Exelon Generation.

RS-14-068 10 CFR 50.54(f)

March 31, 2014

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

LaSalle County Station, Units 1 and 2
Facility Operating License Nos. NPF-11 and NPF-18
NRC Docket Nos. 50-373 and 50-374

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

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
2. NEI Letter, Proposed Path Forward for NTTF Recommendation 2.1: Seismic Reevaluations, dated April 9, 2013
3. NRC Letter, Electric Power Research Institute Final Draft Report XXXXXX, "Seismic Evaluation Guidance: Augmented Approach for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic," as an Acceptable Alternative to the March 12, 2012, Information Request for Seismic Reevaluations, dated May 7, 2013
4. Exelon Generation Company, LLC letter to the NRC, Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Seismic Aspects of Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident – 1.5 Year Response for CEUS Sites, dated September 12, 2013
5. EPRI Report 1025287, Seismic Evaluation Guidance, Screening, Prioritization and Implementation Details (SPID) for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic
6. NRC Letter, Endorsement of Electric Power Research Institute Final Draft Report 1025287, "Seismic Evaluation Guidance," dated February 15, 2013
7. EPRI Technical Report 3002000704, "Seismic Evaluation Guidance: Augmented Approach for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic," dated May 2013

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

In Reference 2, the Nuclear Energy Institute (NEI) requested NRC agreement to delay submittal of the final CEUS Seismic Hazard Evaluation and Screening Reports so that an update to the Electric Power Research Institute (EPRI) ground motion attenuation model could be completed and used to develop that information. NEI proposed that descriptions of subsurface materials and properties and base case velocity profiles be submitted to the NRC by September 12, 2013, with the remaining seismic hazard and screening information submitted by March 31, 2014. NRC agreed with that proposed path forward in Reference 3. In Reference 4, Exelon Generation Company, LLC (EGC) provided the description of subsurface materials and properties and base case velocity profiles for LaSalle County Station, Units 1 and 2.

Reference 5 contains industry guidance and detailed information to be included in the Seismic Hazard Evaluation and Screening Report submittals. NRC endorsed this industry guidance in Reference 6.

The enclosed Seismic Hazard Evaluation and Screening Report for LaSalle County Station, Units 1 and 2, provides the information described in Section 4 of Reference 5 in accordance with the schedule identified in Reference 2. As described in Enclosure 1, LaSalle County Station, Units 1 and 2, do not meet the requirements of SPID Sections 3.2 and 7 (Reference 5) and therefore screen in and a Risk Evaluation and Spent Fuel Pool evaluation will be performed as determined by NRC prioritization following submittal of all nuclear power plant Seismic Hazard Re-evaluations per Reference 1. Additionally, LaSalle County Station, Units 1 and 2, will prepare an Expedited Seismic Evaluation Process (ESEP) Report in accordance with Reference 7, by December 31, 2014.

A list of regulatory commitments contained in this letter is provided in Enclosure 2. If you have any questions regarding this report, please contact Ron Gaston at (630) 657-3359.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 31st day of March 2014.

Respectfully submitted,

Glen T. Kaegi

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

Enclosures:

1. LaSalle County Station, Units 1 and 2, Seismic Hazard and Screening Report
2. Summary of Regulatory Commitments

cc: Director, Office of Nuclear Reactor Regulation
Regional Administrator - NRC Region III
NRC Senior Resident Inspector – LaSalle County Station
NRC Project Manager, NRR – LaSalle County Station
Ms. Jessica A. Kratchman, NRR/JLD/PMB, NRC
Mr. Eric E. Bowman, NRR/DPR/PGCB, NRC or Ms. Eileen M. McKenna, NRO/DSRA/BPTS, NRC
Illinois Emergency Management Agency - Division of Nuclear Safety

Enclosure 1

LaSalle County Station, Units 1 and 2

Seismic Hazard and Screening Report

(53 pages)

SEISMIC HAZARD AND SCREENING REPORT

IN RESPONSE TO THE 50.54(f) INFORMATION REQUEST REGARDING FUKUSHIMA NEAR-TERM TASK FORCE RECOMMENDATION 2.1: SEISMIC

for the

LaSalle County Generating Station, Units 1 and 2
2601 North 21st Road Marseilles, Illinois 61341-9757
Facility Operating License Nos. NFP-11 and NFP-18
NRC Docket Nos. 50-373 and 50-374
Correspondence No.: RS-14-068

Exelon.

Exelon Generation Company, LLC (Exelon)
PO Box 809398
Chicago, IL 60680-5398

Prepared by:
Sargent & Lundy LLC
55 East Monroe Street, Chicago, IL 60603

Report Number: SL-012194, Revision 1

	Printed Name	Signature	Date
Preparer:	Ryan Foley	Ryan Foley	03/25/2014
Reviewer:	Ronald Boehm	R Boehm	3-25-2014
Approver:	Javad Moslemian	Javad Moslemian	3/25/14
Lead Responsible Engineer:	Aram Zare	Aram Zare	3/25/14
Risk Management (Section 5.4):	LAWRENCE LEE	Lawrence Lee	3/25/2014
Branch Manager:	DAN SCHMIT	DJ Schmit	3/26/2014
Senior Manager Design Engineering:	W. Hilton	W. Hilton	3-26-14
Corporate Acceptance:	Jeffrey S. Clark	Jeffrey S. Clark	3/26/14

Exelon.

Sargent & Lundy LLC

Seismic Hazard and Screening Report – LaSalle Units 1 and 2

Report No.: SL-012194
Revision 0 – Initial Issue

S&L Project No.: 11332-185
Nuclear Non-Safety Related

Sections: Cover Page, Executive Summary, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, and Appendix A		
Prepared by:	Alexander Coologeorgen/Ryan Foley	03/18/2014
Reviewed by:	Ronald Boehm	3.18.2014
Sections: 4.2		
Prepared by:	Jay Johnson	3/17/14
Reviewed by:	Brent Starks	3/18/14
All Sections		
Approved by:	Javad Moslemian	3/18/14

Exelon.

Sargent & Lundy LLC

Seismic Hazard and Screening Report – LaSalle Units 1 and 2

Report No.: SL-012194
Revision 1 – Revised Pages (see below)

S&L Project No.: 11332-185
Nuclear Non-Safety Related

Pages: vi, 4-1, 5-1, 6-1		
Prepared by:	Ryan Foley (signature) Ryan Foley	03/25/2014
Reviewed by:	R Boehm (signature) Ronald Boehm	3.25.2014
Section: 4.2		
Prepared by:	(signature) for Jay Johnson Jay Johnson	3/25/2014
Reviewed by:	B S (signature) Brent Starks	3/25/2014
All Revisions		
Approved by:	Javad Moslemian (signature) Javad Moslemian	3/25/14

RECORD OF REVISIONS

Revision	Affected Pages	Description
0	All	Initial Issue
1	vi, 4-1, 5-1, 6-1	Replace pages vi, 4-1, 5-1, and 6-1. All other pages have been revised to reflect Revision 1 as the current revision.

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PURPOSE

Following the accident at the Fukushima Daiichi nuclear power plant resulting from the March 11, 2011, Great Tohoku Earthquake and subsequent tsunami, the Nuclear Regulatory Commission (NRC) issued a 50.54(f) letter (Reference 1) requesting information in response to NRC Near-Term Task Force (NTTF) recommendations intended to clarify and strengthen the regulatory framework for protection against natural phenomena. The 50.54(f) letter (Reference 1) requests that licensees and holders of construction permits under Title 10 Code of Federal Regulations Part 50 (Reference 2) reevaluate the seismic hazards at their sites against present-day NRC requirements. This report provides the information requested in items (1) through (7) of the "Requested Information" section and Attachment 1 of the 50.54(f) letter (Reference 1) pertaining to NTTF Recommendation 2.1 for LaSalle County Generating Station, Units 1 and 2, in accordance with the documented intention of Exelon Generating Company transmitted to the NRC via letter dated April 29, 2013 (Reference 22).

SCOPE

In response to the 50.54(f) letter (Reference 1) and following the Screening, Prioritization, and Implementation Details (SPID) industry guidance document (Reference 3), a seismic hazard reevaluation for LaSalle County station was performed to develop a Ground Motion Response Spectrum (GMRS) for comparison with the Safe Shutdown Earthquake (SSE). The new GMRS represents a beyond-design-basis seismic demand developed by more modern techniques than were used for plant licensing. Consistent with NRC letter dated February 20, 2014, (Reference 36) the seismic hazard reevaluations performed in response to the 50.54(f) letter (Reference 1) are distinct from the current design or licensing bases of operating plants. Therefore, the results generally do not call into question the operability or functionality of SSCs and are not expected to be reportable pursuant to 10 CFR 50.72, "Immediate notification requirements for operating nuclear power reactors," and 10 CFR 50.73, "Licensee event report system."

Section 2 provides a summary of the regional and local geology, seismicity, other major inputs to the seismic hazard reevaluation, and detailed seismic hazard results including definition of the GMRS. Seismic hazard analysis for LaSalle County station, including site response evaluation and GMRS development (Sections 2.2, 2.3, and 2.4 of this report) was performed by the Electric Power Research Institute (EPRI) (Reference 23). A more in-depth discussion of the calculation methods used in the seismic hazard reevaluation can be found in References 3, 7, 8, 14, and 17. Section 3 describes the characteristics of the appropriate plant-level SSE. Section 4 provides a comparison of the GMRS to the SSE. Sections 5 and 6 discuss interim actions and conclusions, respectively.

CONCLUSIONS

The GMRS exceeds the SSE for a portion of the frequency range from 1 Hz to 10 Hz. Therefore, LaSalle County station screens in for a risk evaluation and a spent fuel pool integrity evaluation in response to NTTF 2.1: Seismic. Due to the GMRS exceeding the SSE in the frequency range above 10 Hz, high frequency exceedances can be addressed in the risk evaluation process. LaSalle County station will also perform interim actions in accordance with the Expedited Seismic Evaluation Process (ESEP) guidance (Reference 4). These actions will be performed in accordance with the schedule for central and eastern United States (CEUS) nuclear plants provided via letter from the industry to the NRC dated April 9, 2013 (Reference 6), as agreed to by the NRC in the May 7, 2013 letter to the industry (Reference 32).

1 Introduction

Following the accident at the Fukushima Daiichi nuclear power plant resulting from the March 11, 2011, Great Tohoku Earthquake and subsequent tsunami, the NRC Commission 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 that requests information to assure that these recommendations are addressed by all U. S. nuclear power plants (Reference 1). The 50.54(f) letter requests that licensees and holders of construction permits under 10 CFR Part 50 (Reference 2) reevaluate the seismic hazards at their sites against present-day NRC requirements. Depending on the comparison between the reevaluated seismic hazard and the current design basis, the result is either no further risk evaluation or the performance of a seismic risk assessment. Risk assessment approaches acceptable to the staff include a seismic probabilistic risk assessment (SPRA), or a seismic margin assessment (SMA). Based upon the risk assessment results, the NRC staff will determine whether additional regulatory actions are necessary.

This report provides the information requested in items (1) through (7) of the "Requested Information" section and Attachment 1 of the 50.54(f) letter (Reference 1) pertaining to NTTF Recommendation 2.1 for LaSalle County Generating Station (LaSalle County station), located in LaSalle County, Illinois, in accordance with the documented intention of Exelon Generating Company (Exelon) transmitted to the NRC via letter dated April 29, 2013 (Reference 22). In providing this information, *Exelon* followed the guidance provided in the *Seismic Evaluation Guidance: Screening, Prioritization, and Implementation Details (SPID) for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic* (Reference 3). The Augmented Approach, *Seismic Evaluation Guidance: Augmented Approach for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic* (Reference 4), has been developed as the process for evaluating critical plant equipment as an interim action to demonstrate additional plant seismic margin, prior to performing the complete plant seismic risk evaluations. The SPID (Reference 3) and the Augmented Approach (Reference 4) have been endorsed by the NRC in letters to NEI according to Reference 31 and Reference 32 respectively.

The original geologic and seismic siting investigations for the LaSalle County station were performed in accordance with Appendix A of Title 10 Code of Federal Regulations Part 100 (Reference 5) and meet General Design Criterion 2 in Appendix A of Reference 2. The Safe Shutdown Earthquake (SSE) ground motion was developed in accordance with Appendix A of Reference 5 and is used for the design of seismic Category I systems, structures and components.

In response to the 50.54(f) letter (Reference 1) and following the guidance provided in the SPID (Reference 3), a seismic hazard reevaluation for LaSalle County station was performed. For screening purposes, a Ground Motion Response Spectrum (GMRS) was developed.

2

Seismic Hazard Reevaluation

The LaSalle County station site is located at the north end of the Illinois Basin, in eastern LaSalle County, Illinois, approximately 5 miles south of the Illinois River. The plant power block structures are located in the upland portion of the site. The main power block structures are founded on soil, approximately 150 feet deep from the surface, overlying Pennsylvanian bedrock. This is followed by approximately 3500 feet of sedimentary rock overlying the Precambrian basement (Reference 9).

