Cleve Reasoner
Vice President
Engineering
Ameren Missouri
Callaway Energy Center
T 573.676.8241
F 573.676.4056

September 12, 2013

ULNRC-06030

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

10 CFR 50.54(f)

Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
FACILITY OPERATING LICENSE NPF-30
AMEREN MISSOURI RESPONSE TO NRC REQUEST FOR INFORMATION PURSUANT TO 10CFR50.54(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 RESPONSES FOR CEUS SITES

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, Endorsement of EPRI Final Draft Report 1025287, "Seismic Evaluation Guidance," dated February 15, 2013 (ML12319A074)

3. 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

4. NEI Letter to NRC, Proposed Path Forward for NTTF Recommendation 2.1: Seismic Reevaluations, dated April 9, 2013 (ML13101A379)

5. NRC Letter, EPRI Final Draft Report XXXXXX, "Seismic Evaluation Guidance: Augmented Approach for the Resolution of 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

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 in the Central and Eastern United States (CEUS) to submit a written response consistent with the requested seismic hazard evaluation information (items 1 through 7) by September 12, 2013. On February 15, 2013, NRC issued Reference 2, endorsing the Reference 3 industry guidance for responding to Reference 1. Section 4 of Reference 3 identifies the detailed information to be included in the seismic hazard evaluation submittals.

On April 9, 2013, NEI submitted Reference 4 to NRC, requesting NRC agreement to delay submittal of some of the CEUS seismic hazard evaluation information so that an update to the EPRI (2004, 2006) 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 (items 3a and 3b in Section 4 of Reference 3) be submitted to NRC by September 12, 2013, with the remaining seismic hazard and screening information submitted to NRC by March 31, 2014. In Reference 5, the NRC agreed with this recommendation.

The attachment to this letter contains the requested descriptions of subsurface materials and properties and base case velocity profiles for Ameren Missouri. The information provided in the attachment to this letter is considered an interim product of seismic hazard development efforts being performed for the industry by EPRI. The complete and final seismic hazard reports for Ameren Missouri will be provided to the NRC in our seismic hazard submittals by March 31, 2014 in accordance with Reference 5.

This letter contains no new regulatory commitments.

Should you have any questions concerning the content of this letter, please contact Scott Maglio, Regulatory Affairs Manager, at 573-676-8719.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on: 9/12/2013

Sincerely,

Cleveland Reasoner
Vice President, Engineering

Enclosure

cc: Mr. Steven A. Reynolds
Acting Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
1600 East Lamar Boulevard
Arlington, TX 76011-4511

Senior Resident Inspector
Callaway Resident Office
U.S. Nuclear Regulatory Commission
8201 NRC Road
Steedman, MO 65077

Mr. Fred Lyon
Project Manager, Callaway Plant
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop O-8B1
Washington, DC 20555-2738

Mr. Eric Leeds
Director, Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop O-13H16M
Washington, DC 20555-0001

Mr. Jack Davis
Director, Mitigation Strategies Directorate
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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Callaway Site Description

The basic information used to create the site geologic profile at the Callaway Nuclear Power Plant is shown in Figure 1. This information was documented in the Callaway FSAR Unit 2 (Ref. 1). As indicated in Figure 1, the nuclear island foundation level is at the top of the Graydon Chert Conglomerate unit, at a depth of approximately 37 feet, and this was taken as the SSE Control Point. For purposes of site amplification calculations, the profile was modeled up to the SSE Control Point. For dynamic properties of rock layers, modulus and damping curves were represented with 2 models. The first model used rock curves taken from Reference 2, the second model assumed linear behavior. These dynamic property models were weighted equally. For dynamic properties of fill and compacted sand layers, modulus and damping curves were also represented with 2 models. The first model used soil curves taken from Reference 2, the second model used soil curves taken from Reference 3 and Reference 4. These dynamic property models were weighted equally. To model the profile, rock modulus and damping curves from Reference 2 were paired with soil modulus and damping curves from Reference 2, and linear rock modulus and damping curves were paired with soil modulus and damping curves from Reference 3 and Reference 4.

The 3 base-case shear-wave velocity profiles used to model amplification at the site are shown in Figure 2. Profiles 1, 2, and 3 are weighted 0.4, 0.3, and 0.3, respectively. Thicknesses, depths, and shear-wave velocities (Vs) corresponding to each profile are shown in Table 1.

References

1. UniStar Nuclear Services (2009). *FSAR Callaway Unit 2, Revision 2,* Figure 2.5.2-19.

2. EPRI (1993). *Guidelines for Determining Design Basis Ground Motions*, Elec. Power Res. Inst., Palo Alto, CA, Rept. TR-102293, Vol. 1-5.

