacity. Therefore for the relay component 1E51A-K32 there is no spectral acceleration increase.

Effective spectral test capacity (Ref. 1.1, p. 4-16):

$$SA_T := \begin{bmatrix} SA'_1 \\ SA'_2 + \left(\frac{1.25g}{2}\right) \end{bmatrix} = \begin{pmatrix} 5.10 \\ 16.43 \end{pmatrix} \cdot g \qquad \begin{pmatrix} \text{1E51A-K32} \\ \text{1E51A-K33} \end{pmatrix}$$

8 ANALYSIS (cont'd)

8.3 High-Frequency Seismic Capacity for Ref. 1.1 Relays (cont'd)

8.3.3 Seismic Capacity Knockdown Factor

Determine the seismic capacity knockdown factor for the subject relay based on the type of testing used to determine the seismic capacity of the relay.

The knockdown factor for relay 1E51A-K32 is obtained per Ref. 1.1, Table 4-2. Relay 1E51A-K33 was tested to the EPRI High Frequency Test Program (Ref. 1.2) and tested to its fragility threshold. Work this information with Ref. 1.1, Table 4-2 to obtain the knockdown factor.

Seismic capacity knockdown factor: $F_k := \begin{pmatrix} 1.50 \\ 1.56 \end{pmatrix}$ $\begin{pmatrix} \text{1E51A-K32 (Ref. 1.1, Table 4-2)} \\ \text{1E51A-K33 (Ref. 1.1, Table 4-2)} \end{pmatrix}$

8.3.4 Seismic Testing Single-Axis Correction Factor

Determine the seismic testing single-axis correction factor of the subject relay, which is based on whether the equipment housing to which the relay is mounted has well-separated horizontal and vertical motion or not.

Per Ref. 1.1, pp. 4-17 to 4-18, relays mounted within cabinets that are braced, bolted together in a row, mounted to both floor and wall, etc. will have a correction factor of 1.00. Relays mounted within cabinets that are bolted only to the floor or otherwise not well-braced will have a correction factor of 1.2.

The sample relay components 1E51A-K32 and 1E51A-K33 are mounted within host 1H13-P618. Per Ref. 1.1, pp. 4-18, conservatively take the F_{MS} value as 1.0.

Single-axis correction factor (Ref. 1.1, pp. 4-17 to 4-18): $F_{MS} := 1.0$

8 ANALYSIS (cont'd)

8.3 High-Frequency Seismic Capacity for Ref. 1.1 Relays (cont'd)

8.3.5 Effective Wide-Band Component Capacity Acceleration

Calculate the effective wide-band component capacity acceleration of relay components 1E51A-K32 and 1E51A-K33 per Ref. 1.1, Eq. 4-5.

Effective wide-band component capacity acceleration (Ref. 1.1, Eq. 4-5)

$$TRS := \left(\frac{SA_T}{F_k}\right) \cdot F_{MS} = \begin{pmatrix} 3.400 \\ 10.529 \end{pmatrix} \cdot g \qquad \begin{pmatrix} \text{1E51A-K32} \\ \text{1E51A-K33} \end{pmatrix}$$

8.4 High-Frequency Seismic Capacity for Ref. 1.4, Appendix H Relays

8.4.1 Effective Wide-Band Component Capacity Acceleration

Per a review of the capacity generation methodologies of Ref. 1.1 and Ref. 1.4, App. H, Section H.5, the capacity of a Ref. 1.4 relay is equal to the Ref. 1.1 effective wide-band component capacity multiplied by a factor accounting for the difference between a 1% probability of failure ($C_{1\%}$, Ref. 1.1) and a 10% probability of failure ($C_{10\%}$, Ref. 1.4).

Per Ref. 1.4, App. H, Table H.1, use the $C_{10\%}$ vs. $C_{1\%}$ ratio from the Realistic Lower Bound Case for relays.

$C_{10\%}$ vs. $C_{1\%}$ ratio

$$C_{10} := 1.36$$

Effective wide-band component capacity acceleration (Ref. 1.4, App. H, Sect. H.5)

$$TRS_{1.4} := TRS \cdot C_{10} = \begin{pmatrix} 4.624 \\ 14.319 \end{pmatrix} \cdot g \qquad \begin{pmatrix} \text{1E51A-K32} \\ \text{1E51A-K33} \end{pmatrix}$$

8 ANALYSIS (cont'd)

8.5 Relay (Ref. 1.1) High-Frequency Margin

Calculate the high-frequency seismic margin for Ref. 1.1 relays per Ref. 1.1, Eq. 4-6.

A sample calculation for the high-frequency seismic demand of relay components 1E51A-K32 and 1E51A-K33 is presented here. A table that calculates the high-frequency seismic margin for all of the subject relays listed in Section 1, Table 1.1 of this calculation is provided in Attachment A of this calculation.

Horizontal seismic margin (Ref. 1.1, Eq. 4-6):

$$\frac{TRS}{ICRS_{c.h}} = \begin{pmatrix} 2.821 \\ 8.735 \end{pmatrix} \quad \begin{matrix} \textbf{> 1.0, O.K.} \\ \textbf{> 1.0, O.K.} \end{matrix} \quad \begin{pmatrix} \text{1E51A-K32} \\ \text{1E51A-K33} \end{pmatrix}$$

Vertical seismic margin (Ref. 1.1, Eq. 4-6):

$$\frac{TRS}{ICRS_{c.v}} = \begin{pmatrix} 3.008 \\ 9.313 \end{pmatrix} \quad \begin{matrix} \textbf{> 1.0, O.K.} \\ \textbf{> 1.0, O.K.} \end{matrix} \quad \begin{pmatrix} \text{1E51A-K32} \\ \text{1E51A-K33} \end{pmatrix}$$

Both the horizontal and vertical seismic margins for the relay components 1E51A-K32 and 1E51A-K33 are greater than 1.00. The sample relays are adequate for high-frequency seismic spectral ground motion for their Ref. 1.1 functions.

8.6 Relay (Ref. 1.4) High-Frequency Margin

Calculate the high-frequency seismic margin for Ref. 1.4 relays per Ref. 1.1, Eq. 4-6.

A sample calculation for the high-frequency seismic demand of relay components 1E51A-K32 and 1E51A-K33 is presented here. A table that calculates the high-frequency seismic margin for all of the subject relays listed in Section 1, Table 1.1 of this calculation is provided in Attachment A of this calculation.

Horizontal seismic margin (Ref. 1.1, Eq. 4-6):

$$\frac{TRS_{1.4}}{ICRS_{c.h}} = \begin{pmatrix} 3.836 \\ 11.879 \end{pmatrix} \quad \begin{matrix} \textbf{> 1.0, O.K.} \\ \textbf{> 1.0, O.K.} \end{matrix} \quad \begin{pmatrix} \text{1E51A-K32} \\ \text{1E51A-K33} \end{pmatrix}$$

Vertical seismic margin (Ref. 1.1, Eq. 4-6):

$$\frac{TRS_{1.4}}{ICRS_{c.v}} = \begin{pmatrix} 4.090 \\ 12.666 \end{pmatrix} \quad \begin{matrix} \textbf{> 1.0, O.K.} \\ \textbf{> 1.0, O.K.} \end{matrix} \quad \begin{pmatrix} \text{1E51A-K32} \\ \text{1E51A-K33} \end{pmatrix}$$

Both the horizontal and vertical seismic margins for the relay components 1E51A-K32 and 1E51A-K33 are greater than 1.00. The sample relays are adequate for high-frequency seismic spectral ground motion for their Ref. 1.4 functions.