The LaSalle site is located in an area of relative seismic stability. An evaluation of the seismic and tectonic characteristics of the site and surrounding 200 miles was conducted for the plant design. At the time of licensing, within the past 200 years, maximum reported earthquake intensity felt at the site had not exceeded VI on the Modified Mercalli Scale (MM). The earthquake nearest the site had an epicentral intensity of VI (MM). The assumption was made that an Intensity VII (MM) event could occur near the site. Therefore, the maximum horizontal ground acceleration at the foundation level is 20% gravity (0.2g peak ground acceleration). (Reference 9)

2.1 Regional and Local Geology

LaSalle County station is located in the Bloomington Ridged Plain Subsection of the Till Plains section of the Central Lowland Physiographic Province. The Bloomington Ridged Plain is a region of relatively flat, undissected uplands of Wisconsinan till and terminal moraines that are cut by steep-sided valleys of major through streams. Topography is largely controlled by glacial deposition. Over most of the regional area, bedrock is covered with Quaternary surficial deposits consisting of Pleistocene glacial drift, loess, lake sediments, and residual soils. The bedrock stratigraphic sequence in the regional area consists primarily of Paleozoic sedimentary rocks ranging in age from Pennsylvanian to Cambrian, with a major hiatus between Pennsylvanian and Ordovician in the site vicinity. (Reference 9)

Soil deposits in the upland portion of the LaSalle County station site where the main power block structures are located consist predominantly of 120 to 140 feet of Pleistocene till resting on Pennsylvanian bedrock. The till is locally interbedded with outwash deposits and locally covered by alluvium and colluvium, generally thinner than 10 feet, and by loess 0 to 4 feet thick. The bedrock units at the LaSalle County station site include nearly flat-lying Pennsylvanian cyclothem sequences (limestones, shales, sandstones, coals) overlying Ordovician limestones, shales, dolomites, and sandstones. (Reference 9)

2.2 PROBABILISTIC SEISMIC HAZARD ANALYSIS

2.2.1 Probabilistic Seismic Hazard Analysis Results

In accordance with the 50.54(f) letter (Reference 1) and following the guidance in the SPID (Reference 3), a probabilistic seismic hazard analysis (PSHA) was completed using the recently developed Central and Eastern United States Seismic Source Characterization (CEUS-SSC) for Nuclear Facilities (Reference 7) together with the updated EPRI Ground-Motion Model (GMM) for the CEUS (Reference 8). For the PSHA, a lower-bound moment magnitude of 5.0 was used, as specified in the 50.54(f) letter (Reference 1).

For the PSHA, the CEUS-SSC background seismic sources out to a distance of 400 miles around LaSalle were included. This distance exceeds the 200 mile recommendation contained in NRC Regulatory Guide 1.208 (Reference 17) and was chosen for completeness. Background sources included in this site analysis are the following:

1. Illinois Basin Extended Basement (IBEB)
2. Mesozoic and younger extended prior – narrow (MESE-N)
3. Mesozoic and younger extended prior – wide (MESE-W)
4. Midcontinent-Craton alternative A (MIDC_A)
5. Midcontinent-Craton alternative B (MIDC_B)
6. Midcontinent-Craton alternative C (MIDC_C)
7. Midcontinent-Craton alternative D (MIDC_D)
8. Non-Mesozoic and younger extended prior – narrow (NMESE-N)
9. Non-Mesozoic and younger extended prior – wide (NMESE-W)
10. Paleozoic Extended Crust narrow (PEZ_N)
11. Paleozoic Extended Crust wide (PEZ_W)
12. Reelfoot Rift (RR)
13. Reelfoot Rift including the Rough Creek Graben (RR-RCG)
14. Study region (STUDY_R)

For sources of large magnitude earthquakes, designated Repeated Large Magnitude Earthquake (RLME) sources in CEUS-SSC (Reference 7), the following sources lie within 621 miles (1000 km) of the site and were included in the analysis:

1. Commerce
2. Eastern Rift Margin Fault northern segment (ERM-N)
3. Eastern Rift Margin Fault southern segment (ERM-S)
4. Marianna
5. New Madrid Fault System (NMFS)
6. Wabash Valley

For each of the above background and RLME sources, the mid-continent version of the updated CEUS EPRI GMM (Reference 8) was used.

2.2.2 Base Rock Seismic Hazard Curves

Consistent with the SPID (Reference 3), base rock seismic hazard curves are not provided as the site amplification approach, referred to as Method 3, has been used. Seismic hazard curves are shown below in Section 2.3.7 at the SSE control point elevation.

2.3 SITE RESPONSE EVALUATION

Following the guidance contained in Seismic Enclosure 1 of the 50.54(f) Request for Information (Reference 1) and in the SPID (Reference 3) for nuclear power plant sites that are not founded on hard rock (defined as having a shear wave velocity of at least 9285 ft/sec), a site response analysis was performed for LaSalle County station.

2.3.1 Description of Subsurface Material

The LaSalle County station is located in northeastern Illinois at the north end of the Illinois Basin, 5 miles south of the Illinois River. The general site conditions consist of about 170 feet of soils overlying about 4,200 feet of firm to hard sedimentary rock with Precambrian basement at a depth of about 4,400 feet. As illustrated in Table 2.3.1-1, the SSE is specified at an elevation of 666 feet.

The Category I structures are founded entirely on soil. The soil in the vicinity of the main power block is generally Wisconsinian in age (Reference 9). The soil deposits consist predominantly of 90 to 140 feet of Pleistocene silty clay till overlying 45 to 60 feet of clayey silt till resting on Pennsylvanian bedrock. The till is locally interbedded with outwash deposits and locally covered by alluvium and colluvium, generally thinner than 10 feet and by loess 0 to 4 feet thick. The predominant soil unit in the vicinity of the main power block is known as the Wedron Formation.

The bedrock units include nearly flat-lying Pennsylvanian cyclothem sequences (limestones, shales, sandstones, coals) unconformably overlying Ordovician limestones, shales, dolomites and sandstones. Site stratigraphy features the Pennsylvanian Carbondale Formation and Spoon Formation overlying various Ordovician strata. (Reference 9)

The Carbondale Formation forms the erosional bedrock surface for most of the site and is composed of alternating strata of shale, sandstone, clay, coal, limestone, siltstone, and many intergradational types. (Reference 9)

The Spoon Formation exists throughout the site as a continuous subsurface unit. It consists of about 5 feet of underclay (greenish to brownish, soft, nonbedded) of the Colchester No. 2 Coal overlying about 20 feet of gray shale (gray to green, massive, calcareous, fissile, organic, somewhat soft, and silty). In the site area, the Spoon Formation rests unconformably on Ordovician limestone of the Platteville Group. (Reference 9)

The Platteville Group exists throughout the site as a continuous subsurface unit. It is composed of mottled light gray to dark gray limestones and dolomites of Ordovician age. The rocks are dense and fine-to medium-grained with a small amount of clay and chert. The depth to the Platteville Group in Boring 2 was 341 feet (El. 367 feet MSL); the thickness penetrated was only 19 feet; data suggests the thickness of the Platteville Group is on the order of 50 to 100 feet. (Reference 9)

The contact with the underlying Ordovician Ancell Group is unconformable and at approximately El. 250 to 300 feet MSL (Reference 9). This overlies the Cambrian System of dolomite and sandstone, which in turn overlies the Precambrian Basement Complex (igneous and metamorphic rocks, including granite and granodiorites) at approximately 3,500 feet below MSL. (Reference 9)

Table 2.3.1-1: Summary of geotechnical profile data for LaSalle County station (Reference 30)

Elevations of Layer Boundaries At Reactor Buildings (ft, MSL)	Range in Thickness Across Site (ft)	Soil/Rock Description and Age	Density (pcf)	Shear Wave Velocity (fps)	Compressional Wave Velocity (fps)	Poisson's Ratio
710[a] to 600[b]	90-140	Pleistocene Wisconsinan Wedron Formation, stiff to hard silty clay with some sand and gravel	129-139	400-1100	1100	0.38-0.46
600 to 540	45-60	Pleistocene Wisconsinan Wedron Formation, very dense, very hard to hard clayey silt with some sand and gravel	134-153	1640-1750	5000-5680	0.41-0.49
540 to 395	145-175	Pennsylvanian Carbondale Formation, shale, limestone, sandstone, siltstone, and coal	135-177	4800	9400-10700	0.1-0.37
395 to 370	25	Pennsylvanian Spoon Formation, shale, limestone, sandstone, siltstone, and coal	150	4800	9800	0.34
370 to 300	50-100	Ordovician Platteville Group, dolomite	150	4800	9800	0.34
300 to 50	235-250	Ordovician Ancell Group, sandstone	150	4800	9800	0.34
50 to -3690	3740	Ordovician and Cambrian dolomite and sandstone	155	11000	18300	0.22
-3690 and below	N/A	Precambrian igneous and metamorphic rocks	162	12000	19000	0.18

[a] Surface of finish grade is nominally at El. 710 feet MSL in the vicinity of the main power block. The control point elevation for the SSE is located at the base of the reactor building, El. 666 feet MSL (see Section 3.2).
[b] Bottom of the deepest foundation is at El. 656 feet MSL, within the Wedron Formation.

2.3.2 Development of Base Case Profiles and Nonlinear Material Properties

Table 2.3.1-1 shows the recommended shear-wave velocities and unit weights verses depth for the best estimate single profile. From Table 2.3.1-1 hard reference rock shear-wave velocities (at or exceeding 9,285 ft/s) were reached at the elevation 50 feet MSL. Recommended shear-wave velocities listed in Table 2.3.1-1 were used to develop the mean base-case profile (Profile 1). Lower- and upper-range profiles (Profile 2 and Profile 3 respectively) were developed with a scale factor of 1.57 (Reference 3) as the measurement method and vintage of the recommended shear-wave velocities at the site was unclear. To accommodate uncertainty in depth to hard rock, 616 feet below the SSE in Table 2.3.1-1, the shear-wave velocity of 4,800 ft/s at the Ancell Group sandstone was extended to Precambrian basement resulting in the profiles shown in Figure 2.3.2-1 (Table 2.3.2-1). Profile P3 accommodates shallow hard rock conditions with an increase to reference site conditions at a shear-wave velocity of 9,285 ft/s at a depth of 616 feet. Profiles P1 and P2 have a mean depth to Precambrian basement of 4,356 feet randomized ±1307 feet. Profile P3 has a mean depth to Precambrian basement of 616 feet with layers randomized following the description in Section 2.3.3. The depth randomization reflects ±30% of the depth and was included to provide a realistic broadening of the fundamental resonance at deep sites rather than reflect actual random variations to basement shear-wave velocities across a footprint.

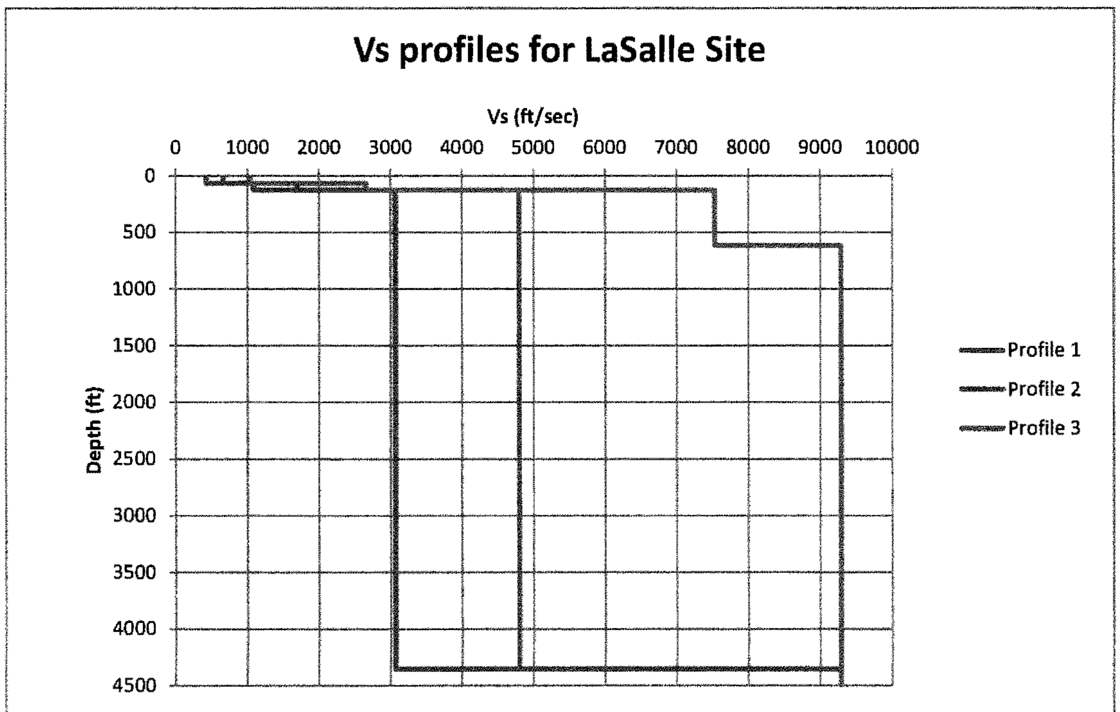

Figure 2.3.2-1: Shear-wave velocity (Vs) profiles for LaSalle County station site (Reference 23)

Table 2.3.2-1[a]: Layer thicknesses, depths, and shear-wave velocity (Vs) for 3 profiles, LaSalle County station site (Reference 23)