B Components Identified for High Frequency Confirmation

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
1	1	1E51A-K032	Timing Control Relay	Core Cooling	Steam Line High Differential Pressure Relay	Agastat	ETR14D3BC2004002	1H13-P618	Rigid	Auxiliary Building	731	GERS	Cap > Dem
2	2	2E51A-K032	Timing Control Relay	Core Cooling	Steam Line High Differential Pressure Relay	Agastat	ETR14D3BC2004002	2H13-P618	Rigid	Auxiliary Building	731	GERS	Cap > Dem
3	1	1E51A-K048	Timing Control Relay	Core Cooling	Steam Line High Differential Pressure Relay	Agastat	ETR14D3BC2004002	1H13-P618	Rigid	Auxiliary Building	731	GERS	Cap > Dem
4	2	2E51A-K048	Timing Control Relay	Core Cooling	Steam Line High Differential Pressure Relay	Agastat	ETR14D3BC2004002	2H13-P618	Rigid	Auxiliary Building	731	GERS	Cap > Dem
5	1	1E51A-K047	Timing Control Relay	Core Cooling	Steam Line High Differential Pressure Relay	Agastat	ETR14D3BC2004002	1H13-P621	Rigid	Auxiliary Building	731	GERS	Cap > Dem
6	2	2E51A-K047	Timing Control Relay	Core Cooling	Steam Line High Differential Pressure Relay	Agastat	ETR14D3BC2004002	2H13-P621	Rigid	Auxiliary Building	731	GERS	Cap > Dem
7	1	1E51A-K033	Auxiliary Relay	Core Cooling	RCIC Isolation Relay	GE	12HFA151A2F	1H13-P618	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
8	2	2E51A-K033	Auxiliary Relay	Core Cooling	RCIC Isolation Relay	GE	12HFA151A2F	2H13-P618	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
9	1	1E51A-K057	Auxiliary Relay	Core Cooling	Reactor Low Pressure Relay	GE	12HFA151A2F	1H13-P618	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
10	2	2E51A-K057	Auxiliary Relay	Core Cooling	Reactor Low Pressure Relay	GE	12HFA151A2F	2H13-P618	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
11	1	1E51A-K058	Auxiliary Relay	Core Cooling	Reactor Low Pressure Relay	GE	12HFA151A2F	1H13-P618	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
12	2	2E51A-K058	Auxiliary Relay	Core Cooling	Reactor Low Pressure Relay	GE	12HFA151A2F	2H13-P618	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
13	1	1E51A-K060	Auxiliary Relay	Core Cooling	RCIC Isolation Relay	GE	12HFA151A2F	1H13-P618	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
14	2	2E51A-K060	Auxiliary Relay	Core Cooling	RCIC Isolation Relay	GE	12HFA151A2F	2H13-P618	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
15	1	1E51A-K015	Auxiliary Relay	Core Cooling	RCIC Isolation Relay	GE	12HFA151A2F	1H13-P621	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
16	2	2E51A-K015	Auxiliary Relay	Core Cooling	RCIC Isolation Relay	GE	12HFA151A2F	2H13-P621	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
17	1	1E51A-K054	Auxiliary Relay	Core Cooling	Reactor Low Pressure Relay	GE	12HFA151A2F	1H13-P621	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
18	2	2E51A-K054	Auxiliary Relay	Core Cooling	Reactor Low Pressure Relay	GE	12HFA151A2F	2H13-P621	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
19	1	1E51A-K055	Auxiliary Relay	Core Cooling	Reactor Low Pressure Relay	GE	12HFA151A2F	1H13-P621	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
20	2	2E51A-K055	Auxiliary Relay	Core Cooling	Reactor Low Pressure Relay	GE	12HFA151A2F	2H13-P621	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
21	1	1B21C-K004A	Auxiliary Relay	RCS/Reactor Vessel Inventory Control	High Drywell Pressure/RPV Low Level Relay	GE	12HFA151A2F	1H13-P628	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
22	2	2B21C-K004A	Auxiliary Relay	RCS/Reactor Vessel Inventory Control	High Drywell Pressure/RPV Low Level Relay	GE	12HFA151A2F	2H13-P628	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
23	1	1B21C-K008A	Auxiliary Relay	RCS/Reactor Vessel Inventory Control	High Drywell Pressure/RPV Low Level Relay	GE	12HFA151A2F	1H13-P628	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
24	2	2B21C-K008A	Auxiliary Relay	RCS/Reactor Vessel Inventory Control	High Drywell Pressure/RPV Low Level Relay	GE	12HFA151A2F	2H13-P628	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
25	1	1B21C-K004B	Auxiliary Relay	RCS/Reactor Vessel Inventory Control	High Drywell Pressure/RPV Low Level Relay	GE	12HFA151A2F	1H13-P631	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
26	2	2B21C-K004B	Auxiliary Relay	RCS/Reactor Vessel Inventory Control	High Drywell Pressure/RPV Low Level Relay	GE	12HFA151A2F	2H13-P631	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
27	1	1B21C-K008B	Auxiliary Relay	RCS/Reactor Vessel Inventory Control	High Drywell Pressure/RPV Low Level Relay	GE	12HFA151A2F	1H13-P631	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
28	2	2B21C-K008B	Auxiliary Relay	RCS/Reactor Vessel Inventory Control	High Drywell Pressure/RPV Low Level Relay	GE	12HFA151A2F	2H13-P631	Rigid	Auxiliary Building	731	EPRI HF Test	Cap > Dem
29	1	1E51A-K039	Auxiliary Relay	Core Cooling	Turbine Exhaust Diaphragm High Pressure Relay	GE	12HMA24A2F	1H13-P618	Rigid	Auxiliary Building	731	GERS	Cap > Dem
30	2	2E51A-K039	Auxiliary Relay	Core Cooling	Turbine Exhaust Diaphragm High Pressure Relay	GE	12HMA24A2F	2H13-P618	Rigid	Auxiliary Building	731	GERS	Cap > Dem
31	1	1E51A-K006	Auxiliary Relay	Core Cooling	Turbine Exhaust High Pressure Relay	GE	12HMA24A2F	1H13-P621	Rigid	Auxiliary Building	731	GERS	Cap > Dem
32	2	2E51A-K006	Auxiliary Relay	Core Cooling	Turbine Exhaust High Pressure Relay	GE	12HMA24A2F	2H13-P621	Rigid	Auxiliary Building	731	GERS	Cap > Dem
33	1	1E51A-K007	Auxiliary Relay	Core Cooling	Pump Suction Low Pressure Relay	GE	12HMA24A2F	1H13-P621	Rigid	Auxiliary Building	731	GERS	Cap > Dem
34	2	2E51A-K007	Auxiliary Relay	Core Cooling	Pump Suction Low Pressure Relay	GE	12HMA24A2F	2H13-P621	Rigid	Auxiliary Building	731	GERS	Cap > Dem
35	1	1E51A-K008	Auxiliary Relay	Core Cooling	Turbine Trip Auxiliary Relay	GE	12HMA24A2F	1H13-P621	Rigid	Auxiliary Building	731	GERS	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
36	2	2E51A-K008	Auxiliary Relay	Core Cooling	Turbine Trip Auxiliary Relay	GE	12HMA24A2F	2H13-P621	Rigid	Auxiliary Building	731	GERS	Cap > Dem
37	1	1E51A-K029	Auxiliary Relay	Core Cooling	Turbine Exhaust Diaphragm High Pressure Relay	GE	12HMA24A2F	1H13-P621	Rigid	Auxiliary Building	731	GERS	Cap > Dem
38	2	2E51A-K029	Auxiliary Relay	Core Cooling	Turbine Exhaust Diaphragm High Pressure Relay	GE	12HMA24A2F	2H13-P621	Rigid	Auxiliary Building	731	GERS	Cap > Dem
39	1	1E31-N022A	Pressure Switch	Core Cooling	Reactor Pressure Switch	SOR	6N6-B5-NX-C1A-JJTTX7	1H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
40	2	2E31-N022A	Pressure Switch	Core Cooling	Reactor Pressure Switch	SOR	6N6-B5-NX-C1A-JJTTX7	2H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
41	1	1E31-N022C	Pressure Switch	Core Cooling	Reactor Pressure Switch	SOR	6N6-B5-NX-C1A-JJTTX7	1H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
42	2	2E31-N022C	Pressure Switch	Core Cooling	Reactor Pressure Switch	SOR	6N6-B5-NX-C1A-JJTTX7	2H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
43	1	1E51-N006	Pressure Switch	Core Cooling	Pump Suction Pressure Switch	SOR	54N6-B118-M9-C1A-JJTTNQ	1H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
44	2	2E51-N006	Pressure Switch	Core Cooling	Pump Suction Pressure Switch	SOR	54N6-B118-NX-C1A-JJTTX7	2H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
45	1	1E51-N009A	Pressure Switch	Core Cooling	Turbine Exhaust Pressure Switch	SOR	6N6-B45-NX-C1A-JJTTX7	1H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
46	2	2E51-N009A	Pressure Switch	Core Cooling	Turbine Exhaust Pressure Switch	SOR	4N6-E45-NX-C1A-TTX6	2H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
47	1	1E51-N009B	Pressure Switch	Core Cooling	Turbine Exhaust Pressure Switch	SOR	6N6-B3-U8-C1A-JJTTNQ	1H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
48	2	2E51-N009B	Pressure Switch	Core Cooling	Turbine Exhaust Pressure Switch	SOR	6N6-B3-U8-C1A-JJTTNQ	2H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
49	1	1E51-N012A	Pressure Switch	Core Cooling	Turbine Exhaust Diaphragm Pressure Switch	SOR	6N6-B2-NX-C1A-JJTTX7	1H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
50	2	2E51-N012A	Pressure Switch	Core Cooling	Turbine Exhaust Diaphragm Pressure Switch	SOR	4N6-E45-NX-C1A-TTX6	2H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
51	1	1E51-N012C	Pressure Switch	Core Cooling	Turbine Exhaust Diaphragm Pressure Switch	SOR	6N6-B2-NX-C1A-JJTTX7	1H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
52	2	2E51-N012C	Pressure Switch	Core Cooling	Turbine Exhaust Diaphragm Pressure Switch	SOR	4N6-E45-NX-C1A-TTX6	2H22-P017	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
53	1	1E31-N022B	Pressure Switch	Core Cooling	Reactor Pressure Switch	SOR	6N6-B5-NX-C1A-JJTTX7	1H22-P029	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
54	2	2E31-N022B	Pressure Switch	Core Cooling	Reactor Pressure Switch	SOR	6N6-B5-NX-C1A-JJTTX7	2H22-P029	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
55	1	1E31-N022D	Pressure Switch	Core Cooling	Reactor Pressure Switch	SOR	6N6-B5-NX-C1A-JJTTX7	1H22-P029	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
56	2	2E31-N022D	Pressure Switch	Core Cooling	Reactor Pressure Switch	SOR	6N6-B5-NX-C1A-JJTTX7	2H22-P029	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
57	1	1E51-N012B	Pressure Switch	Core Cooling	Turbine Exhaust Diaphragm Pressure Switch	SOR	6N6-B2-NX-C1A-JJTTX7	1H22-P029	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
58	2	2E51-N012B	Pressure Switch	Core Cooling	Turbine Exhaust Diaphragm Pressure Switch	SOR	4N6-E45-NX-C1A-TTX6	2H22-P029	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
59	1	1E51-N012D	Pressure Switch	Core Cooling	Turbine Exhaust Diaphragm Pressure Switch	SOR	6N6-B2-NX-C1A-JJTTX7	1H22-P029	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
60	2	2E51-N012D	Pressure Switch	Core Cooling	Turbine Exhaust Diaphragm Pressure Switch	SOR	4N6-E45-NX-C1A-TTX6	2H22-P029	Control Cabinet	Reactor Building	673	LAS Report	Cap > Dem
61	1	PS-1BN21-N039C	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
62	2	PS-2BN21-N039C	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	2H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
63	1	PS-1BN21-N039D	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
64	2	PS-2BN21-N039D	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	2H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
65	1	PS-1BN21-N039E	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
66	2	PS-2BN21-N039E	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	2H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
67	1	PS-1BN21-N039K	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
68	2	PS-2BN21-N039K	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6 / 29N6-B45-U1-C1A-JJTTNQ	2H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
69	1	PS-1BN21-N039P	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
70	2	PS-2BN21-N039P	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	2H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
71	1	PS-1BN21-N039S	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
72	2	PS-2BN21-N039S	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	2H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
73	1	PS-1BN21-N039U	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
74	2	PS-2BN21-N039U	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	2H22-P026	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
75	1	PS-1BN21-N060U	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6 / 29N6-B45-U1-C1A-JJTTNQ	1H22-P075	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
76	1	PS-1BN21-N039CC	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P076	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
77	1	PS-1BN21-N039DD	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P076	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
78	1	PS-1BN21-N039EE	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P076	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
79	1	PS-1BN21-N039KK	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P076	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
80	1	PS-1BN21-N039PP	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P076	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
81	1	PS-1BN21-N039SS	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P076	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
82	1	PS-1BN21-N039UU	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6	1H22-P076	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
83	1	PS-1BN21-N060UU	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	SOR	9N6-B45-NX-C1A-JJTTX6 / 29N6-B45-U1-C1A-JJTTNQ	1H22-P076	Control Cabinet	Reactor Building	761	LAS Report	Cap > Dem
84	1	1B21C-K054A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Relay	Agastat	Type GP	1H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
85	2	2B21C-K054A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Relay	Agastat	Type GP	2H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
86	1	1B21C-K055A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Seal-In Relay	Agastat	Type GP	1H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
87	2	2B21C-K055A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Seal-In Relay	Agastat	Type GP	2H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
88	1	1B21C-K056A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Relay	Agastat	Type GP	1H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
89	2	2B21C-K056A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Relay	Agastat	Type GP	2H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
90	1	1B21C-K057A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Seal-In Relay	Agastat	Type GP	1H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
91	2	2B21C-K057A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Seal-In Relay	Agastat	Type GP	2H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
92	1	1B21C-K066A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013D Solenoid "C" Open Relay	Agastat	Type GP	1H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
93	2	2B21C-K066A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013D Solenoid "C" Open Relay	Agastat	Type GP	2H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
94	1	1B21C-K068A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013S Solenoid "C" Open Relay	Agastat	Type GP	1H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
95	2	2B21C-K068A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013S Solenoid "C" Open Relay	Agastat	Type GP	2H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
96	1	1B21C-K069A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013C Solenoid "C" Open Relay	Agastat	Type GP	1H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
97	2	2B21C-K069A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013C Solenoid "C" Open Relay	Agastat	Type GP	2H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
98	1	1B21C-K070A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013E Solenoid "C" Open Relay	Agastat	Type GP	1H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
99	2	2B21C-K070A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013E Solenoid "C" Open Relay	Agastat	Type GP	2H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
100	1	1B21C-K071A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013K Solenoid "C" Open Relay	Agastat	Type GP	1H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
101	2	2B21C-K071A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013K Solenoid "C" Open Relay	Agastat	Type GP	2H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
102	1	1B21C-K072A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013P Solenoid "C" Open Relay	Agastat	Type GP	1H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
103	2	2B21C-K072A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013P Solenoid "C" Open Relay	Agastat	Type GP	2H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
104	1	1B21C-K075A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013U Solenoid "C" Open Relay	Agastat	Type GP	1H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
105	2	2B21C-K075A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013U Solenoid "C" Open Relay	Agastat	Type GP	2H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
106	1	1B21C-K076A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Seal-In Relay	Agastat	Type GP	1H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
107	2	2B21C-K076A	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Seal-In Relay	Agastat	Type GP	2H13-P644	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
108	1	1B21C-K054B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Relay	Agastat	Type GP	1H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
109	2	2B21C-K054B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Relay	Agastat	Type GP	2H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
110	1	1B21C-K055B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Seal-In Relay	Agastat	Type GP	1H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
111	2	2B21C-K055B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Seal-In Relay	Agastat	Type GP	2H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
112	1	1B21C-K056B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Relay	Agastat	Type GP	1H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
113	2	2B21C-K056B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Relay	Agastat	Type GP	2H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
114	1	1B21C-K057B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Seal-In Relay	Agastat	Type GP	1H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
115	2	2B21C-K057B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Seal-In Relay	Agastat	Type GP	2H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
116	1	1B21C-K066B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013D Solenoid "B" Open Relay	Agastat	Type GP	1H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
117	2	2B21C-K066B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013D Solenoid "B" Open Relay	Agastat	Type GP	2H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
118	1	1B21C-K068B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013S Solenoid "B" Open Relay	Agastat	Type GP	1H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
119	2	2B21C-K068B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013S Solenoid "B" Open Relay	Agastat	Type GP	2H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
120	1	1B21C-K069B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013C Solenoid "B" Open Relay	Agastat	Type GP	1H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
121	2	2B21C-K069B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013C Solenoid "B" Open Relay	Agastat	Type GP	2H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
122	1	1B21C-K070B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013E Solenoid "B" Open Relay	Agastat	Type GP	1H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
123	2	2B21C-K070B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013E Solenoid "B" Open Relay	Agastat	Type GP	2H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
124	1	1B21C-K071B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013K Solenoid "B" Open Relay	Agastat	Type GP	1H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
125	2	2B21C-K071B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013K Solenoid "B" Open Relay	Agastat	Type GP	2H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
126	1	1B21C-K072B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013P Solenoid "B" Open Relay	Agastat	Type GP	1H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
127	2	2B21C-K072B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013P Solenoid "B" Open Relay	Agastat	Type GP	2H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
128	1	1B21C-K075B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 1B21-F013U Solenoid "B" Open Relay	Agastat	Type GP	1H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
129	2	2B21C-K075B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	Valve 2B21-F013U Solenoid "B" Open Relay	Agastat	Type GP	2H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
130	1	1B21C-K076B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Seal-In Relay	Agastat	Type GP	1H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
131	2	2B21C-K076B	Timing Control Relay	RCS/Reactor Vessel Inventory Control	ADS Low-Low Set Seal-In Relay	Agastat	Type GP	2H13-P645	Control Cabinet	Auxiliary Building	731	Qualification Test	Cap > Dem