Profile 1 (P1)			Profile 2 (P2)			Profile 3 (P3)		
Thickness (ft)	Depth (ft)	Vs (ft/s)	Thickness (ft)	Depth (ft)	Vs (ft/s)	Thickness (ft)	Depth (ft)	Vs (ft/s)
	0	663		0	424		0	1041
5.5	5.5	663	5.5	5.5	424	5.5	5.5	1041
5.5	11.0	663	5.5	11.0	424	5.5	11.0	1041
5.5	16.5	663	5.5	16.5	424	5.5	16.5	1041
5.5	22.0	663	5.5	22.0	424	5.5	22.0	1041
5.5	27.6	663	5.5	27.6	424	5.5	27.6	1041
5.5	33.1	663	5.5	33.1	424	5.5	33.1	1041
5.5	38.6	663	5.5	38.6	424	5.5	38.6	1041
5.5	44.1	663	5.5	44.1	424	5.5	44.1	1041
5.5	49.6	663	5.5	49.6	424	5.5	49.6	1041
5.5	55.1	663	5.5	55.1	424	5.5	55.1	1041
5.5	60.6	663	5.5	60.6	424	5.5	60.6	1041
5.5	66.1	663	5.5	66.1	424	5.5	66.1	1041
6.0	72.1	1694	6.0	72.1	1084	6.0	72.1	2660
6.0	78.1	1694	6.0	78.1	1084	6.0	78.1	2660
6.0	84.2	1694	6.0	84.2	1084	6.0	84.2	2660
6.0	90.2	1694	6.0	90.2	1084	6.0	90.2	2660
6.0	96.2	1694	6.0	96.2	1084	6.0	96.2	2660
6.0	102	1694	6.0	102	1084	6.0	102	2660
6.0	108	1694	6.0	108	1084	6.0	108	2660
6.0	114	1694	6.0	114	1084	6.0	114	2660
6.0	120	1694	6.0	120	1084	6.0	120	2660
6.0	126	1694	6.0	126	1084	6.0	126	2660
29.0	155	4800	29.0	155	3072	29.0	155	7536
29.0	184	4800	29.0	184	3072	29.0	184	7536
29.0	213	4800	29.0	213	3072	29.0	213	7536
29.0	242	4800	29.0	242	3072	29.0	242	7536
7.8	250	4800	7.8	250	3072	7.8	250	7536
25.0	275	4800	25.0	275	3072	25.0	275	7536
25.0	300	4800	25.0	300	3072	25.0	300	7536
25.0	325	4800	25.0	325	3072	25.0	325	7536
25.0	350	4800	25.0	350	3072	25.0	350	7536
25.0	375	4800	25.0	375	3072	25.0	375	7536
25.0	400	4800	25.0	400	3072	25.0	400	7536
25.0	425	4800	25.0	425	3072	25.0	425	7536
25.0	450	4800	25.0	450	3072	25.0	450	7536
25.0	475	4800	25.0	475	3072	25.0	475	7536
25.0	500	4800	25.0	500	3072	25.0	500	7536
115.8	616	4800	115.8	616	3072	115.8	616	7536
268.1	884	4800	268.1	884	3072	268.1	884	9285
204.2	1088	4800	204.2	1088	3072	204.2	1088	9285

Table 2.3.2-1[a]: (Continued)

Profile 1 (P1)			Profile 2 (P2)			Profile 3 (P3)		
Thickness (ft)	Depth (ft)	Vs (ft/s)	Thickness (ft)	Depth (ft)	Vs (ft/s)	Thickness (ft)	Depth (ft)	Vs (ft/s)
204.2	1292	4800	204.2	1292	3072	204.2	1292	9285
204.2	1497	4800	204.2	1497	3072	204.2	1497	9285
204.2	1701	4800	204.2	1701	3072	204.2	1701	9285
204.2	1905	4800	204.2	1905	3072	204.2	1905	9285
204.2	2109	4800	204.2	2109	3072	204.2	2109	9285
204.2	2314	4800	204.2	2314	3072	204.2	2314	9285
204.2	2518	4800	204.2	2518	3072	204.2	2518	9285
204.2	2722	4800	204.2	2722	3072	204.2	2722	9285
204.2	2926	4800	204.2	2926	3072	204.2	2926	9285
204.2	3130	4800	204.2	3130	3072	204.2	3130	9285
204.2	3335	4800	204.2	3335	3072	204.2	3335	9285
204.2	3539	4800	204.2	3539	3072	204.2	3539	9285
204.2	3743	4800	204.2	3743	3072	204.2	3743	9285
204.2	3947	4800	204.2	3947	3072	204.2	3947	9285
204.2	4152	4800	204.2	4152	3072	204.2	4152	9285
204.0	4356	4800	204.0	4356	3072	204.0	4356	9285
3280.8	7636	9285	3280.8	7636	9285	3280.8	7636	9285

[a] Table 2.3.2-1 is modified from the table presented in Reference 30. The control point elevation was modified from EL. 710 feet MSL to EL. 666 feet MSL as discussed in Section 3.2. Therefore, due to the revision in the control point elevation, the soil layers do not match those presented in Reference 30.

2.3.2.1 Shear Modulus and Damping Curves

Results of recent laboratory testing for nonlinear dynamic material properties were not available for the soils or firm rock materials for the LaSalle County station. To reflect epistemic uncertainty in nonlinear dynamic material properties, the firm rock material at the site was assumed[1] to have behavior that could be modeled as either linear or non-linear and a realistic range in soil nonlinearity was accommodated with two sets of modulus reduction and hysteretic damping curves. Consistent with the SPID (Reference 3), the EPRI soil and rock curves (model M1) were considered to be appropriate to represent the upper range nonlinearity likely in the materials at the site; and Peninsular Range (PR) curves for soils combined with linear analyses (model M2) for rock was assumed[1] to represent an equally plausible less nonlinear alternative response across loading level. For the linear firm rock analyses, the low strain damping from the EPRI soil and rock curves were used as the constant damping values in the upper 500 feet of the profile.

[1] Assumptions discussed in Section 2 are provided by EPRI engineers (Reference 23) in accordance with implementation of the SPID (Reference 3) methodology.

2.3.2.2 Kappa

For the LaSalle County station profile of about 4,400 feet of soils and firm rock over hard reference rock, the estimates of kappa were based on the low-strain damping in the hysteretic damping curves over the top 500 feet plus the assumption[1] of a constant hysteretic damping of 1.25 (Q_S of 40) for the remaining firm rock profile in addition to a kappa value of 0.006s for hard rock (Reference 3). For base-case profiles P1, P2, and P3 the kappa contributions from the profiles was 0.028s, 0.043s, and 0.006s respectively. The total kappa values, after adding the hard reference rock value of 0.006s, were 0.034s, 0.040s (maximum of 0.04s, Reference 3), and 0.012s respectively (Table 2.3.2-2). Additional epistemic uncertainty in profile damping (kappa) is accommodated at design loading levels through multiple sets of modulus reduction and hysteretic damping curves for the soils.

Table 2.3.2-2: Kappa values and weights used for site response analyses (Reference 23)

Velocity Profile	Kappa(s)
P1	0.034
P2	0.040
P3	0.012
	Weights
P1	0.4
P2	0.3
P3	0.3
G/G_{max} and Hysteretic Damping Curves	
M1, EPRI Soil, EPRI Rock	0.5
M2, PR Soil, Linear Rock	0.5

2.3.3 Randomization of Base Case Profiles

To account for the aleatory variability in dynamic material properties that is expected to occur across a site at the scale of a typical nuclear facility, variability in the assumed[1] shear-wave velocity profiles has been incorporated in the site response calculations. For the LaSalle County station site, random shear wave velocity profiles were developed from the base case profiles shown in Figure 2.3.2-1. Consistent with the discussion in Appendix B of the SPID (Reference 3), the velocity randomization procedure made use of random field models which describe the statistical correlation between layering and shear wave velocity. The default randomization parameters developed in Toro (Reference 14) for USGS "A" site conditions were used for this site. Thirty random velocity profiles were generated for each base case profile. These random velocity profiles were generated using a natural log standard deviation of 0.25 over the upper 50 feet and 0.15 below that depth. As specified in the SPID (Reference 3), correlation of shear wave velocity between layers was modeled using the footprint correlation model. In the correlation model, a limit of +/- 2 standard deviations about the median value in each layer was assumed[1] for the limits on random velocity fluctuations.

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[1] Assumptions discussed in Section 2 are provided by EPRI engineers (Reference 23) in accordance with implementation of the SPID (Reference 3) methodology.

2.3.4 Input Spectra

Consistent with the guidance in Appendix B of the SPID (Reference 3), input Fourier amplitude spectra were defined for a single representative earthquake magnitude (**M** 6.5) using two different assumptions[1] regarding the shape of the seismic source spectrum (single-corner and double-corner). A range of 11 different input amplitudes (median peak ground accelerations (PGA) ranging from 0.01g to 1.50 g) were used in the site response analyses. The characteristics of the seismic source and upper crustal attenuation properties assumed[1] for the analysis of the LaSalle County station were the same as those identified in Tables B-4, B-5, B-6 and B-7 of the SPID (Reference 3) as appropriate for typical CEUS sites.

2.3.5 Methodology

To perform the site response analyses for the LaSalle County station site, a random vibration theory (RVT) approach was employed. This process utilizes a simple, efficient approach for computing site-specific amplification functions and is consistent with existing NRC guidance and the SPID (Reference 3). The guidance contained in Appendix B of the SPID (Reference 3) on incorporating epistemic uncertainty in shear-wave velocities, kappa, non-linear dynamic properties and source spectra for plants with limited at-site information was followed for the LaSalle County station.

2.3.6 Amplification Functions

The results of the site response analysis consist of amplification factors (5% damped pseudo absolute response spectra) which describe the amplification (or de-amplification) of hard reference rock motion as a function of frequency and input reference rock amplitude. The amplification factors are represented in terms of a median amplification value and an associated standard deviation (sigma) for each oscillator frequency and input rock amplitude. Consistent with the SPID (Reference 3) a minimum median amplification value of 0.5 was employed in the present analysis. Figure 2.3.6-1 illustrates the median and +/- 1 standard deviation in the predicted amplification factors developed for the eleven loading levels parameterized by the median reference (hard rock) peak acceleration (0.01g to 1.50g) for profile P1 and EPRI soil and firm rock G/G_{max} and hysteretic damping curves (Reference 3). The variability in the amplification factors results from variability in shear-wave velocity, depth to hard rock, and modulus reduction and hysteretic damping curves. To illustrate the effects of more linear response at the LaSalle County station firm rock site, Figure 2.3.6-2 shows the corresponding amplification factors developed with PR curves for soil and linear site response analyses for firm rock (model M2). Between the more nonlinear and more linear analyses, Figure 2.3.6-1 and Figure 2.3.6-2 respectively show a significant difference at high structural frequency (≥ 10 Hz) at very high loading level. Tabulated values of amplification factors are provided in Tables A-2b1 and A-2b2 in Appendix A.

[1] Assumptions discussed in Section 2 are provided by EPRI engineers (Reference 23) in accordance with implementation of the SPID (Reference 3) methodology.

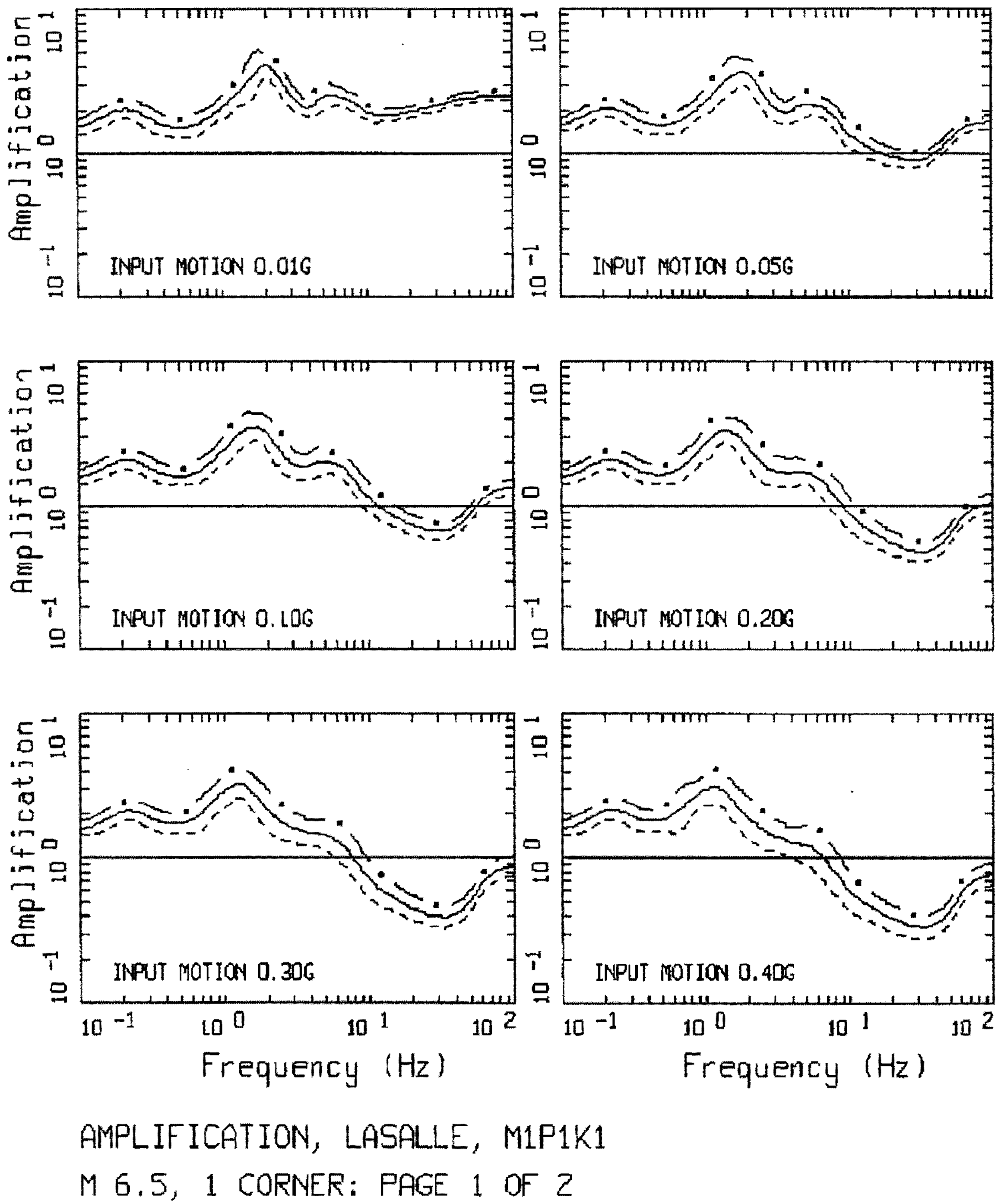
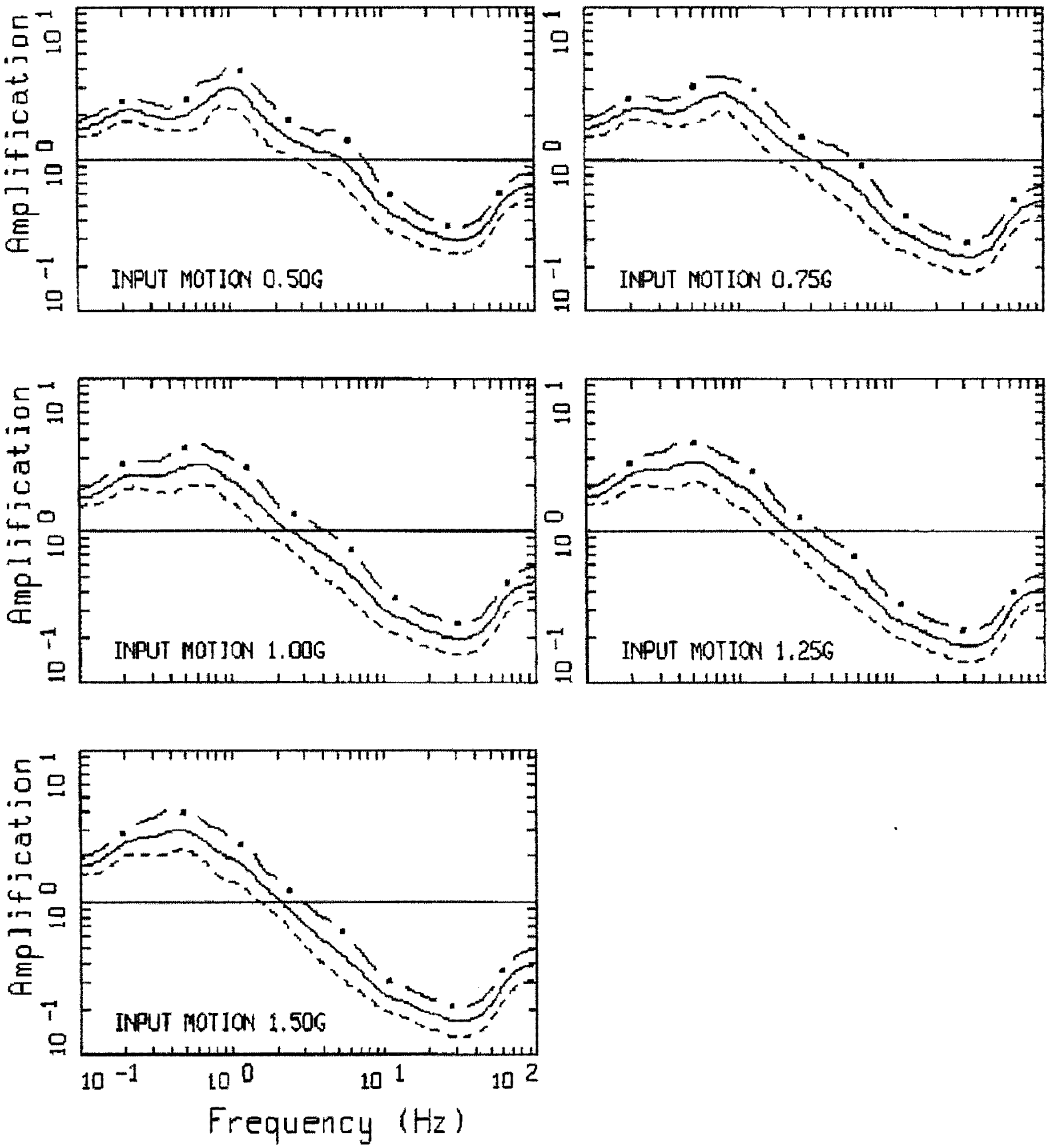


Figure 2.3.6-1: Example suite of amplification factors (5% critical damping pseudo absolute acceleration spectra) developed for the mean base-case profile (P1), EPRI soil and rock modulus reduction and hysteretic damping curves (model M1), and base-case kappa at eleven loading levels of hard rock median peak acceleration values from 0.01g to 1.50g. **M** 6.5 and single-corner source model (Reference 3) (Reference 23)



AMPLIFICATION, LASALLE, M1P1K1

M 6.5, 1 CORNER: PAGE 2 OF 2

Figure 2.3.6-1: (Continued)

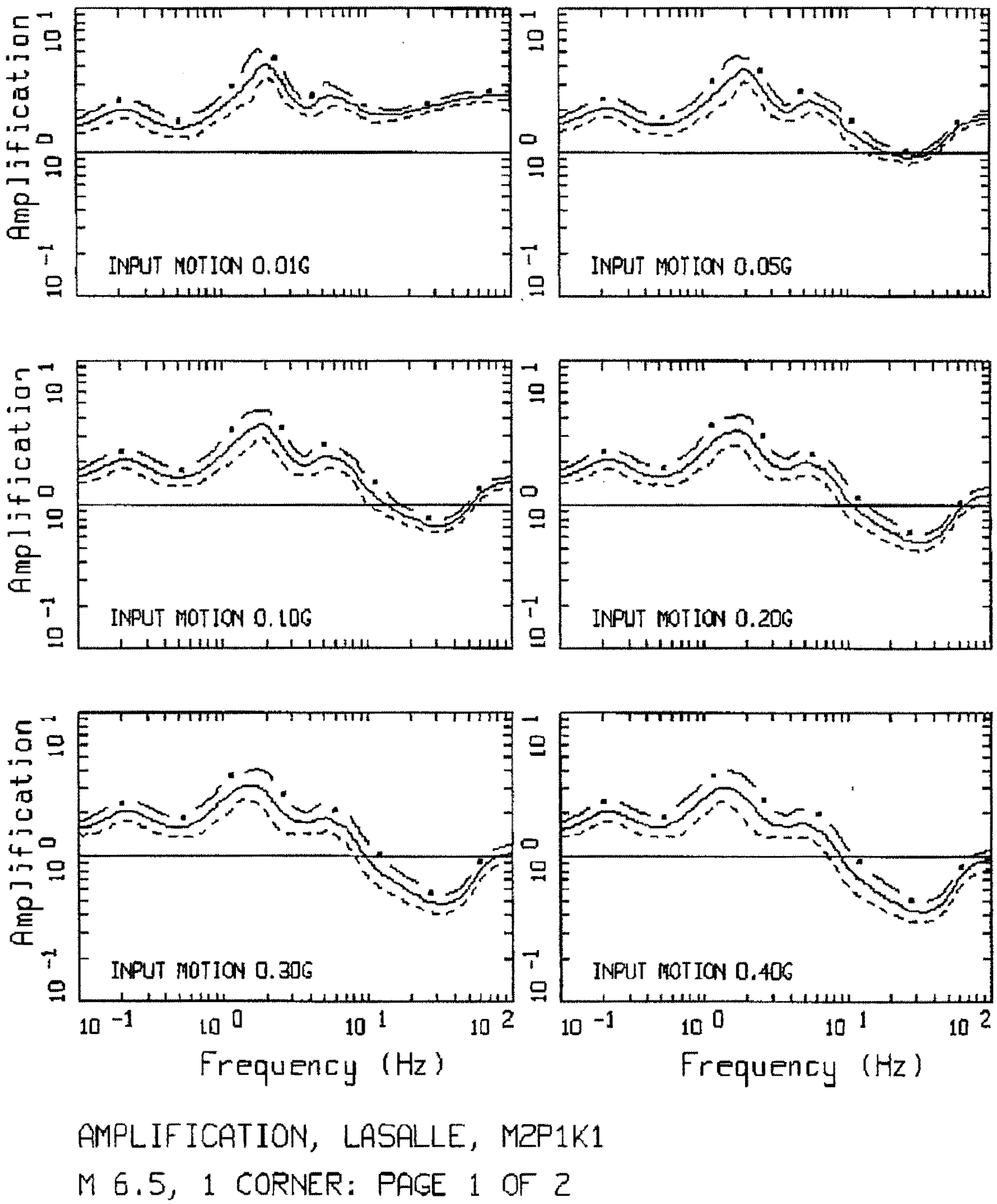
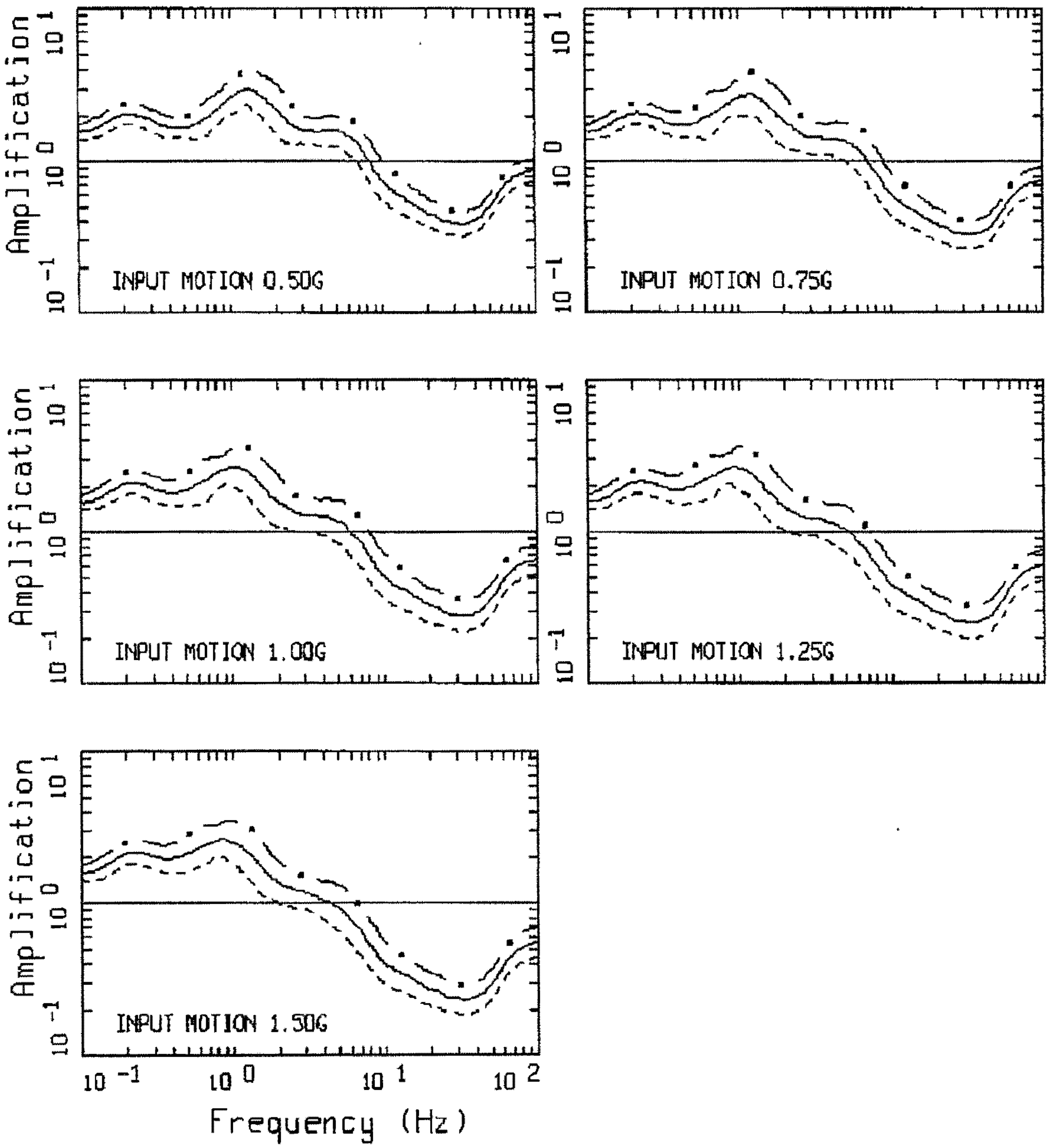


Figure 2.3.6-2: Example suite of amplification factors (5% critical damping pseudo absolute acceleration spectra) developed for the mean base-case profile (P1), Peninsular Range curves for soil and linear site response for firm rock (model M2), and base-case kappa at eleven loading levels of hard rock median peak acceleration values from 0.01g to 1.50g. **M** 6.5 and single-corner source model (Reference 3) (Reference 23)



AMPLIFICATION, LASALLE, M2P1K1

M 6.5, 1 CORNER: PAGE 2 OF 2

Figure 2.3.6-2: (Continued)

2.3.7 Control Point Seismic Hazard Curves

The procedure to develop probabilistic site-specific control point hazard curves used in the present analysis follows the methodology described in Section B-6.0 of the SPID (Reference 3). This procedure (referred to as Method 3) computes a site-specific control point hazard curve for a broad range of spectral accelerations given the site-specific bedrock hazard curve and site-specific estimates of soil or soft-rock response and associated uncertainties. This process is repeated for each of the seven spectral frequencies for which ground motion equations are available. The dynamic response of the materials below the control point was represented by the frequency- and amplitude-dependent amplification functions (median values and standard deviations) developed and described in the previous section. The resulting control point mean hazard curves for LaSalle County station are shown in Figure 2.3.7-1 for the seven spectral frequencies for which ground motion equations are defined. Tabulated values of mean and fractile seismic hazard curves and site response amplification functions are provided in Appendix A.