132	1	1E31A-K002A	Relay	Core Cooling	Steam Leak Detection Relay	Agastat	Type GP	1H13-P632	Control Cabinet	Auxiliary Building	768	Qualification Test	Cap > Dem
133	2	2E31A-K002A	Relay	Core Cooling	Steam Leak Detection Relay	Agastat	Type GP	2H13-P632	Control Cabinet	Auxiliary Building	768	Qualification Test	Cap > Dem
134	1	1E31A-K002B	Relay	Core Cooling	Steam Leak Detection Relay	Agastat	Type GP	1H13-P642	Control Cabinet	Auxiliary Building	768	Qualification Test	Cap > Dem
135	2	2E31A-K002B	Relay	RCS/Reactor Vessel Inventory Control	Steam Leak Detection Relay	Agastat	Type GP	2H13-P642	Control Cabinet	Auxiliary Building	768	Qualification Test	Cap > Dem
136	2	PS-2BN21-N060U	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	Barksdale	B1T-M12SS-GE	2H22-P075	Control Cabinet	Reactor Building	761	SQURTS Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
137	2	PS-2BN21-N039CC	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	Barksdale	B1T-M12SS-GE	2H22-P076	Control Cabinet	Reactor Building	761	SQURTS Test	Cap > Dem
138	2	PS-2BN21-N039DD	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	Barksdale	B1T-M12SS-GE	2H22-P076	Control Cabinet	Reactor Building	761	SQURTS Test	Cap > Dem
139	2	PS-2BN21-N039EE	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	Barksdale	B1T-M12SS-GE	2H22-P076	Control Cabinet	Reactor Building	761	SQURTS Test	Cap > Dem
140	2	PS-2BN21-N039KK	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	Barksdale	B1T-M12SS-GE	2H22-P076	Control Cabinet	Reactor Building	761	SQURTS Test	Cap > Dem
141	2	PS-2BN21-N039PP	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	Barksdale	B1T-M12SS-GE	2H22-P076	Control Cabinet	Reactor Building	761	SQURTS Test	Cap > Dem
142	2	PS-2BN21-N039SS	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	Barksdale	B1T-M12SS-GE	2H22-P076	Control Cabinet	Reactor Building	761	SQURTS Test	Cap > Dem
143	2	PS-2BN21-N039UU	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	Barksdale	B1T-M12SS-GE	2H22-P076	Control Cabinet	Reactor Building	761	SQURTS Test	Cap > Dem
144	2	PS-2BN21-N060UU	Pressure Switch	RCS/Reactor Vessel Inventory Control	RPV High Pressure Switch	Barksdale	B1T-M12SS-GE	2H22-P076	Control Cabinet	Reactor Building	761	SQURTS Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
145	1	42-O/1E12-F016A	Contactor	RCS/Reactor Vessel Inventory Control	Valve 1E12-F016A Opening Contactor	N/A	N/A	135Y-2 (1AP76E)	Motor Control Center	Reactor Building	710	LAS Report	Cap > Dem
146	1	42-O/1E12-F017A	Contactor	RCS/Reactor Vessel Inventory Control	Valve 1E12-F017A Opening Contactor	N/A	N/A	135Y-2 (1AP76E)	Motor Control Center	Reactor Building	710	LAS Report	Cap > Dem
147	1	42-O/1E12-F016B	Contactor	RCS/Reactor Vessel Inventory Control	Valve 1E12-F016B Opening Contactor	N/A	N/A	136Y-1 (1AP82E)	Motor Control Center	Reactor Building	710	LAS Report	Cap > Dem
148	1	42-O/1E12-F017B	Contactor	RCS/Reactor Vessel Inventory Control	Valve 1E12-F017B Opening Contactor	N/A	N/A	136Y-1 (1AP82E)	Motor Control Center	Reactor Building	710	LAS Report	Cap > Dem
149	1	42-O/1E12-F009	Contactor	RCS/Reactor Vessel Inventory Control	Valve 1E12-F009 Opening Contactor	N/A	N/A	136Y-1 (1AP82E)	Motor Control Center	Reactor Building	710'-6"	LAS Report	Cap > Dem
150	1	CR1/1E12-F009	Relay	RCS/Reactor Vessel Inventory Control	Valve 1E12-F009 Opening Relay	N/A	N/A	136Y-1 (1AP82E)	Motor Control Center	Reactor Building	710'-6"	LAS Report	Cap > Dem
151	1	42-O/1E12-F008	Contactor	RCS/Reactor Vessel Inventory Control	Valve 1E12-F008 Opening Contactor	N/A	N/A	135X-1 (1AP71E)	Motor Control Center	Reactor Building	761	LAS Report	Cap > Dem
152	2	42-O/2E12-F016A	Contactor	RCS/Reactor Vessel Inventory Control	Valve 2E12-F016A Opening Contactor	N/A	N/A	2AP76E	Motor Control Center	Reactor Building	710'-6"	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
153	2	42-O/2E12-F017A	Contactor	RCS/Reactor Vessel Inventory Control	Valve 2E12-F017A Opening Contactor	N/A	N/A	2AP76E	Motor Control Center	Reactor Building	710'-6"	LAS Report	Cap > Dem
154	2	42-O/2E12-F016B	Contactor	RCS/Reactor Vessel Inventory Control	Valve 2E12-F016B Opening Contactor	N/A	N/A	2AP82E	Motor Control Center	Reactor Building	710'-6"	LAS Report	Cap > Dem
155	2	42-O/2E12-F017B	Contactor	RCS/Reactor Vessel Inventory Control	Valve 2E12-F017B Opening Contactor	N/A	N/A	2AP82E	Motor Control Center	Reactor Building	710'-6"	LAS Report	Cap > Dem
156	2	42-O/2E12-F009	Contactor	RCS/Reactor Vessel Inventory Control	Valve 2E12-F009 Opening Contactor	N/A	N/A	2AP82E	Motor Control Center	Reactor Building	710'-6"	LAS Report	Cap > Dem
157	2	CR1/2E12-F009	Relay	RCS/Reactor Vessel Inventory Control	Valve 2E12-F009 Opening Relay	N/A	N/A	2AP82E	Motor Control Center	Reactor Building	710'-6"	LAS Report	Cap > Dem
158	2	42-O/2E12-F008	Contactor	RCS/Reactor Vessel Inventory Control	Valve 2E12-F008 Opening Contactor	N/A	N/A	2AP71E	Motor Control Center	Reactor Building	761	LAS Report	Cap > Dem
159	0	86DG0 / 0HS-DGS003A	Auxiliary Relay	AC/DC Power Support Systems	DG 0 Lockout Relay	GE	Type HEA	0DG02JB	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
160	1	86DG1A / 1HS-DGS003A	Auxiliary Relay	AC/DC Power Support Systems	DG 1A Lockout Relay	GE	Type HEA	1DG02JB	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
161	1	1E22-K015	Auxiliary Relay	AC/DC Power Support Systems	DG 1B Engine Fault Lockout Relay	GE	Type HEA	1E22-P301B	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
162	1	1E22-K001	Auxiliary Relay	AC/DC Power Support Systems	DG 1B Generator Fault Lockout Relay	GE	Type HEA	1E22-P028 (1H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
163	2	86DG2A / 2HS-DGS003A	Auxiliary Relay	AC/DC Power Support Systems	DG 2A Lockout Relay	GE	SBM-12HEA61C236X2	2DG02JB	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
164	2	2E22-K015	Lockout Relay	AC/DC Power Support Systems	DG 2B Engine Fault Lockout Relay	GE	12HEA62B234X2	2E22-P301B	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
165	2	2E22-K001	Lockout Relay	AC/DC Power Support Systems	DG 2B Generator Fault Lockout Relay	GE	Type HEA	2E22-P028 (2H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
166	0	K10 / 0DGK010	Rotary Relay	AC/DC Power Support Systems	DG 0 Overspeed Relay	P & B	MDR-137-8	0DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
167	0	87X / 0DG087	Auxiliary Relay	AC/DC Power Support Systems	DG 0 Differential Overcurrent Auxiliary Relay	P & B	MDR-137-8	0DG02JB	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
168	0	81X / 0DG081X	Auxiliary Relay	AC/DC Power Support Systems	DG 0 Frequency Relay	P & B	MDR-137-8	0DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
169	0	K9 / 0DGK009	Auxiliary Relay	AC/DC Power Support Systems	DG 0 Failure to Start Relay	P & B	MDR-137-8	0DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
170	0	K11 / 0DGK011	Auxiliary Relay	AC/DC Power Support Systems	DG 0 Low Oil Pressure Relay	P & B	MDR-137-8	0DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
171	0	K12 / 0DGK012	Auxiliary Relay	AC/DC Power Support Systems	DG 0 Oil Temperature Relay	P & B	MDR-137-8	0DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
172	0	K25 / 0DGK025	Auxiliary Relay	AC/DC Power Support Systems	DG 0 Field Excitation Failure Relay	P & B	MDR-137-8	0DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
173	1	K10 / 1DGK010	Rotary Relay	AC/DC Power Support Systems	DG 1A Overspeed Relay	P & B	MDR-137-8	1DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
174	1	87X / 1DG087	Auxiliary Relay	AC/DC Power Support Systems	DG 1A Differential Overcurrent Auxiliary Relay	P & B	MDR-137-8	1DG02JB	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
175	1	81X / 1DG081X	Auxiliary Relay	AC/DC Power Support Systems	DG 1A Frequency Relay	P & B	MDR-137-8	1DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
176	1	K9 / 1DGK009	Auxiliary Relay	AC/DC Power Support Systems	DG 1A Failure to Start Relay	P & B	MDR-137-8	1DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
177	1	K11 / 1DGK011	Auxiliary Relay	AC/DC Power Support Systems	DG 1A Low Oil Pressure Relay	P & B	MDR-137-8	1DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
178	1	K12 / 1DGK012	Auxiliary Relay	AC/DC Power Support Systems	DG 1A Low Oil Temperature Relay	P & B	MDR-137-8	1DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
179	1	K25 / 1DGK025	Auxiliary Relay	AC/DC Power Support Systems	DG 1A Field Excitation Failure Auxiliary Relay	P & B	MDR-137-8	1DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
180	1	K10 / 1E22-K010	Overspeed Relay	AC/DC Power Support Systems	DG 1B Overspeed Relay	P & B	MDR-131-1	1E22-P301B	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
181	1	K9 / 1E22-K009	Auxiliary Relay	AC/DC Power Support Systems	DG 1B Failure to Start Relay	P & B	MDR-131-1	1E22-P301B	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
182	1	K11 / 1E22-K011	Auxiliary Relay	AC/DC Power Support Systems	DG 1B Low Oil Pressure Relay	P & B	MDR-131-1	1E22-P301B	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
183	1	K12 / 1E22-K012	Auxiliary Relay	AC/DC Power Support Systems	DG 1B Low Oil Temperature Relay	P & B	MDR-131-1	1E22-P301B	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
184	2	K10 / 2DGK010	Rotary Relay	AC/DC Power Support Systems	DG 2A Overspeed Relay	P & B	MDR-137-8	2DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
185	2	87X / 2DG087	Auxiliary Relay	AC/DC Power Support Systems	DG 2A Differential Overcurrent Auxiliary Relay	P & B	MDR-137-8	2DG02JB	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
186	2	81X / 2DG081X	Auxiliary Relay	AC/DC Power Support Systems	DG 2A Frequency Relay	P & B	MDR-137-8	2DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
187	2	K9 / 2DGK009	Auxiliary Relay	AC/DC Power Support Systems	DG 2A Failure to Start Relay	P & B	MDR-137-8	2DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
188	2	K11 / 2DGK011	Auxiliary Relay	AC/DC Power Support Systems	DG 2A Low Oil Pressure Relay	P & B	MDR-137-8	2DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
189	2	K12 / 2DGK012	Auxiliary Relay	AC/DC Power Support Systems	DG 2A Low Oil Temperature Relay	P & B	MDR-137-8	2DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
190	2	K25 / 2DGK025	Auxiliary Relay	AC/DC Power Support Systems	DG 2A Field Excitation Failure Relay	P & B	MDR-137-8	2DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