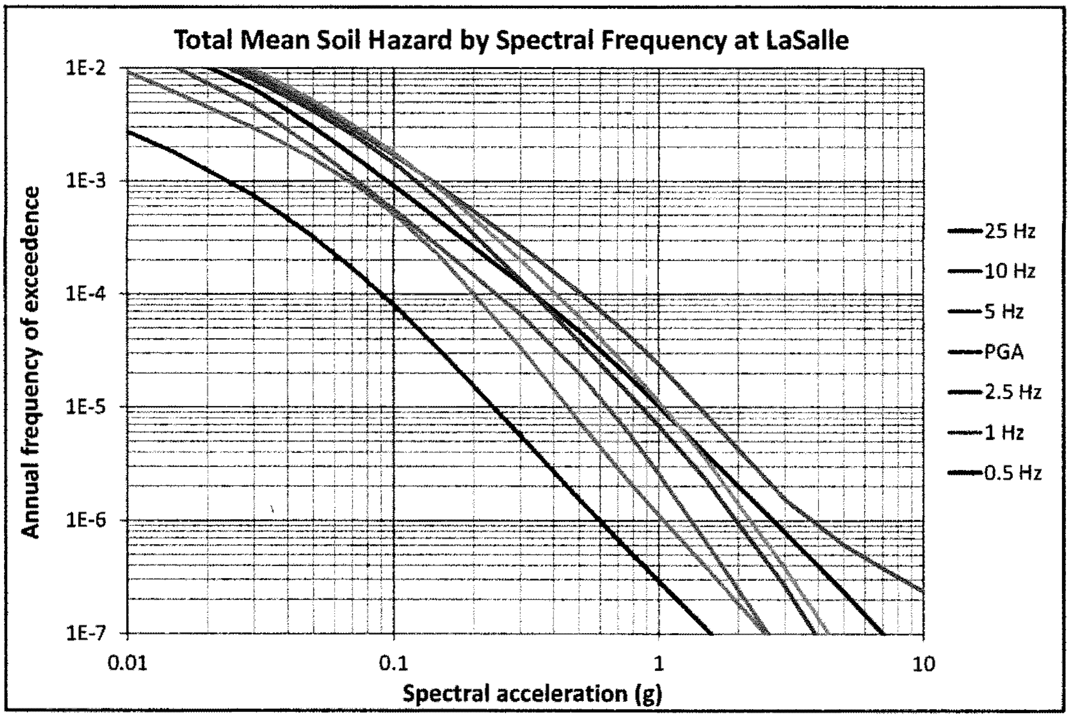


Figure 2.3.7-1: Control point mean hazard curves for spectral frequencies of 0.5, 1, 2.5, 5, 10, 25 and 100 Hz (PGA) at the LaSalle County station (5% critical damping) (Reference 23)

2.4 CONTROL POINT RESPONSE SPECTRA

The control point hazard curves described above have been used to develop uniform hazard response spectra (UHRS) and the ground motion response spectrum (GMRS). The UHRS were obtained through linear interpolation in log-log space to estimate the spectral acceleration at each spectral frequency for the 1E-4 and 1E-5 per year hazard levels.

The 1E-4 and 1E-5 UHRS, along with a Design Factor (DF), are used to compute the GMRS at the control point using the criteria in Regulatory Guide 1.208 (Reference 17). Table 2.4-1 shows the UHRS and GMRS spectral accelerations for a range of spectral frequencies.

Table 2.4-1: UHRS and GMRS for LaSalle County station (Reference 23)

Freq. (Hz)	10^{-4} UHRS (g)	10^{-5} UHRS (g)	GMRS (g)
100	2.44E-01	6.41E-01	3.17E-01
90	2.45E-01	6.57E-01	3.24E-01
80	2.47E-01	6.75E-01	3.31E-01
70	2.51E-01	6.98E-01	3.41E-01
60	2.56E-01	7.27E-01	3.54E-01
50	2.68E-01	7.67E-01	3.73E-01
40	2.89E-01	8.31E-01	4.04E-01
35	3.06E-01	8.76E-01	4.26E-01
30	3.23E-01	9.36E-01	4.54E-01
25	3.38E-01	1.01E+00	4.86E-01
20	3.62E-01	1.04E+00	5.07E-01
15	4.17E-01	1.18E+00	5.74E-01
12.5	4.62E-01	1.30E+00	6.35E-01
10	5.11E-01	1.42E+00	6.95E-01
9	5.14E-01	1.40E+00	6.86E-01
8	4.94E-01	1.35E+00	6.64E-01
7	4.61E-01	1.28E+00	6.27E-01
6	4.26E-01	1.16E+00	5.72E-01
5	4.09E-01	1.04E+00	5.17E-01
4	4.05E-01	9.75E-01	4.91E-01
3.5	4.04E-01	9.50E-01	4.80E-01
3	3.88E-01	9.12E-01	4.61E-01
2.5	3.38E-01	8.61E-01	4.28E-01
2	3.18E-01	8.10E-01	4.03E-01
1.5	2.74E-01	6.55E-01	3.30E-01
1.25	2.42E-01	5.61E-01	2.84E-01
1	2.01E-01	4.55E-01	2.32E-01
0.9	1.82E-01	4.21E-01	2.14E-01

Table 2.4-1: (Continued)

Freq. (Hz)	10^{-4} UHRS (g)	10^{-5} UHRS (g)	GMRS (g)
0.8	1.61E-01	3.82E-01	1.93E-01
0.7	1.38E-01	3.36E-01	1.69E-01
0.6	1.13E-01	2.86E-01	1.43E-01
0.5	9.05E-02	2.38E-01	1.18E-01
0.4	7.24E-02	1.90E-01	9.41E-02
0.35	6.33E-02	1.67E-01	8.23E-02
0.3	5.43E-02	1.43E-01	7.06E-02
0.25	4.52E-02	1.19E-01	5.88E-02
0.2	3.62E-02	9.52E-02	4.71E-02
0.15	2.71E-02	7.14E-02	3.53E-02
0.125	2.26E-02	5.95E-02	2.94E-02
0.1	1.81E-02	4.76E-02	2.35E-02

The 1E-4 and 1E-5 UHRS are used to compute the GMRS at the control point and are shown in Figure 2.4-1.

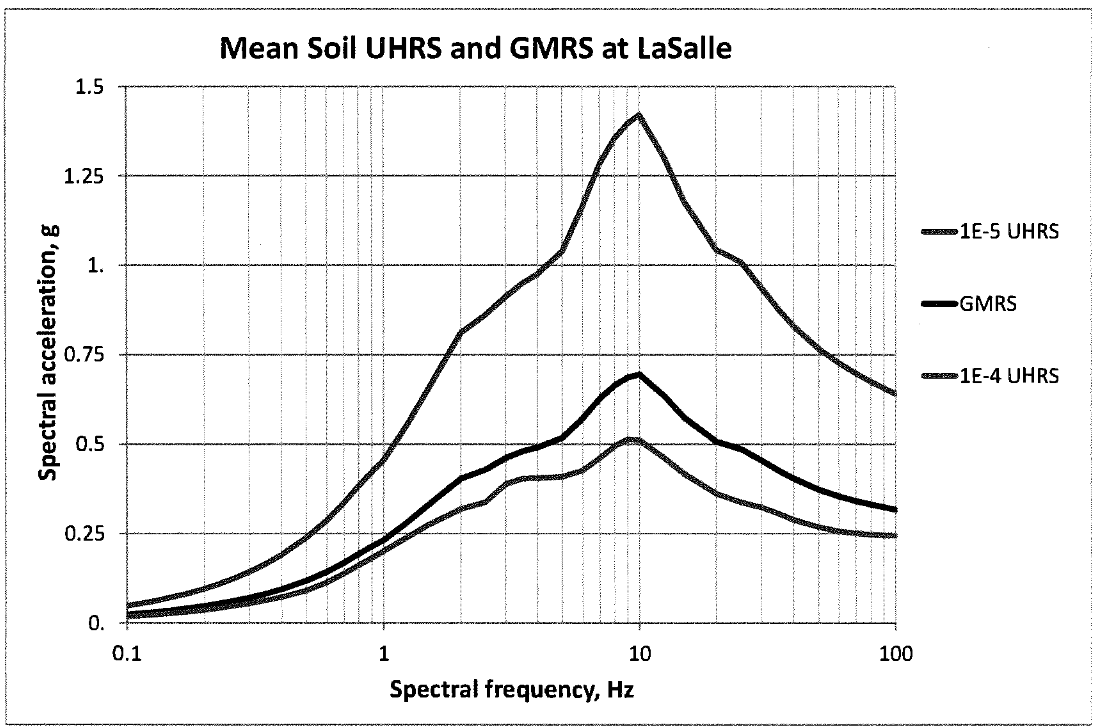


Figure 2.4-1: Plots of 1E-4 and 1E-5 UHRS and GMRS at the control point for LaSalle County station (5% critical damping). (Reference 23)

3

Plant Design Basis Ground Motion

The design basis for LaSalle County station is identified in the Updated Final Safety Analysis Report (UFSAR) (Reference 9). The SSE for the site is based on the assumption that an Intensity VII (MM) event could occur in the vicinity of the site. Seismic Category I structures are designed for safe shutdown due to maximum horizontal ground accelerations at the foundation level of 20% of gravity. The response spectrum for the safe shutdown earthquake is shown in Table 3.1-1.

3.1 SSE Description of Spectral Shape

The SSE is defined in terms of a PGA and a design response spectrum. The PGA for the site is 20% of gravity for the SSE. The 5% critical damping horizontal SSE for LaSalle County station is shown in UFSAR Figure 2.5-39 (Reference 9). This spectra shape is based on the Atomic Energy Commission (AEC, now NRC) criteria in effect at the time of the LaSalle construction permit (Reference 12). The SSE was recreated using the control points from UFSAR Figure 2.5-39. Table 3.1-1 shows the spectral acceleration values as a function of frequency for the 5% critically damped horizontal SSE. Figure 3.1-1 shows a plot of the same information.

Table 3.1-1: LaSalle County station Safe Shutdown Earthquake horizontal ground response spectrum, 5% critical damping

Frequency	5% Damped Spectral
0.10	0.01
0.13	0.01
0.15	0.02
0.20	0.03
0.25	0.05
0.30	0.07
0.35	0.09
0.38	0.10
0.40	0.11
0.50	0.14
0.60	0.16
0.70	0.19
0.80	0.22
0.90	0.24
1.00	0.27
1.25	0.34
1.50	0.41
2	0.54
3	0.54
4	0.54
5	0.54
6	0.54
6.4	0.54
7	0.50
8	0.46
9	0.42
10	0.38
12.5	0.32
15	0.28
20	0.23
23.5	0.20
25	0.20
30	0.20
50	0.20
100	0.20

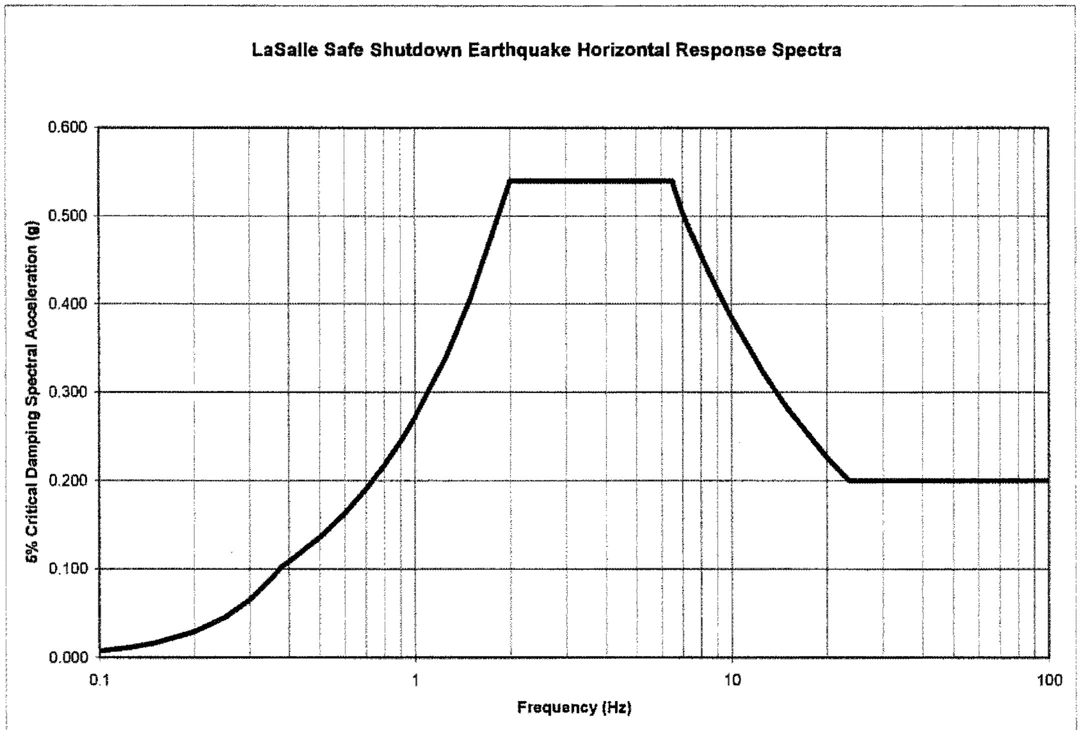


Figure 3.1-1: LaSalle County station Safe Shutdown Earthquake horizontal ground response spectrum (5% critical damping)

3.2 CONTROL POINT ELEVATION

Section 3.7.1.1 of the UFSAR (Reference 9) states that the site response spectra are defined at the free field foundation level for the SSE. The foundation elevation is not explicitly stated in section 3.7.1.1. Review of the station design basis soil structure interaction analysis calculation (Reference 25) and UFSAR Figure 3.7-39 (Reference 9) show that the elevation considered as the SSE control point is elevation 666 feet MSL, which is approximately the bottom of the reactor building basemat (located in the concrete mud mat under the foundation). The SSE control point elevation of elevation 666 feet MSL differs from the control point reported in Reference 30, which reported the control point as elevation 710 feet MSL (surface grade). Elevation 666 feet MSL is the appropriate SSE control point based on the previous discussion.

4 Screening Evaluation

Following completion of the seismic hazard reevaluation, as requested in the 50.54(f) letter (Reference 1), a screening process is needed to determine if a risk evaluation is needed. The horizontal GMRS determined from the hazard reevaluation is used to characterize the amplitude of the new seismic hazard at each of the nuclear power plant sites. The screening evaluation compares the GMRS with the 5% critical damping horizontal SSE, in accordance with the SPID (Reference 3).

4.1 Risk Evaluation Screening (1 to 10 Hz)

In the 1 Hz to 10 Hz part of the response spectrum, the GMRS (Table 2.4-1) exceeds the SSE (Table 3.1-1). Therefore, LaSalle station screens in for a risk evaluation.

Further, in accordance with the screening requirements in the ESEP guidance (Reference 4), LaSalle County station will perform "Augmented Approach" near-term seismic evaluations. The ESEP will be performed as an interim assessment for LaSalle County station. See Section 5.1 for further details on the ESEP.

4.2 High Frequency Screening (> 10 Hz)

In the frequency range above 10 Hz, the GMRS exceeds the SSE. Therefore, high frequency exceedances can be addressed in the risk evaluation process discussed in Section 4.1.

Section 3.4 of the SPID (Reference 3) discusses high-frequency exceedances. It discusses the impact of high-frequency ground motion on plant components and identifies the component groups that are sensitive to high-frequency vibration. A two-phase test program is described, which is currently ongoing, that will develop data to support the high-frequency evaluation.

The SPID concludes that high-frequency vibration is not damaging, in general, to components with strain- or stress-based failure modes, based on EPRI Report NP-7498 (Reference 28). But components, such as relays, subject to electrical functionality failure modes have unknown acceleration sensitivity for frequencies above 16 Hz.

EPRI Report 1015108 (Reference 26) provides evidence that supports the conclusion that high-frequency motions are not damaging to the majority of nuclear plant components, excluding relays and other electrical devices whose output signals may be affected by high-frequency vibration. EPRI Report 1015109 (Reference 27) provides guidance for identifying and evaluating potentially high-frequency sensitive components. Guidance from these documents is considered in the SPID (Reference 3) report for identifying components that are sensitive to high-frequency vibration. Component types listed in Table 2-1 of EPRI Report 3002000706 (Reference 29) will require high -frequency evaluation. Those component types are:

- Electro-mechanical relays
- Circuit breakers
- Control switches
- Process switches and sensors
- Electro-mechanical contactors
- Auxiliary contacts
- Transfer switches
- Potentiometers

4.3 Spent Fuel Pool Evaluation Screening (1 to 10 Hz)

In the 1 Hz to 10 Hz part of the response spectrum, the GMRS exceeds the SSE. Therefore, a spent fuel pool evaluation will be performed.

5 Interim Actions

Based on the screening evaluation outcome described in Section 4, the GMRS exceeds the SSE at frequencies from 1 Hz to 10 Hz and greater than 10 Hz. Therefore, LaSalle County station screens in for a risk evaluation in response to the 50.54(f) letter request for information (Reference 1). Prior to completion of the risk evaluation, LaSalle County station is implementing certain interim actions to ensure continued and improved seismic safety of the plant, namely the execution of the Expedited Seismic Evaluation Process (ESEP).

5.1 Expedited Seismic Evaluation Process

Based on the screening evaluation, the expedited seismic evaluation described in EPRI Report 3002000704 (Reference 4) will be performed as proposed in the NEI letter to the NRC dated April 9, 2013 (Reference 6), and agreed to by the NRC in the letter dated May 7, 2013 (Reference 32).

The ESEP addresses the 50.54(f) letter (Reference 1) request for "interim evaluations and actions taken or planned to address the higher seismic hazard relative to the design basis, as appropriate, prior to completion of the risk evaluation." Specifically, the ESEP focuses initial industry efforts on short term evaluations that will lead to prompt modifications to some of the most important components that could improve plant seismic safety.

5.2 Interim Evaluation of Seismic Hazard

Consistent with the NRC letter dated February 20, 2014 (Reference 36), the seismic hazard reevaluations presented herein are distinct from the current design and licensing bases of LaSalle County station. Therefore, the results do not call into question the operability or functionality of SSCs and are not reportable pursuant to 10 CFR 50.72, "Immediate notification requirements for operating nuclear power reactors" (Reference 37), and 10 CFR 50.73, "Licensee event report system" (Reference 38).

The NRC letter also requests that licensees provide an interim evaluation or actions to demonstrate that the plant can cope with the reevaluated hazard while the expedited approach and risk evaluations are conducted. In response to that request, NEI letter dated March 12, 2014 (Reference 33) provides seismic core damage risk estimates using the updated seismic hazards for the operating nuclear plants in the Central and Eastern United States. These risk estimates continue to support the following conclusions of the NRC GI-199 Safety/Risk Assessment (Reference 34):

Overall seismic core damage risk estimates are consistent with the Commission's Safety Goal Policy Statement because they are within the subsidiary objective of 10^{-4}/year for core damage frequency. The GI-199 Safety/Risk Assessment, based in part on information from the U. S. Nuclear Regulatory Commission's (NRC's) Individual Plant Examination of External Events (IPEEE) program, indicates that no concern exists regarding adequate protection and that the current seismic design of operating reactors provides a safety margin to withstand potential earthquakes exceeding the original design basis.

LaSalle County station is included in the March 12, 2014 risk estimates (Reference 33). Using the methodology described in the NEI letter, all plants were shown to be below 10^{-4}/year; thus, the above conclusions apply.

5.3 SEISMIC WALKDOWN INSIGHTS

In response to NTTF Recommendation 2.3, the 50.54(f) letter (Reference 1) also requested licensees to perform seismic walkdowns in order to, in the context of seismic response: 1) verify that the current plant configuration is consistent with the licensing basis, 2) verify the adequacy of current strategies, monitoring, and maintenance programs, and 3) identify degraded, nonconforming, or unanalyzed conditions. Seismic walkdown guidance (EPRI 1025286, Reference 16) was developed by NEI and endorsed by the NRC as a means for all plants to provide a uniform and acceptable industry response to NTTF 2.3 seismic walkdowns.

Seismic walkdowns in response to NTTF 2.3 for LaSalle County station have been performed and documented in References 10 and 11. The seismic walkdowns for LaSalle County station concluded that none of the equipment items included in the walkdowns had adverse anchorage conditions, adverse seismic spatial interactions, or other adverse seismic conditions. Any potentially degraded, non-conforming, or unanalyzed conditions identified during the seismic walkdown program were assessed in accordance with the plant corrective action program, and were identified as being minor issues.

A review of the LaSalle County station Individual Plant Examination of External Events (IPEEE) submittal (Reference 15 and 24) along with the NRC Staff Evaluation Report (SER) (Reference 18) was conducted during the seismic walkdowns to confirm IPEEE seismic vulnerabilities had been addressed (References 10 and 11). The seismic IPEEE reviews found that no vulnerabilities were identified in the submittal and no plant improvements resulted from the IPEEE program (References 10 and 11).

5.4 BEYOND-DESIGN-BASIS SEISMIC INSIGHTS

A beyond-design-basis SPRA was performed for the seismic portion of the LaSalle County station IPEEE (Reference 15 and 24). LaSalle County station is defined as a 0.3g focused scope plant in accordance with NUREG 1407 (Reference 19). The IPEEE submittal (Reference 15 and 24) is based on an SPRA developed for Unit 2 as part of the NRCs Risk Methods Integration and Evaluation Program (RMIEP). Volume 8 of NUREG/CR-4832 contains the plant specific analysis for LaSalle Unit 2 titled, *Analysis of the LaSalle Unit 2 Nuclear Power Plant: Risk Methods Integration and Evaluation Program (RMIEP)* (Reference 20). The SPRA consisted of the development of a seismic risk model, a seismic hazard analysis, seismic response of structures and equipment, development of seismic fragilities, and computation of seismic core damage frequency. The resulting seismically induced CDF was 6.0E-7/year (mean point estimate) (Reference 20).

The NRC SER of the LaSalle County station IPEEE submittal was performed by Sandia National Laboratories (Reference 18). No major weaknesses were identified in the IPEEE submittal. Minor weaknesses were reported in the SER along with additional factors which may impact the reported seismically induced CDF. The SER findings report that the seismic risk assessment for the LaSalle County station IPEEE constitutes a detailed, defendable analysis using state-of-the-art approaches and a detailed evaluation of component and structure responses and fragilities (Reference 18).

Therefore, considering the low seismically induced CDF reported in Reference 20, the IPEEE SPRA for LaSalle County station has shown that the plant has significant seismic safety for beyond-design-basis earthquakes.

6

Conclusions

In accordance with the 50.54(f) letter (Reference 1), a seismic hazard and screening evaluation was performed for LaSalle County station. This reevaluation followed the SPID guidance (Reference 3) in order to develop a GMRS for the site. The GMRS was developed solely for the purpose of screening for additional evaluation requirements in accordance with the SPID (Reference 3). The new GMRS represents a beyond-design-basis seismic demand and does not constitute a change in the plant design or licensing basis.

The screening evaluation comparison demonstrates that the GMRS exceeds the SSE in the 1 Hz to 10 Hz range of the response spectrum and also above 10 Hz. Based on the screening evaluation, LaSalle County station screens in for a risk evaluation and a spent fuel pool integrity evaluation. The risk evaluation process can also evaluate components for high frequency exceedances (> 10 Hz). The risk evaluation will be performed on a schedule in accordance with NRC prioritization and the NEI letter dated April 9, 2013 (Reference 6) as endorsed by the NRC in the letter to NEI dated May 7, 2013 (Reference 32).

The near-term ESEP interim evaluations will be performed following the ESEP guidance (Reference 4). This is an interim action to establish beyond-design-basis seismic margin prior to completion of the risk evaluation. ESEP evaluations will be performed and modifications (if required) will be implemented on a schedule in accordance with the NEI letter dated April 9, 2013 (Reference 6) as endorsed by the NRC in the letter to NEI dated May 7, 2013 (Reference 32).

7 References

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4. EPRI Technical Report 3002000704, *Seismic Evaluation Guidance: Augmented Approach for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic*, dated May 2013

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10. Seismic Walkdown Report in Response to the 50.54(f) Information Request Regarding Fukushima Near-Term Task Force Recommendation 2.3: Seismic for the LaSalle County Generating Station Unit 1, November 2012 (Exelon Correspondence No. RS-12-163, Enclosure 1)

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A

Additional Tables

Table A-1a: Mean and fractile seismic hazard curves for 100 Hz (PGA) at LaSalle, 5% of critical damping (Reference 23)

AMPS(g)	MEAN	0.05	0.16	0.50	0.84	0.95
0.0005	8.53E-02	5.20E-02	6.54E-02	8.60E-02	9.93E-02	9.93E-02
0.001	7.24E-02	3.63E-02	5.27E-02	7.34E-02	9.24E-02	9.93E-02
0.005	2.80E-02	1.08E-02	1.72E-02	2.64E-02	3.84E-02	5.12E-02
0.01	1.52E-02	5.75E-03	8.85E-03	1.38E-02	2.07E-02	3.09E-02
0.015	1.03E-02	3.63E-03	5.66E-03	9.24E-03	1.38E-02	2.22E-02
0.03	4.52E-03	1.34E-03	2.01E-03	3.73E-03	6.45E-03	1.13E-02
0.05	1.98E-03	4.56E-04	7.13E-04	1.44E-03	2.96E-03	5.75E-03
0.075	9.50E-04	1.60E-04	2.80E-04	6.26E-04	1.44E-03	2.88E-03
0.1	5.57E-04	7.55E-05	1.42E-04	3.52E-04	8.60E-04	1.67E-03
0.15	2.61E-04	2.60E-05	5.42E-05	1.62E-04	4.19E-04	8.23E-04
0.3	6.66E-05	4.31E-06	1.08E-05	3.79E-05	1.13E-04	2.25E-04
0.5	2.01E-05	1.11E-06	3.01E-06	1.02E-05	3.47E-05	6.93E-05
0.75	6.42E-06	2.88E-07	8.35E-07	3.09E-06	1.10E-05	2.29E-05
1.	2.59E-06	8.60E-08	2.84E-07	1.18E-06	4.50E-06	9.37E-06
1.5	6.60E-07	1.02E-08	4.90E-08	2.76E-07	1.13E-06	2.53E-06
3.	6.03E-08	1.82E-10	1.32E-09	1.55E-08	9.24E-08	2.68E-07
5.	9.37E-09	9.11E-11	1.29E-10	1.40E-09	1.31E-08	4.56E-08
7.5	1.86E-09	9.11E-11	1.11E-10	2.35E-10	2.32E-09	9.79E-09
10.	5.42E-10	8.12E-11	9.11E-11	1.20E-10	6.93E-10	2.96E-09

Table A-1b: Mean and fractile seismic hazard curves for 25 Hz at LaSalle, 5% of critical damping (Reference 23)