191	0	S8 / 0STS-DG076	Speed Switch	AC/DC Power Support Systems	DG 0 Overspeed Switch	Stewart & Stevenson	81381-D-STC-4240	0DG02JB	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
192	1	S8 / 1STS-DG076	Speed Switch	AC/DC Power Support Systems	DG 1A Overspeed Switch	Synchro-Start	ESSB-4AT	1DG02JB	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
193	1	S8 / 1E22-J901	Overspeed Switch	AC/DC Power Support Systems	DG 1B Overspeed Switch	Stewart & Stevenson	81381-D-STC-4240	1E22-P301B	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
194	2	S8 / 2STS-DG076	Speed Switch	AC/DC Power Support Systems	DG 2A Overspeed Switch	GE	81381-D-STC-4240	2DG02JB	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
195	2	S8 /2E22-J901	Overspeed Switch	AC/DC Power Support Systems	DG 2B Overspeed Switch	Stewart & Stevenson	81381-D-STC-4240	2E22-P301B	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
196	0	87 / 0DG008	Auxiliary Relay	AC/DC Power Support Systems	DG 0 Differential Overcurrent Relay	ABB	SA-1	0DG02JA	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
197	1	87 / 1DG008	Auxiliary Relay	AC/DC Power Support Systems	DG 1A Differential Overcurrent Relay	ABB	SA-1	1DG02JA	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
198	2	87 / 2DG008	Auxiliary Relay	AC/DC Power Support Systems	DG 2A Differential Overcurrent Relay	ABB	SA-1	2DG02JA	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
199	0	K59X1 / 0DGK059X	Auxiliary Relay	AC/DC Power Support Systems	DG 0 Neutral Ground Auxiliary Relay	GE	12HMA11B6	0DG02JA	Control Panel	Diesel Generator Building	710'-6"	Qualification Test	Cap > Dem
200	0	K32X / 0DGK032X	Auxiliary Relay	AC/DC Power Support Systems	DG 1A Reverse Power Auxiliary Relay	GE	12HMA11B6	0DG02JA	Control Panel	Diesel Generator Building	710'-6"	Qualification Test	Cap > Dem
201	1	K59X1 / 1DGK059X	Auxiliary Relay	AC/DC Power Support Systems	DG 1A Neutral Ground Auxiliary Relay	GE	12HMA11B6	1DG02JA	Control Panel	Diesel Generator Building	710'-6"	Qualification Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
202	1	K32X / 1DG032	Auxiliary Relay	AC/DC Power Support Systems	DG 1A Reverse Power Auxiliary Relay	GE	12HMA11B6	1DG02JA	Control Panel	Diesel Generator Building	710'-6"	Qualification Test	Cap > Dem
203	2	K32X / 2DGK32X	Auxiliary Relay	AC/DC Power Support Systems	DG 2A Reverse Power Auxiliary Relay	GE	12HMA11B6	2DG02JA	Control Panel	Diesel Generator Building	710'-6"	Qualification Test	Cap > Dem
204	0	59 / 0DG005	Overvoltage Relay	AC/DC Power Support Systems	DG 0 Neutral Ground Relay	GE	12IAV51D1A	0DG02JA	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
205	1	59 / 1DG012	Overvoltage Relay	AC/DC Power Support Systems	DG 1A Neutral Ground Relay	GE	12IAV51D1A	1DG02JA	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
206	2	59 / 2DG012	Overvoltage Relay	AC/DC Power Support Systems	DG 2A Neutral Ground Relay	GE	IAV51D	2DG02JA	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
207	0	51VX / 0DG051VX	Time Relay	AC/DC Power Support Systems	DG 0 Overcurrent Auxiliary Relay	Agastat / Amerace	7012PB	0DG03J	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
208	0	K39 / 0DGK039	Time Relay	AC/DC Power Support Systems	DG 0 Failure to Start Time Delay Relay	Agastat	E7012PD002	0DG03J	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
209	0	K33 / 0DGK033	Time Relay	AC/DC Power Support Systems	DG 0 Engine Start Time Delay Relay	Agastat / Amerace	7012PE	0DG03J	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
210	1	51VX / 1DG051VX	Time Relay	AC/DC Power Support Systems	DG 1A Overcurrent Relay	Agastat / Amerace	7012P4	1DG03J	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
211	1	K39 / 1DGK039	Time Relay	AC/DC Power Support Systems	DG 1A Failure to Start Time Delay Relay	Agastat	E7012PD002	1DG03J	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
212	1	K33 / 1DGK033	Time Relay	AC/DC Power Support Systems	DG 1A Engine Start Time Delay Relay	Agastat / Amerace	7012PE	1DG03J	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
213	1	K39 / 1E22-K039	Time Delay Relay	AC/DC Power Support Systems	DG 1B Failure to Start Time Delay Relay	Agastat	E7012PD002	1E22-P301B	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
214	1	K33 / 1E22-K033	Time Delay Relay	AC/DC Power Support Systems	DG 1B Engine Start Time Delay Relay	Agastat	E7012PD	1E22-P301B	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
215	1	K6 / 1E22B-K006	Time Delay Relay	AC/DC Power Support Systems	DG 1B Time Delay Relay	Agastat	Model 7012	1E22-P028 (1H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	GERS	Cap > Dem
216	2	51VX / 2DG051VX	Time Relay	AC/DC Power Support Systems	DG 2A Overcurrent Relay	Agastat / Amerace	Model 7012	2DG03J	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
217	2	K39 / 2DGK039	Time Relay	AC/DC Power Support Systems	DG 2A Failure to Start Time Delay Relay	Amerace / Agastat	E7012PD002	2DG03J	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
218	2	K33 / 2DGK033	Time Delay Relay	AC/DC Power Support Systems	DG 2A Engine Start Time Delay Relay	Agastat	7012PE	2DG03J	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
219	2	K39 / 2E22-K039	Time Delay Relay	AC/DC Power Support Systems	DG 2B Failure to Start Time Delay Relay	Amerace / Agastat	E7012PD002	2E22-P301B	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
220	2	K33 / 2E22-K033	Time Delay Relay	AC/DC Power Support Systems	DG 2B Engine Start Time Delay Relay	Amerace / Agastat	7012PD	2E22-P301B	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
221	2	K6 / 2E22B-K006	Time Delay Relay	AC/DC Power Support Systems	DG 2B Time Delay Relay	Amerace / Agastat	Model 7012	2E22-P028 (2H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	GERS	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
222	1	S11 / 1E22-N517	Temperature Switch	AC/DC Power Support Systems	DG 2A Oil Temperature Switch	Square D	9025-BGW-22S9 Series	1E22-P301B	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
223	2	S11 / 2E22-N517	Temperature Switch	AC/DC Power Support Systems	DG 2B Oil Temperature Switch	Square D	9025 Model	2E22-P301B	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
224	0	32 / 0DG002	Power Relay	AC/DC Power Support Systems	DG 0 Reverse Power Relay	GE	12ICW51A2A	0DG02JA	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
225	1	32 / 1DG009	Power Relay	AC/DC Power Support Systems	DG 1A Reverse Power Relay	GE	12ICW51A2A	1DG02JA	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
226	2	32 / 2DG009	Power Relay	AC/DC Power Support Systems	DG 2A Reverse Power Relay	GE	12ICW51A2A	2DG02JA	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
227	0	40 (1440-DG003)	Protective Relay	AC/DC Power Support Systems	DG 0 Field Excitation	GE	Type CEH	0DG02JA	Control Panel	Diesel Generator Building	710'-6"	N/A	Operator Action
228	1	40 (1440-DG010)	Protective Relay	AC/DC Power Support Systems	DG 1A Field Excitation	GE	Type CEH	1DG02JA	Control Panel	Diesel Generator Building	710'-6"	N/A	Operator Action
229	2	40 (2440-DG010)	Protective Relay	AC/DC Power Support Systems	DG 2A Field Excitation	GE	Type CEH	2DG02JA	Control Panel	Diesel Generator Building	710'-6"	N/A	Operator Action
230	1	K30A (1487-DG1B)	Differential Overcurrent Relay	AC/DC Power Support Systems	DG 1B Differential Overcurrent Relay	GE	12PVD21B1A	1E22-P028 (1H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
231	1	K30B (1487-DG1B)	Differential Overcurrent Relay	AC/DC Power Support Systems	DG 1B Differential Overcurrent Relay	GE	12PVD21B1A	1E22-P028 (1H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
232	1	K30C (1487-DG1B)	Differential Overcurrent Relay	AC/DC Power Support Systems	DG 1B Differential Overcurrent Relay	GE	12PVD21B1A	1E22-P028 (1H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
233	2	K30A (2487-DG2B)	Differential Overcurrent Relay	AC/DC Power Support Systems	DG 2B Differential Overcurrent Relay	GE	12PVD21B1A	2E22-P028 (2H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
234	2	K30B (2487-DG2B)	Differential Overcurrent Relay	AC/DC Power Support Systems	DG 2B Differential Overcurrent Relay	GE	12PVD21B1A	2E22-P028 (2H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
235	2	K30C (2487-DG2B)	Differential Overcurrent Relay	AC/DC Power Support Systems	DG 2B Differential Overcurrent Relay	GE	12PVD21B1A	2E22-P028 (2H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
236	0	S11 / 0TS-DG041	Temperature Switch	AC/DC Power Support Systems	DG 0 Oil Temperature Switch	Square D	9025-BCW-32	0DG01K	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
237	1	S11 / 1TS-DG041	Temperature Switch	AC/DC Power Support Systems	DG 1A Oil Temperature Switch	Square D	9025-BCW-32	1DG01K	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
238	2	S11 / 2TS-DG041	Temperature Switch	AC/DC Power Support Systems	DG 1B Oil Temperature Switch	Square D	9025-BCW-32	2DG01K	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
239	0	51V (1451-DG015A)	Overcurrent Relay	AC/DC Power Support Systems	DG 0 Overcurrent Relay Phase A	GE	IJCV-51B	0DG02JA	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
240	0	51V (1451-DG015B)	Overcurrent Relay	AC/DC Power Support Systems	DG 0 Overcurrent Relay Phase B	GE	IJCV-51B	0DG02JA	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
241	0	51V (1451-DG015C)	Overcurrent Relay	AC/DC Power Support Systems	DG 0 Overcurrent Relay Phase C	GE	IJCV-51B	0DG02JA	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
242	1	51V (1451-DG016A)	Overcurrent Relay	AC/DC Power Support Systems	DG 1A Overcurrent Relay Phase A	GE	IJCV-51B	1DG02JA	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
243	1	51V (1451-DG016B)	Overcurrent Relay	AC/DC Power Support Systems	DG 1A Overcurrent Relay Phase B	GE	IJCV-51B	1DG02JA	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
244	1	51V (1451-DG016C)	Overcurrent Relay	AC/DC Power Support Systems	DG 1A Overcurrent Relay Phase C	GE	IJCV-51B	1DG02JA	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
245	1	K35A (1451V-DG1B)	Overcurrent Relay	AC/DC Power Support Systems	DG 1B Overcurrent Relay	GE	12IJCV51B21A	1E22-P028 (1H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	GERS	Cap > Dem