AMPS(g)	MEAN	0.05	0.16	0.50	0.84	0.95
0.0005	8.73E-02	5.83E-02	6.73E-02	8.85E-02	9.93E-02	9.93E-02
0.001	7.60E-02	4.43E-02	5.66E-02	7.66E-02	9.51E-02	9.93E-02
0.005	3.40E-02	1.49E-02	2.16E-02	3.23E-02	4.50E-02	6.00E-02
0.01	2.00E-02	8.23E-03	1.18E-02	1.84E-02	2.68E-02	3.95E-02
0.015	1.41E-02	5.50E-03	7.89E-03	1.27E-02	1.90E-02	2.92E-02
0.03	6.51E-03	2.01E-03	3.01E-03	5.50E-03	9.51E-03	1.44E-02
0.05	3.00E-03	5.66E-04	9.51E-04	2.32E-03	4.77E-03	7.89E-03
0.075	1.51E-03	2.10E-04	3.90E-04	1.07E-03	2.42E-03	4.37E-03
0.1	9.05E-04	1.21E-04	2.29E-04	6.09E-04	1.44E-03	2.68E-03
0.15	4.38E-04	6.09E-05	1.13E-04	2.84E-04	6.93E-04	1.25E-03
0.3	1.25E-04	1.82E-05	3.52E-05	8.35E-05	2.07E-04	3.63E-04
0.5	4.72E-05	6.26E-06	1.31E-05	3.23E-05	7.89E-05	1.36E-04
0.75	1.98E-05	2.35E-06	5.42E-06	1.42E-05	3.33E-05	5.58E-05
1.	1.02E-05	1.07E-06	2.76E-06	7.45E-06	1.74E-05	2.84E-05
1.5	3.91E-06	3.05E-07	8.60E-07	2.57E-06	6.73E-06	1.16E-05
3.	7.89E-07	1.57E-08	6.93E-08	3.42E-07	1.46E-06	3.01E-06
5.	2.34E-07	1.04E-09	8.12E-09	6.45E-08	4.50E-07	1.01E-06
7.5	8.42E-08	1.69E-10	1.29E-09	1.42E-08	1.60E-07	3.90E-07
10.	3.93E-08	1.11E-10	3.57E-10	4.43E-09	7.45E-08	1.92E-07

Table A-1c: Mean and fractile seismic hazard curves for 10 Hz at LaSalle, 5% of critical damping (Reference 23)

AMPS(g)	MEAN	0.05	0.16	0.50	0.84	0.95
0.0005	9.14E-02	6.45E-02	7.23E-02	9.11E-02	9.93E-02	9.93E-02
0.001	8.33E-02	5.50E-02	6.45E-02	8.35E-02	9.93E-02	9.93E-02
0.005	4.26E-02	2.04E-02	2.72E-02	4.13E-02	5.83E-02	7.03E-02
0.01	2.54E-02	1.08E-02	1.51E-02	2.39E-02	3.57E-02	4.56E-02
0.015	1.78E-02	7.13E-03	1.01E-02	1.64E-02	2.53E-02	3.28E-02
0.03	8.75E-03	2.84E-03	4.31E-03	7.77E-03	1.31E-02	1.77E-02
0.05	4.66E-03	1.10E-03	1.79E-03	4.01E-03	7.45E-03	1.07E-02
0.075	2.64E-03	4.25E-04	7.45E-04	2.10E-03	4.43E-03	6.83E-03
0.1	1.70E-03	2.10E-04	3.90E-04	1.29E-03	2.88E-03	4.77E-03
0.15	8.83E-04	8.23E-05	1.64E-04	6.17E-04	1.49E-03	2.60E-03
0.3	2.69E-04	2.29E-05	4.83E-05	1.72E-04	4.63E-04	8.12E-04
0.5	1.05E-04	9.51E-06	2.01E-05	6.17E-05	1.82E-04	3.33E-04
0.75	4.57E-05	4.37E-06	9.24E-06	2.53E-05	8.12E-05	1.55E-04
1.	2.39E-05	2.10E-06	4.50E-06	1.27E-05	4.19E-05	8.35E-05
1.5	8.75E-06	4.63E-07	1.18E-06	4.63E-06	1.60E-05	3.05E-05
3.	1.54E-06	1.16E-08	4.90E-08	6.09E-07	3.01E-06	6.00E-06
5.	6.08E-07	4.56E-10	3.47E-09	6.54E-08	1.23E-06	3.01E-06
7.5	3.45E-07	1.11E-10	4.07E-10	8.47E-09	7.23E-07	1.84E-06
10.	2.37E-07	9.79E-11	1.34E-10	1.92E-09	4.98E-07	1.29E-06

Table A-1d: Mean and fractile seismic hazard curves for 5 Hz at LaSalle, 5% of critical damping (Reference 23)

AMPS(g)	MEAN	0.05	0.16	0.50	0.84	0.95
0.0005	9.33E-02	6.64E-02	7.45E-02	9.24E-02	9.93E-02	9.93E-02
0.001	8.76E-02	6.09E-02	6.83E-02	8.72E-02	9.93E-02	9.93E-02
0.005	4.90E-02	2.49E-02	3.23E-02	4.77E-02	6.64E-02	7.66E-02
0.01	2.92E-02	1.34E-02	1.79E-02	2.80E-02	4.07E-02	4.83E-02
0.015	2.01E-02	8.98E-03	1.21E-02	1.90E-02	2.84E-02	3.42E-02
0.03	9.63E-03	4.07E-03	5.75E-03	9.11E-03	1.36E-02	1.69E-02
0.05	5.14E-03	1.98E-03	2.84E-03	4.77E-03	7.34E-03	9.65E-03
0.075	2.86E-03	1.01E-03	1.46E-03	2.53E-03	4.25E-03	5.91E-03
0.1	1.78E-03	5.83E-04	8.60E-04	1.51E-03	2.64E-03	3.95E-03
0.15	8.48E-04	2.49E-04	3.73E-04	6.83E-04	1.25E-03	2.04E-03
0.3	2.02E-04	4.25E-05	7.23E-05	1.53E-04	3.14E-04	5.35E-04
0.5	6.34E-05	8.35E-06	1.67E-05	4.50E-05	1.07E-04	1.82E-04
0.75	2.36E-05	1.82E-06	4.25E-06	1.53E-05	4.19E-05	7.45E-05
1.	1.12E-05	5.83E-07	1.55E-06	6.45E-06	2.01E-05	3.73E-05
1.5	3.53E-06	1.18E-07	3.79E-07	1.69E-06	6.45E-06	1.29E-05
3.	3.79E-07	6.54E-09	2.53E-08	1.31E-07	6.64E-07	1.55E-06
5.	6.30E-08	4.70E-10	2.19E-09	1.82E-08	1.02E-07	2.68E-07
7.5	1.48E-08	1.15E-10	3.14E-10	3.33E-09	2.16E-08	6.45E-08
10.	5.29E-09	9.37E-11	1.31E-10	9.24E-10	7.23E-09	2.42E-08

Table A-1e: Mean and fractile seismic hazard curves for 2.5 Hz at LaSalle, 5% of critical damping (Reference 23)

AMPS(g)	MEAN	0.05	0.16	0.50	0.84	0.95
0.0005	9.24E-02	6.54E-02	7.34E-02	9.24E-02	9.93E-02	9.93E-02
0.001	8.50E-02	5.75E-02	6.64E-02	8.47E-02	9.93E-02	9.93E-02
0.005	4.38E-02	2.07E-02	2.76E-02	4.19E-02	6.09E-02	7.34E-02
0.01	2.51E-02	1.08E-02	1.49E-02	2.32E-02	3.57E-02	4.50E-02
0.015	1.69E-02	7.13E-03	9.79E-03	1.55E-02	2.42E-02	3.09E-02
0.03	7.88E-03	3.05E-03	4.43E-03	7.34E-03	1.13E-02	1.46E-02
0.05	4.19E-03	1.38E-03	2.10E-03	3.79E-03	6.26E-03	8.35E-03
0.075	2.35E-03	6.54E-04	1.02E-03	1.98E-03	3.68E-03	5.27E-03
0.1	1.45E-03	3.57E-04	5.66E-04	1.16E-03	2.35E-03	3.57E-03
0.15	6.62E-04	1.38E-04	2.29E-04	4.90E-04	1.07E-03	1.77E-03
0.3	1.34E-04	2.04E-05	3.73E-05	9.24E-05	2.19E-04	3.90E-04
0.5	3.81E-05	3.57E-06	7.55E-06	2.42E-05	6.64E-05	1.21E-04
0.75	1.41E-05	7.03E-07	1.74E-06	8.00E-06	2.53E-05	4.83E-05
1.	6.88E-06	1.95E-07	5.66E-07	3.42E-06	1.23E-05	2.49E-05
1.5	2.33E-06	2.84E-08	1.10E-07	9.11E-07	4.13E-06	9.24E-06
3.	2.64E-07	9.51E-10	5.91E-09	6.36E-08	4.43E-07	1.18E-06
5.	3.98E-08	1.40E-10	5.12E-10	6.26E-09	5.75E-08	1.82E-07
7.5	8.13E-09	9.51E-11	1.29E-10	8.72E-10	9.24E-09	3.63E-08
10.	2.62E-09	9.11E-11	1.11E-10	2.49E-10	2.42E-09	1.08E-08

Table A-1f: Mean and fractile seismic hazard curves for 1 Hz at LaSalle, 5% of critical damping (Reference 23)

AMPS(g)	MEAN	0.05	0.16	0.50	0.84	0.95
0.0005	6.84E-02	2.92E-02	4.25E-02	6.83E-02	9.37E-02	9.93E-02
0.001	5.23E-02	1.77E-02	2.68E-02	5.12E-02	7.77E-02	9.24E-02
0.005	1.74E-02	4.07E-03	6.45E-03	1.53E-02	2.84E-02	3.90E-02
0.01	9.18E-03	1.77E-03	3.14E-03	7.89E-03	1.51E-02	2.10E-02
0.015	6.14E-03	1.01E-03	1.95E-03	5.27E-03	1.02E-02	1.42E-02
0.03	2.95E-03	3.33E-04	7.23E-04	2.35E-03	5.20E-03	7.55E-03
0.05	1.58E-03	1.32E-04	2.96E-04	1.10E-03	2.92E-03	4.63E-03
0.075	8.63E-04	5.91E-05	1.34E-04	5.12E-04	1.62E-03	2.88E-03
0.1	5.16E-04	3.23E-05	7.23E-05	2.72E-04	9.37E-04	1.84E-03
0.15	2.17E-04	1.29E-05	2.84E-05	1.04E-04	3.73E-04	8.12E-04
0.3	3.41E-05	2.25E-06	4.90E-06	1.64E-05	5.58E-05	1.20E-04
0.5	7.55E-06	5.05E-07	1.15E-06	3.73E-06	1.25E-05	2.68E-05
0.75	2.40E-06	1.34E-07	3.28E-07	1.13E-06	4.07E-06	8.85E-06
1.	1.12E-06	4.83E-08	1.25E-07	4.77E-07	1.87E-06	4.31E-06
1.5	3.96E-07	9.93E-09	2.92E-08	1.34E-07	6.36E-07	1.64E-06
3.	6.33E-08	5.27E-10	1.84E-09	1.21E-08	8.60E-08	2.88E-07
5.	1.45E-08	1.21E-10	2.49E-10	1.60E-09	1.60E-08	6.64E-08
7.5	4.04E-09	9.11E-11	1.11E-10	3.28E-10	3.57E-09	1.79E-08
10.	1.52E-09	8.35E-11	9.79E-11	1.51E-10	1.18E-09	6.54E-09

Table A-1g: Mean and fractile seismic hazard curves for 0.5 Hz at LaSalle, 5% of critical damping (Reference 23)

AMPS(g)	MEAN	0.05	0.16	0.50	0.84	0.95
0.0005	3.36E-02	1.46E-02	2.07E-02	3.23E-02	4.63E-02	5.75E-02
0.001	2.01E-02	8.00E-03	1.15E-02	1.87E-02	2.84E-02	3.63E-02
0.005	5.13E-03	1.34E-03	2.35E-03	4.63E-03	7.77E-03	1.07E-02
0.01	2.72E-03	4.19E-04	8.85E-04	2.29E-03	4.56E-03	6.54E-03
0.015	1.79E-03	1.79E-04	4.19E-04	1.36E-03	3.23E-03	4.83E-03
0.03	7.40E-04	3.33E-05	8.60E-05	3.90E-04	1.44E-03	2.64E-03
0.05	3.23E-04	8.00E-06	2.16E-05	1.16E-04	5.83E-04	1.36E-03
0.075	1.49E-04	2.42E-06	6.93E-06	4.13E-05	2.42E-04	6.54E-04
0.1	8.08E-05	1.02E-06	3.14E-06	1.92E-05	1.21E-04	3.63E-04
0.15	3.17E-05	3.09E-07	1.01E-06	6.73E-06	4.43E-05	1.34E-04
0.3	5.60E-06	4.07E-08	1.53E-07	1.10E-06	7.23E-06	2.39E-05
0.5	1.54E-06	8.85E-09	3.90E-08	2.92E-07	1.92E-06	7.03E-06
0.75	5.76E-07	2.49E-09	1.20E-08	9.93E-08	7.23E-07	2.72E-06
1.	2.92E-07	1.01E-09	4.90E-09	4.31E-08	3.57E-07	1.38E-06
1.5	1.13E-07	3.01E-10	1.34E-09	1.23E-08	1.18E-07	5.35E-07
3.	2.06E-08	1.11E-10	1.77E-10	1.16E-09	1.46E-08	9.37E-08
5.	5.12E-09	9.11E-11	1.11E-10	2.25E-10	2.53E-09	2.04E-08
7.5	1.51E-09	8.12E-11	9.11E-11	1.16E-10	5.91E-10	5.35E-09
10.	5.91E-10	8.12E-11	9.11E-11	1.11E-10	2.42E-10	1.87E-09