246	1	K35B (1451V-DG1B)	Overcurrent Relay	AC/DC Power Support Systems	DG 1B Overcurrent Relay	GE	12IJCV51B21A	1E22-P028 (1H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	GERS	Cap > Dem
247	1	K35C (1451V-DG1B)	Overcurrent Relay	AC/DC Power Support Systems	DG 1B Overcurrent Relay	GE	12IJCV51B21A	1E22-P028 (1H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	GERS	Cap > Dem
248	2	51V (2451-DG016A)	Overcurrent Relay	AC/DC Power Support Systems	DG 2A Overcurrent Relay Phase A	GE	IJCV-51B	2DG02JA	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
249	2	51V (2451-DG016B)	Overcurrent Relay	AC/DC Power Support Systems	DG 2A Overcurrent Relay Phase B	GE	IJCV-51B	2DG02JA	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
250	2	51V (2451-DG016C)	Overcurrent Relay	AC/DC Power Support Systems	DG 2A Overcurrent Relay Phase C	GE	IJCV-51B	2DG02JA	Control Panel	Diesel Generator Building	710'-6"	GERS	Cap > Dem
251	2	K35A (2451V-DG2B)	Overcurrent Relay	AC/DC Power Support Systems	DG 2B Overcurrent Relay	GE	12JCV51B21A	2E22-P028 (2H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	GERS	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
252	2	K35B (2451V-DG2B)	Overcurrent Relay	AC/DC Power Support Systems	DG 2B Overcurrent Relay	GE	12JCV51B21A	2E22-P028 (2H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	GERS	Cap > Dem
253	2	K35C (2451V-DG2B)	Overcurrent Relay	AC/DC Power Support Systems	DG 2B Overcurrent Relay	GE	12JCV51B21A	2E22-P028 (2H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	GERS	Cap > Dem
254	1	51G (1451-AP055)	Ground Fault Relay	AC/DC Power Support Systems	141Y Feed to 135X Ground Fault	ABB	202D6141UL Type GR-5	141Y (1AP04E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
255	1	51N (1351-AP082)	Overcurrent Relay	AC/DC Power Support Systems	141Y Feed to 135X Neutral Overcurrent	GE	IAC-60B	135X (1AP19E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
256	1	51G (1451-AP057)	Ground Fault Relay	AC/DC Power Support Systems	141Y Feed to 135Y Ground Fault	ABB	GR-5	141Y (1AP04E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
257	1	51N (1351-AP083)	Overcurrent Relay	AC/DC Power Support Systems	141Y Feed to 135Y Neutral Overcurrent	GE	IAC-60B	135Y (1AP20E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
258	1	51G (1451-AP071)	Ground Fault Relay	AC/DC Power Support Systems	142Y Feed to 136X Ground Fault	ABB	Type GR-5	142Y (1AP06E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
259	1	51N (1351-AP090)	Overcurrent Relay	AC/DC Power Support Systems	142Y Feed to 136X Neutral Overcurrent	GE	IAC-60B	136X (1AP21E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
260	1	51G (1451-AP073)	Ground Fault Relay	AC/DC Power Support Systems	142Y Feed to 136Y Ground Fault	ABB	Type GR-5	142Y (1AP06E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
261	1	51N (1351-AP091)	Overcurrent Relay	AC/DC Power Support Systems	142Y Feed to 136Y Neutral Overcurrent	GE	IAC-60B	136Y (1AP22E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
262	1	86N/1432	Lockout Relay	AC/DC Power Support Systems	143 Switchgear Lockout Relay	N/A	N/A	143 (1AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
263	1	51 (1451-AP034A)	Overcurrent Relay	AC/DC Power Support Systems	Normal Feed to SG 143 Overcurrent	GE	IAC-51A	143 (1AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
264	1	51 (1451-AP034B)	Overcurrent Relay	AC/DC Power Support Systems	Normal Feed to SG 143 Overcurrent	GE	IAC-51A	143 (1AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
265	1	51 (1451-AP035)	Overcurrent Relay	AC/DC Power Support Systems	Normal Feed to SG 143 Overcurrent	GE	IAC-53A	143 (1AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
266	1	51 (1451-AP074A)	Overcurrent Relay	AC/DC Power Support Systems	143 Feed to 143-1 Overcurrent	GE	IAC-51	143 (1AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
267	1	51 (1451-AP074B)	Overcurrent Relay	AC/DC Power Support Systems	143 Feed to 143-1 Overcurrent	GE	IAC-51	143 (1AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
268	2	51G (2451-AP055)	Ground Fault Relay	AC/DC Power Support Systems	241Y Feed to 235X Ground Fault	ABB	202D6141UL Type GR-5	241Y (2AP04E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
269	2	51N (2351-AP082)	Ground Fault Relay	AC/DC Power Support Systems	241Y Feed to 235X Neutral Overcurrent	GE	IAC-60B	235X (2AP19E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
270	2	51G (2451-AP057)	Ground Fault Relay	AC/DC Power Support Systems	241Y Feed to 235Y Ground Fault	ABB	Type GR-5	241Y (2AP04E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
271	2	51N (2351-AP083)	Ground Fault Relay	AC/DC Power Support Systems	241Y Feed to 235Y Neutral Overcurrent	GE	IAC-60B	235Y (2AP20E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
272	2	51G (2451-AP071)	Ground Fault Relay	AC/DC Power Support Systems	242Y Feed to 236X Ground Fault	ABB	Type GR-5	242Y (2AP06E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
273	2	51N (2351-AP090)	Overcurrent Relay	AC/DC Power Support Systems	242Y Feed to 236X Neutral Overcurrent	GE	IAC-60B	236X (2AP21E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
274	2	51G (2451-AP073)	Ground Fault Relay	AC/DC Power Support Systems	242Y Feed to 236Y Ground Fault	ABB	Type GR-5	242Y (2AP06E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
275	2	51N (2351-AP091)	Ground Fault Relay	AC/DC Power Support Systems	242Y Feed to 236Y Neutral Overcurrent	GE	IAC-60B	236Y (2AP22E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
276	2	86N/2432	Lockout Relay	AC/DC Power Support Systems	243 Switchgear Lockout Relay	N/A	N/A	243 (2AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
277	2	51 (2451-AP034A)	Overcurrent Relay	AC/DC Power Support Systems	Normal Feed to SG 243 Overcurrent	GE	IAC-51B	243 (2AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
278	2	51 (2451-AP034B)	Overcurrent Relay	AC/DC Power Support Systems	Normal Feed to SG 243 Overcurrent	GE	IAC-51B	243 (2AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
279	2	51 (2451-AP035)	Overcurrent Relay	AC/DC Power Support Systems	Normal Feed to SG 243 Overcurrent	GE	IAC-53A	243 (2AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
280	2	51 (2451-AP074A)	Overcurrent Relay	AC/DC Power Support Systems	243 Feed to 243-1 Overcurrent	GE	IAC-51B	243 (2AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
281	2	51 (2451-AP074B)	Overcurrent Relay	AC/DC Power Support Systems	243 Feed to 243-1 Overcurrent	GE	IAC-51B	243 (2AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
282	1	K32 (1432-DG1B)	Power Relay	AC/DC Power Support Systems	DG 1B Reverse Power Relay	GE	12GGP53B1A	1E22-P028 (1H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	GERS	Cap > Dem
283	2	K32 (2432-DG2B)	Power Relay	AC/DC Power Support Systems	DG 2B Reverse Power Relay	GE	12GGP53B1A	2E22-P028 (2H22-P028)	Vertical Board	Diesel Generator Building	710'-6"	GERS	Cap > Dem
284	1	K2	Overvoltage Relay	AC/DC Power Support Systems	250V Battery Charger Overvoltage	Power Conv. Prod.	3SD-260-200	1DC03E	Battery Charger	Auxiliary Building	710'-6"	LAS Report	Cap > Dem
285	1	59K1	Overvoltage Relay	AC/DC Power Support Systems	1AA Battery Charger Overvoltage Fault Module F-55-2285	Power Conv. Prod.	3SD-130-200	1DC09E	Battery Charger	Auxiliary Building	710'-6"	LAS Report	Cap > Dem
286	1	59K1	Overvoltage Relay	AC/DC Power Support Systems	1BA Battery Charger Overvoltage Fault Module F-55-2285	Power Conv. Prod.	3S-130-200D	1DC17E	Battery Charger	Auxiliary Building	731	LAS Report	Cap > Dem
287	1	K4	Overvoltage Relay	AC/DC Power Support Systems	1C Battery Charger Overvoltage Fault	Power Conv. Prod.	3SD-130B-50D	1DC19E	Battery Charger	Auxiliary Building	687	LAS Report	Cap > Dem
288	2	K2	Overvoltage Relay	AC/DC Power Support Systems	250V Battery Charger Overvoltage	Power Conv. Prod.	3SD-260-200	2DC03E	Battery Charger	Auxiliary Building	710'-6"	LAS Report	Cap > Dem
289	2	59K1	Overvoltage Relay	AC/DC Power Support Systems	2AA Battery Charger Overvoltage Fault Module F-55-2285	Power Conv. Prod.	3SD-130-200	2DC09E	Battery Charger	Auxiliary Building	710'-6"	LAS Report	Cap > Dem
290	2	59K1	Overvoltage Relay	AC/DC Power Support Systems	2BA Battery Charger Overvoltage Fault Module F-55-2285	Power Conv. Prod.	3S-130-200D	2DC17E	Battery Charger	Auxiliary Building	731	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
291	2	K4	Overvoltage Relay	AC/DC Power Support Systems	2C Battery Charger Overvoltage Fault	Power Conv. Prod.	3SD-130B-50D	2DC19E	Battery Charger	Auxiliary Building	687	LAS Report	Cap > Dem
292	2	K10	Overspeed Relay	AC/DC Power Support Systems	DG 2B Overspeed Relay	N/A	N/A	2E22-P301B	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
293	2	K9	Start Relay	AC/DC Power Support Systems	DG 2B Failure to Start Relay	N/A	N/A	2E22-P301B	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
294	2	K11	Pressure Relay	AC/DC Power Support Systems	DG 2B Low Oil Pressure Relay	N/A	N/A	2E22-P301B	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
295	2	K12	Temperature Relay	AC/DC Power Support Systems	DG 2B Low Oil Temperature Relay	N/A	N/A	2E22-P301B	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
296	1	CB-6 / 1E22-P301A-CB6	Circuit Breaker	AC/DC Power Support Systems	Feeder Breaker from 1C Battery	GE	TEB122100	1E22-P301A	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
297	1	CB-9 / 1E22-P301A-CB9	Circuit Breaker	AC/DC Power Support Systems	Feeder Breaker from 1C Battery Charger	GE	TEB122100	1E22-P301A	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
298	2	CB-6 / 2E22-P301A-CB6	Circuit Breaker	AC/DC Power Support Systems	Feeder Breaker from 2C Battery	GE	TEB122100	2E22-P301A	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
299	2	CB-9 / 2E22-P301A-CB9	Circuit Breaker	AC/DC Power Support Systems	Feeder Breaker from 2C Battery Charger	GE	TEB122100	2E22-P301A	Control Panel	Diesel Generator Building	710'-6"	LAS Report	Cap > Dem
300	1	51 (1451-AP054A)	Overcurrent Relay	AC/DC Power Support Systems	141Y Feed to 135X Overcurrent	ABB	CO-4	141Y (1AP04E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
301	1	51 (1451-AP054B)	Overcurrent Relay	AC/DC Power Support Systems	141Y Feed to 135X Overcurrent	ABB	CO-4	141Y (1AP04E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