Table A-2a: Amplification functions for LaSalle, 5% of critical damping (Reference 23)

100 Hz (PGA)	Median AF	Sigma ln(AF)	25 Hz	Median AF	Sigma ln(AF)	10 Hz	Median AF	Sigma ln(AF)	5 Hz	Median AF	Sigma ln(AF)
1.00E-02	2.53E+00	9.17E-02	1.30E-02	2.05E+00	9.54E-02	1.90E-02	2.08E+00	1.79E-01	2.09E-02	2.51E+00	2.02E-01
4.95E-02	1.73E+00	1.12E-01	1.02E-01	1.03E+00	1.54E-01	9.99E-02	1.64E+00	2.29E-01	8.24E-02	2.19E+00	2.17E-01
9.64E-02	1.44E+00	1.27E-01	2.13E-01	8.14E-01	1.82E-01	1.85E-01	1.46E+00	2.37E-01	1.44E-01	2.00E+00	2.21E-01
1.94E-01	1.17E+00	1.52E-01	4.43E-01	6.35E-01	2.17E-01	3.56E-01	1.24E+00	2.39E-01	2.65E-01	1.73E+00	2.28E-01
2.92E-01	1.02E+00	1.69E-01	6.76E-01	5.39E-01	2.38E-01	5.23E-01	1.09E+00	2.49E-01	3.84E-01	1.56E+00	2.41E-01
3.91E-01	9.14E-01	1.82E-01	9.09E-01	5.00E-01	2.46E-01	6.90E-01	9.71E-01	2.62E-01	5.02E-01	1.42E+00	2.56E-01
4.93E-01	8.31E-01	1.91E-01	1.15E+00	5.00E-01	2.53E-01	8.61E-01	8.82E-01	2.72E-01	6.22E-01	1.32E+00	2.69E-01
7.41E-01	6.97E-01	2.10E-01	1.73E+00	5.00E-01	2.70E-01	1.27E+00	7.25E-01	2.95E-01	9.13E-01	1.12E+00	2.88E-01
1.01E+00	6.05E-01	2.25E-01	2.36E+00	5.00E-01	2.83E-01	1.72E+00	6.11E-01	3.17E-01	1.22E+00	9.83E-01	3.01E-01
1.28E+00	5.39E-01	2.35E-01	3.01E+00	5.00E-01	2.89E-01	2.17E+00	5.27E-01	3.32E-01	1.54E+00	8.77E-01	3.27E-01
1.55E+00	5.00E-01	2.40E-01	3.63E+00	5.00E-01	2.89E-01	2.61E+00	5.00E-01	3.46E-01	1.85E+00	8.07E-01	3.43E-01
2.5 Hz	**Median AF**	**Sigma ln(AF)**	**1 Hz**	**Median AF**	**Sigma ln(AF)**	**0.5 Hz**	**Median AF**	**Sigma ln(AF)**			
2.18E-02	2.90E+00	2.36E-01	1.27E-02	2.60E+00	3.11E-01	8.25E-03	1.65E+00	1.68E-01			
7.05E-02	2.70E+00	2.51E-01	3.43E-02	2.63E+00	2.40E-01	1.96E-02	1.73E+00	1.89E-01			
1.18E-01	2.55E+00	2.49E-01	5.51E-02	2.58E+00	2.49E-01	3.02E-02	1.79E+00	2.28E-01			
2.12E-01	2.34E+00	2.49E-01	9.63E-02	2.45E+00	2.79E-01	5.11E-02	1.92E+00	2.45E-01			
3.04E-01	2.19E+00	2.50E-01	1.36E-01	2.39E+00	2.92E-01	7.10E-02	1.98E+00	2.60E-01			
3.94E-01	2.05E+00	2.57E-01	1.75E-01	2.33E+00	2.92E-01	9.06E-02	2.00E+00	2.67E-01			
4.86E-01	1.92E+00	2.68E-01	2.14E-01	2.28E+00	2.95E-01	1.10E-01	2.01E+00	2.69E-01			
7.09E-01	1.66E+00	2.99E-01	3.10E-01	2.17E+00	2.92E-01	1.58E-01	2.04E+00	2.86E-01			
9.47E-01	1.44E+00	3.32E-01	4.12E-01	2.14E+00	2.87E-01	2.09E-01	2.07E+00	2.89E-01			
1.19E+00	1.30E+00	3.60E-01	5.18E-01	2.14E+00	2.88E-01	2.62E-01	2.10E+00	2.91E-01			
1.43E+00	1.25E+00	3.65E-01	6.19E-01	2.15E+00	2.86E-01	3.12E-01	2.14E+00	2.92E-01			

Tables A-2b1 and A-2b2 are tabular versions of the typical amplification factors provided in Figures 2.3.6-1 and 2.3.6-2. Values are provided for two input motion levels at approximately 10^{-4} and 10^{-5} mean annual frequency of exceedance. These tables concentrate on the frequency range of 0.5 Hz to 25 Hz, with values up to 100 Hz included, with a single value at 0.1 Hz included for completeness. These factors are unverified and are provided for information only. The figures should be considered the governing information.

Table A-2b1: Median AFs and sigmas for Model 1, Profile 1, for 2 PGA levels (Reference 35)

M1P1K1	Rock PGA=0.292			M1P1K1	PGA=1.55		
Freq. (Hz)	Soil_SA	med. AF	sigma ln(AF)	Freq. (Hz)	Soil_SA	med. AF	sigma ln(AF)
100.0	0.259	0.888	0.164	100.0	0.616	0.398	0.229
87.1	0.260	0.863	0.164	87.1	0.616	0.385	0.229
75.9	0.260	0.822	0.164	75.9	0.616	0.362	0.229
66.1	0.260	0.748	0.165	66.1	0.616	0.323	0.229
57.5	0.260	0.633	0.165	57.5	0.616	0.266	0.229
50.1	0.261	0.524	0.166	50.1	0.616	0.218	0.230
43.7	0.262	0.444	0.167	43.7	0.617	0.184	0.230
38.0	0.263	0.408	0.169	38.0	0.617	0.171	0.230
33.1	0.265	0.390	0.172	33.1	0.618	0.165	0.230
28.8	0.267	0.396	0.176	28.8	0.618	0.168	0.230
25.1	0.271	0.402	0.182	25.1	0.619	0.171	0.231
21.9	0.278	0.434	0.193	21.9	0.621	0.183	0.232
19.1	0.286	0.456	0.204	19.1	0.623	0.190	0.233
16.6	0.296	0.493	0.210	16.6	0.626	0.202	0.235
14.5	0.307	0.538	0.224	14.5	0.630	0.216	0.237
12.6	0.322	0.582	0.240	12.6	0.636	0.227	0.240
11.0	0.348	0.647	0.273	11.0	0.645	0.239	0.245
9.5	0.384	0.752	0.298	9.5	0.660	0.259	0.254
8.3	0.426	0.908	0.316	8.3	0.683	0.294	0.271
7.2	0.469	1.069	0.314	7.2	0.718	0.334	0.298
6.3	0.511	1.243	0.308	6.3	0.767	0.383	0.333
5.5	0.536	1.368	0.278	5.5	0.827	0.436	0.357
4.8	0.546	1.428	0.228	4.8	0.898	0.488	0.361
4.2	0.544	1.473	0.210	4.2	0.969	0.548	0.352
3.6	0.536	1.492	0.210	3.6	1.024	0.599	0.332
3.2	0.529	1.570	0.235	3.2	1.098	0.687	0.326
2.8	0.526	1.645	0.248	2.8	1.176	0.780	0.317
2.4	0.530	1.799	0.290	2.4	1.241	0.898	0.293
2.1	0.532	1.992	0.330	2.1	1.271	1.017	0.264
1.8	0.563	2.362	0.335	1.8	1.276	1.148	0.273
1.6	0.573	2.779	0.306	1.6	1.241	1.297	0.271
1.4	0.561	3.166	0.248	1.4	1.237	1.511	0.320
1.2	0.505	3.242	0.233	1.2	1.226	1.712	0.318
1.0	0.425	3.032	0.283	1.0	1.195	1.866	0.331

Table A-2b1: (Continued)

M1P1K1		Rock PGA=0.292		M1P1K1		PGA=1.55	
Freq. (Hz)	Soil_SA	med. AF	sigma ln(AF)	Freq. (Hz)	Soil_SA	med. AF	sigma ln(AF)
0.91	0.343	2.693	0.260	0.91	1.144	1.980	0.352
0.79	0.266	2.312	0.267	0.79	1.118	2.160	0.354
0.69	0.205	2.013	0.272	0.69	1.093	2.395	0.315
0.60	0.163	1.839	0.231	0.60	1.053	2.675	0.311
0.52	0.130	1.729	0.160	0.52	0.967	2.912	0.295
0.46	0.106	1.696	0.150	0.46	0.828	3.010	0.302
0.10	0.004	1.613	0.106	0.10	0.020	1.765	0.119

Table A-2b2: Median AFs and sigmas for Model 2, Profile 1, for 2 PGA levels (Reference 35)

M2P1K1		PGA=0.292		M2P1K1		PGA=1.55	
Freq. (Hz)	Soil_SA	med. AF	sigma ln(AF)	Freq. (Hz)	Soil_SA	med. AF	sigma ln(AF)
100.0	0.309	1.056	0.136	100.0	0.861	0.557	0.225
87.1	0.309	1.028	0.137	87.1	0.861	0.538	0.226
75.9	0.309	0.979	0.137	75.9	0.862	0.507	0.226
66.1	0.310	0.891	0.138	66.1	0.862	0.452	0.226
57.5	0.311	0.755	0.138	57.5	0.863	0.373	0.226
50.1	0.312	0.626	0.140	50.1	0.864	0.305	0.227
43.7	0.313	0.532	0.142	43.7	0.865	0.258	0.227
38.0	0.316	0.491	0.147	38.0	0.866	0.240	0.228
33.1	0.321	0.473	0.153	33.1	0.869	0.232	0.230
28.8	0.327	0.485	0.161	28.8	0.872	0.238	0.232
25.1	0.336	0.497	0.171	25.1	0.878	0.242	0.236
21.9	0.350	0.548	0.190	21.9	0.887	0.262	0.242
19.1	0.365	0.582	0.196	19.1	0.900	0.274	0.251
16.6	0.381	0.635	0.207	16.6	0.917	0.296	0.260
14.5	0.396	0.694	0.216	14.5	0.938	0.322	0.272
12.6	0.421	0.763	0.246	12.6	0.965	0.345	0.286
11.0	0.462	0.861	0.255	11.0	1.007	0.373	0.308
9.5	0.521	1.020	0.281	9.5	1.070	0.421	0.334
8.3	0.587	1.250	0.261	8.3	1.164	0.502	0.361
7.2	0.660	1.505	0.254	7.2	1.284	0.596	0.372
6.3	0.686	1.669	0.212	6.3	1.436	0.717	0.374
5.5	0.696	1.779	0.180	5.5	1.593	0.841	0.361
4.8	0.695	1.819	0.212	4.8	1.733	0.942	0.348
4.2	0.650	1.760	0.193	4.2	1.809	1.022	0.312
3.6	0.615	1.713	0.159	3.6	1.842	1.078	0.276
3.2	0.592	1.756	0.191	3.2	1.851	1.158	0.269
2.8	0.604	1.891	0.268	2.8	1.798	1.193	0.267
2.4	0.649	2.207	0.327	2.4	1.722	1.245	0.276
2.1	0.692	2.589	0.344	2.1	1.635	1.308	0.303

Table A-2b2: (Continued)

M2P1K1		PGA=0.292		M2P1K1		PGA=1.55	
Freq. (Hz)	Soil_SA	med. AF	sigma ln(AF)	Freq. (Hz)	Soil_SA	med. AF	sigma ln(AF)
1.8	0.711	2.982	0.299	1.8	1.622	1.460	0.337
1.6	0.639	3.096	0.258	1.6	1.603	1.674	0.404
1.4	0.548	3.091	0.223	1.4	1.592	1.944	0.419
1.2	0.449	2.885	0.254	1.2	1.588	2.218	0.381
1.0	0.363	2.586	0.289	1.0	1.556	2.430	0.348
0.91	0.289	2.267	0.243	0.91	1.497	2.590	0.302
0.79	0.228	1.983	0.221	0.79	1.346	2.600	0.245
0.69	0.182	1.783	0.221	0.69	1.125	2.465	0.278
0.60	0.148	1.673	0.195	0.60	0.912	2.318	0.304
0.52	0.121	1.607	0.138	0.52	0.721	2.171	0.277
0.46	0.101	1.604	0.141	0.46	0.564	2.050	0.262
0.10	0.004	1.589	0.106	0.10	0.018	1.618	0.114

Enclosure 2

SUMMARY OF REGULATORY COMMITMENTS

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

COMMITMENT	COMMITTED DATE OR "OUTAGE"	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	PROGRAMMATIC (Yes/No)
1. LaSalle County Station, Units 1 and 2, will perform a Risk Evaluation including a High Frequency Confirmation evaluation.	As determined by NRC prioritization following submittal of all nuclear power plant Seismic Hazard Re-evaluations, but no later than December 31, 2019.	Yes	No
2. LaSalle County Station, Units 1 and 2, will perform a Spent Fuel Pool evaluation in accordance with EPRI Report 1025287, Section 7.	As determined by NRC prioritization following submittal of all nuclear power plant Seismic Hazard Re-evaluations, but no later than December 31, 2019.	Yes	No
3. LaSalle County Station, Units 1 and 2, will prepare an Expedited Seismic Evaluation Process (ESEP) Report in accordance with EPRI Report 3002000704.	December 31, 2014	Yes	No