302	1	51 (1451-AP056A)	Overcurrent Relay	AC/DC Power Support Systems	141Y Feed to 135Y Overcurrent	ABB	CO-4	141Y (1AP04E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
303	1	51 (1451-AP056B)	Overcurrent Relay	AC/DC Power Support Systems	141Y Feed to 135Y Overcurrent	ABB	CO-4	141Y (1AP04E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
304	1	51 (1451-AP070A)	Overcurrent Relay	AC/DC Power Support Systems	142Y Feed to 136X Overcurrent	ABB	CO-4	142Y (1AP06E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
305	1	51 (1451-AP070B)	Overcurrent Relay	AC/DC Power Support Systems	142Y Feed to 136X Overcurrent	ABB	CO-4	142Y (1AP06E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
306	1	51 (1451-AP072A)	Overcurrent Relay	AC/DC Power Support Systems	142Y Feed to 136Y Overcurrent	ABB	CO-4	142Y (1AP06E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
307	1	51 (1451-AP072B)	Overcurrent Relay	AC/DC Power Support Systems	142Y Feed to 136Y Overcurrent	ABB	CO-4	142Y (1AP06E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
308	2	51 (2451-AP054A)	Overcurrent Relay	AC/DC Power Support Systems	241Y Feed to 235X Overcurrent	ABB	CO-4	241Y (2AP04E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
309	2	51 (2451-AP054B)	Overcurrent Relay	AC/DC Power Support Systems	241Y Feed to 235X Overcurrent	ABB	CO-4	241Y (2AP04E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
310	2	51 (2451-AP056A)	Overcurrent Relay	AC/DC Power Support Systems	241Y Feed to 235Y Overcurrent	ABB	CO-4	241Y (2AP04E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
311	2	51 (2451-AP056B)	Overcurrent Relay	AC/DC Power Support Systems	241Y Feed to 235Y Overcurrent	ABB	CO-4	241Y (2AP04E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
312	2	51 (2451-AP070A)	Overcurrent Relay	AC/DC Power Support Systems	242Y Feed to 236X Overcurrent	ABB	CO-4	242Y (2AP06E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
313	2	51 (2451-AP070B)	Overcurrent Relay	AC/DC Power Support Systems	242Y Feed to 236X Overcurrent	ABB	CO-4	242Y (2AP06E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
314	2	51 (2451-AP072A)	Overcurrent Relay	AC/DC Power Support Systems	242Y Feed to 236Y Overcurrent	ABB	CO-4	242Y (2AP06E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
315	2	51 (2451-AP072B)	Overcurrent Relay	AC/DC Power Support Systems	242Y Feed to 236Y Overcurrent	ABB	CO-4	242Y (2AP06E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
316	1	1E31-R001C	Switch	Core Cooling	Steam Leak Detection Switch	Yokogawa	DX-112-2-2/A3/C3/S-S	1H13-P632	Control Cabinet	Auxiliary Building	768	LAS Report	Cap > Dem
317	2	2E31-R001C	Switch	RCS/Reactor Vessel Inventory Control	Steam Leak Detection Switch	Yokogawa	DX-112-2-2/A3/C3/S-S	2H13-P632	Control Cabinet	Auxiliary Building	768	LAS Report	Cap > Dem
318	1	1E31-R002C	Switch	Core Cooling	Steam Leak Detection Switch	Yokogawa	DX-112-2-2/A3/C3/S-S	1H13-P642	Control Cabinet	Auxiliary Building	768	LAS Report	Cap > Dem
319	2	2E31-R002C	Switch	RCS/Reactor Vessel Inventory Control	Steam Leak Detection Switch	Yokogawa	DX-112-2-2/A3/C3/S-S	2H13-P642	Control Cabinet	Auxiliary Building	768	LAS Report	Cap > Dem
320	0	81 / 0DG007	Auxiliary Relay	AC/DC Power Support Systems	DG 0 Frequency Relay	ABB	Type ITE-81	0DG02JA	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
321	1	81 / 1DG014	Auxiliary Relay	AC/DC Power Support Systems	DG 1A Frequency Relay	ABB	Type ITE-81	1DG02JA	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
322	2	81 / 2DG014	Auxiliary Relay	AC/DC Power Support Systems	DG 2A Frequency Relay	ABB	Type ITE-81	2DG02JA	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem
323	1	ACB1413 / 1AP04E-3	Circuit Breaker	AC/DC Power Support Systems	DG 0 Circuit Breaker	ITE Circuit Breaker LTD.	5HK350	141Y (1AP04E)	Switchgear	Reactor Building	710'-6"	EPRI HF Test	Cap > Dem
324	1	52 / 1AP04E-9	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to 135X & 135Y	ITE Circuit Breaker LTD.	5HK350	141Y (1AP04E)	Switchgear	Reactor Building	710'-6"	EPRI HF Test	Cap > Dem
325	1	ACB1423 / 1AP06E-3	Circuit Breaker	AC/DC Power Support Systems	DG 1A Circuit Breaker	ITE Circuit Breaker LTD.	5HK350	142Y (1AP06E)	Switchgear	Reactor Building	731	EPRI HF Test	Cap > Dem
326	1	52 / 1AP06E-9	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to 136X & 136Y	ITE Circuit Breaker LTD.	5HK350	142Y (1AP06E)	Switchgear	Reactor Building	731	EPRI HF Test	Cap > Dem
327	2	ACB2413 / 2AP04E-10	Circuit Breaker	AC/DC Power Support Systems	DG 0 Circuit Breaker	ITE Circuit Breaker LTD.	5HK350	241Y (2AP04E)	Switchgear	Reactor Building	710'-6"	EPRI HF Test	Cap > Dem
328	2	52 / 2AP04E-4	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to 235X & 235Y	ITE Circuit Breaker LTD.	5HK350	241Y (2AP04E)	Switchgear	Reactor Building	710'-6"	EPRI HF Test	Cap > Dem
329	2	ACB2423 / 2AP06E-11	Circuit Breaker	AC/DC Power Support Systems	DG 2A Circuit Breaker	ITE Circuit Breaker LTD.	5HK350	242Y (2AP06E)	Switchgear	Reactor Building	731	EPRI HF Test	Cap > Dem
330	2	52 / 2AP06E-5	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to 236X & 236Y	ITE Circuit Breaker LTD.	5HK350	242Y (2AP06E)	Switchgear	Reactor Building	731	EPRI HF Test	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
331	1	52 / 1AP19E-102B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker from 141Y	GE	AK-50	135X (1AP19E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
332	1	52 / 1AP19E-103A	Circuit Breaker	AC/DC Power Support Systems	DG 0 Cooling Water Pump Circuit Breaker	GE	AK-25	135X (1AP19E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
333	1	52 / 1AP19E-103C	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to MCC 135X-2	GE	AK-25	135X (1AP19E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
334	1	52 / 1AP19E-103D	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to MCC 135X-3	GE	AK-25	135X (1AP19E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
335	1	52 / 1AP20E-202B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker from 141Y	GE	AK-50	135Y (1AP20E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
336	1	52 / 1AP20E-204B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to MCC 135Y-2	GE	AK-25	135Y (1AP20E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
337	1	52 / 1AP21E-302B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker from 142Y	GE	AK-50	136X (1AP21E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
338	1	52 / 1AP21E-303A	Circuit Breaker	AC/DC Power Support Systems	DG 1A Cooling Water Pump Circuit Breaker	GE	AK-25	136X (1AP21E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
339	1	52/ 1AP21E-304D	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to MCC 136X-3	GE	AK-25	136X (1AP21E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
340	1	52 / 1AP22E-402B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker from 142Y	GE	AK-50	136Y (1AP22E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
341	1	52 / 1AP22E-404B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to MCC 136Y-1	GE	AK-25	136Y (1AP22E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
342	2	52 / 2AP19E-103B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker from 241Y	GE	AK-50	235X (2AP19E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
343	2	52 / 2AP19E-102A	Circuit Breaker	AC/DC Power Support Systems	DG 0 Cooling Water Pump Circuit Breaker	GE	AK-25	235X (2AP19E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
344	2	52 / 2AP19E-102C	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to MCC 235X-2	GE	AK-25	235X (2AP19E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
345	2	52 / 2AP19E-102D	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to MCC 235X-3	GE	AK-25	235X (2AP19E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
346	2	52 / 2AP20E-203B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker from 241Y	GE	AK-50	235Y (2AP20E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
347	2	52 / 2AP20E-201C	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to MCC 235Y-2	GE	AK-25	235Y (2AP20E)	Switchgear	Reactor Building	710'-6"	LAS Report	Cap > Dem
348	2	52 / 2AP21E-303B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker from 242Y	GE	AK-50	236X (2AP21E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
349	2	52 / 2AP21E-302C	Circuit Breaker	AC/DC Power Support Systems	DG 2A Cooling Water Pump Circuit Breaker	GE	AK-25	236X (2AP21E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
350	2	52 / 2AP21E-301B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to MCC 236X-3	GE	AK-25	236X (2AP21E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
351	2	52 / 2AP22E-403B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker from 242Y	GE	AK-50	236Y (2AP22E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
352	2	52 / 2AP22E-401C	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to MCC 136Y-1	GE	AK-25	236Y (2AP22E)	Switchgear	Reactor Building	731	LAS Report	Cap > Dem
353	1	ACB1433 / 1AP07E-003	Circuit Breaker	AC/DC Power Support Systems	DG 1B Circuit Breaker	GE	AM-4.16-350	143 (1AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
354	1	52 / 1AP07E-005	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to 143-1	GE	AM-4.16-350	143 (1AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
355	2	ACB2433 / 2AP07E-003	Circuit Breaker	AC/DC Power Support Systems	DG 2B Circuit Breaker	GE	AM-4.16-350	243 (2AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
356	2	52 / 2AP07E-005	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to 243-1	GE	AM-4.16-350	243 (2AP07E)	Switchgear	Reactor Building	687	LAS Report	Cap > Dem
357	1	52 / 1DC02E-2B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to Distribution Panel 121Y	GE	AK-25	1DC02E	Distribution Panel	Auxiliary Building	710'-6"	LAS Report	Cap > Dem
358	1	52 / 1DC08E-3B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to Distribution Panel 111Y	GE	AK-25	1DC08E	Distribution Panel	Auxiliary Building	710'-6"	LAS Report	Cap > Dem
359	1	52 / 1DC15E-3B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to Distribution Panel 112Y	GE	AK-25	1DC15E	Distribution Panel	Auxiliary Building	731	LAS Report	Cap > Dem
360	2	52 / 2DC02E-2B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to Distribution Panel 221Y	GE	AK-25	2DC02E	Distribution Panel	Auxiliary Building	710'-6"	LAS Report	Cap > Dem

Table B-1: Components Identified for High Frequency Confirmation

No.	Unit	Component						Enclosure		Building	Floor Elev. (ft)	Component Evaluation	
		ID	Type	System	Function	Manuf.	Model No.	ID	Type			Basis for Capacity	Evaluation Result
361	2	52 / 2DC08E-3B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to Distribution Panel 211Y	GE	AK-25	2DC08E	Distribution Panel	Auxiliary Building	710'-6"	LAS Report	Cap > Dem
362	2	52 / 2DC15E-3B	Circuit Breaker	AC/DC Power Support Systems	Feeder Circuit Breaker to Distribution Panel 212Y	GE	AK-25	2DC15E	Distribution Panel	Auxiliary Building	731	LAS Report	Cap > Dem
363	2	K59X1 / 2DGK059X	Auxiliary Relay	AC/DC Power Support Systems	DG 2A Neutral Ground Auxiliary Relay	GE	12HFA151A2H	2DG03J	Control Panel	Diesel Generator Building	710'-6"	EPRI HF Test	Cap > Dem

Table B-2: Reactor Coolant Leak Path Valve Identified for High Frequency Confirmation

VALVE*	P&ID	SHEET	UNIT	NOTE
2B21-F013C	M116	1	2	SRV
2B21-F013D	M116	1	2	SRV
2B21-F013E	M116	1	2	SRV
2B21-F013F	M116	1	2	SRV
2B21-F013H	M116	1	2	SRV
2B21-F013K	M116	1	2	SRV
2B21-F013L	M116	1	2	SRV
2B21-F013M	M116	1	2	SRV
2B21-F013P	M116	1	2	SRV
2B21-F013R	M116	1	2	SRV
2B21-F013S	M116	1	2	SRV
2B21-F013U	M116	1	2	SRV
2B21-F013V	M116	1	2	SRV
2B21-F022C	M116	2	2	MSIV Inboard
2B21-F028C	M116	2	2	MSIV Outboard
2B21-F022D	M116	2	2	MSIV Inboard
2B21-F028D	M116	2	2	MSIV Outboard
2B21-F022A	M116	2	2	MSIV Inboard

Table B-2: Reactor Coolant Leak Path Valve Identified for High Frequency Confirmation

VALVE*	P&ID	SHEET	UNIT	NOTE
2B21-F028A	M116	2	2	MSIV Outboard
2B21-F022B	M116	2	2	MSIV Inboard
2B21-F028B	M116	2	2	MSIV Outboard
2B21-F011B	M118	1	2	
2B21-F010B	M118	1	2	Simple Check Valve (no need to be included)
2B21-F011A	M118	1	2	
2B21-F010A	M118	1	2	Simple Check Valve (no need to be included)
2B33-F067A	M139	1	2	
2B33-F060A	M139	1	2	
2B33-F023A	M139	1	2	
2B33-F067B	M139	2	2	
2B33-F060B	M139	2	2	
2B33-F023B	M139	2	2	
2E21-F005	M140	1	2	Downstream of Simple Check Valve (no need to be included)
2E21-F006	M140	1	2	Simple Check Valve (no need to be included)
2E22-F005	M141	1	2	Simple Check Valve (no need to be included)
2E22-F004	M141	1	2	Downstream of Simple Check Valve (no need to be included)
2E12-F017A	M142	1	2	

Table B-2: Reactor Coolant Leak Path Valve Identified for High Frequency Confirmation

VALVE*	P&ID	SHEET	UNIT	NOTE
2E12-F016A	M142	1	2	
2E12-F041A	M142	1	2	Simple Check Valve (no need to be included)
2E12-F042A	M142	1	2	Downstream of Simple Check Valve (no need to be included)
2E12-F050A	M142	1	2	Simple Check Valve (no need to be included)
2E12-F053A	M142	1	2	Downstream of Simple Check Valve (no need to be included)
2E12-F017B	M142	2	2	
2E12-F016B	M142	2	2	
2E12-F041B	M142	2	2	Simple Check Valve (no need to be included)
2E12-F042B	M142	2	2	Downstream of Simple Check Valve (no need to be included)
2E12-F050B	M142	2	2	Simple Check Valve (no need to be included)
2E12-F053B	M142	2	2	Downstream of Simple Check Valve (no need to be included)
2E12-F009	M142	3	2	
2E12-F008	M142	3	2	
2E12-F041C	M142	3	2	Simple Check Valve (no need to be included)
2E12-F042C	M142	3	2	Downstream of Simple Check Valve (no need to be included)
2G33-F101	M143	1	2	

Table B-2: Reactor Coolant Leak Path Valve Identified for High Frequency Confirmation

VALVE*	P&ID	SHEET	UNIT	NOTE
2G33-F001	M143	1	2	
2G33-F102	M143	1	2	
2E51-F063	M147	1	2	
2E51-F008	M147	1	2	
2B21-F016	M-116	7	2	
2B21-F019	M-116	7	2	
2B21-F067C	M-116	7	2	
2B21-F067D	M-116	7	2	
2B21-F067A	M-116	7	2	
2B21-F067B	M-116	7	2	

* Note that the evaluation of these valves and Unit 1 valves are discussed in Section 2.2 of this report as well as in report 15C0348-RPT-001 (Ref. 18).