3. Silva, W.J., N. A. Abrahamson, G.R. Toro, and C. Costantino (1996). *Description and Validation of the Stochastic Ground Motion Model,* Rept. submitted to Brookhaven Natl. Lab., Assoc. Universities Inc., Upton NY 11973, Contract No. 770573.

4. Walling, M.A., W.J., Silva and N.A. Abrahamson (2008). "Nonlinear Site Amplification Factors for Constraining the NGA Models," *Earthquake Spectra,* 24 (1) 243-255.

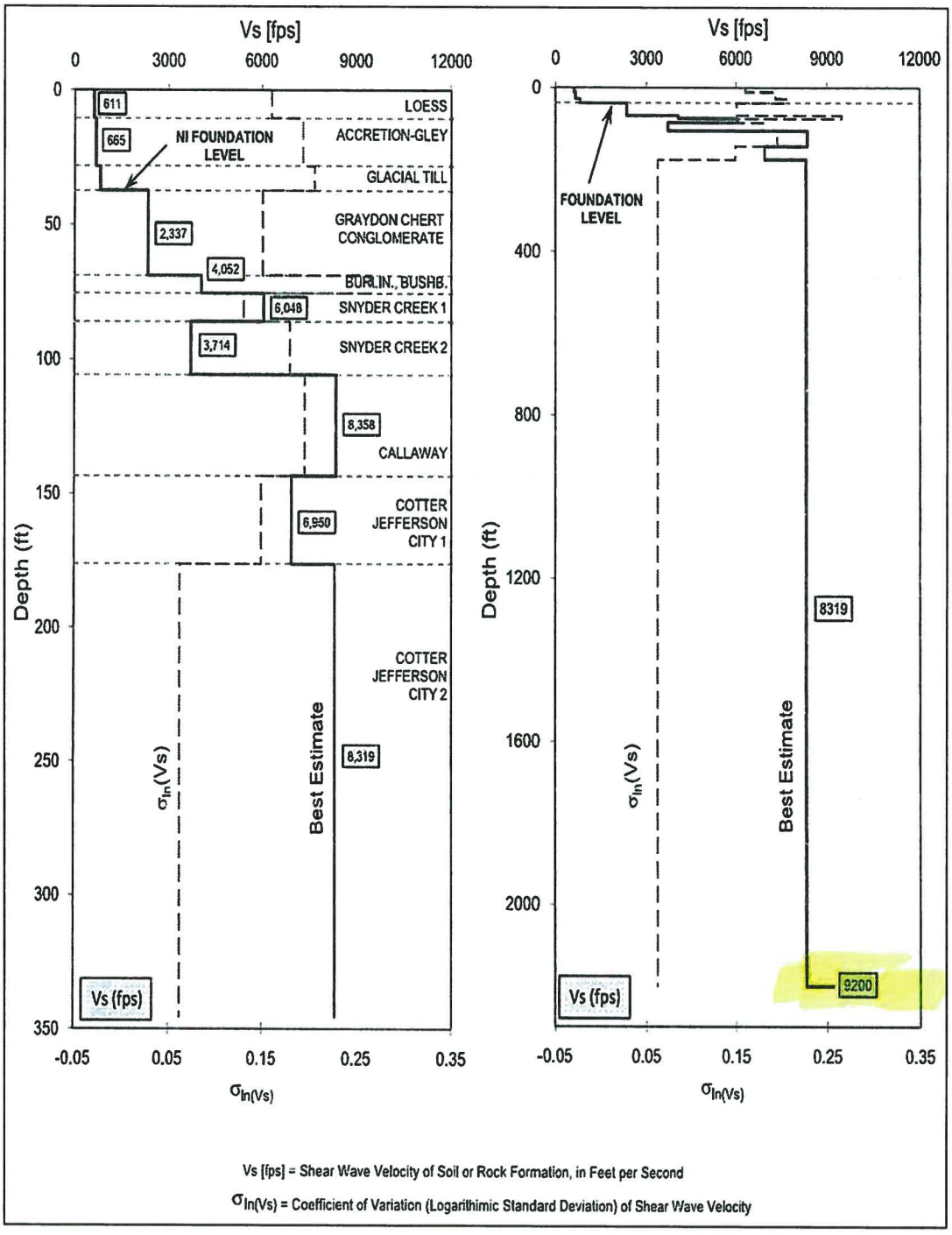

Figure 1. Summary of Stratigraphy and Shear-Wave Velocity for Callaway Nuclear Power Plant

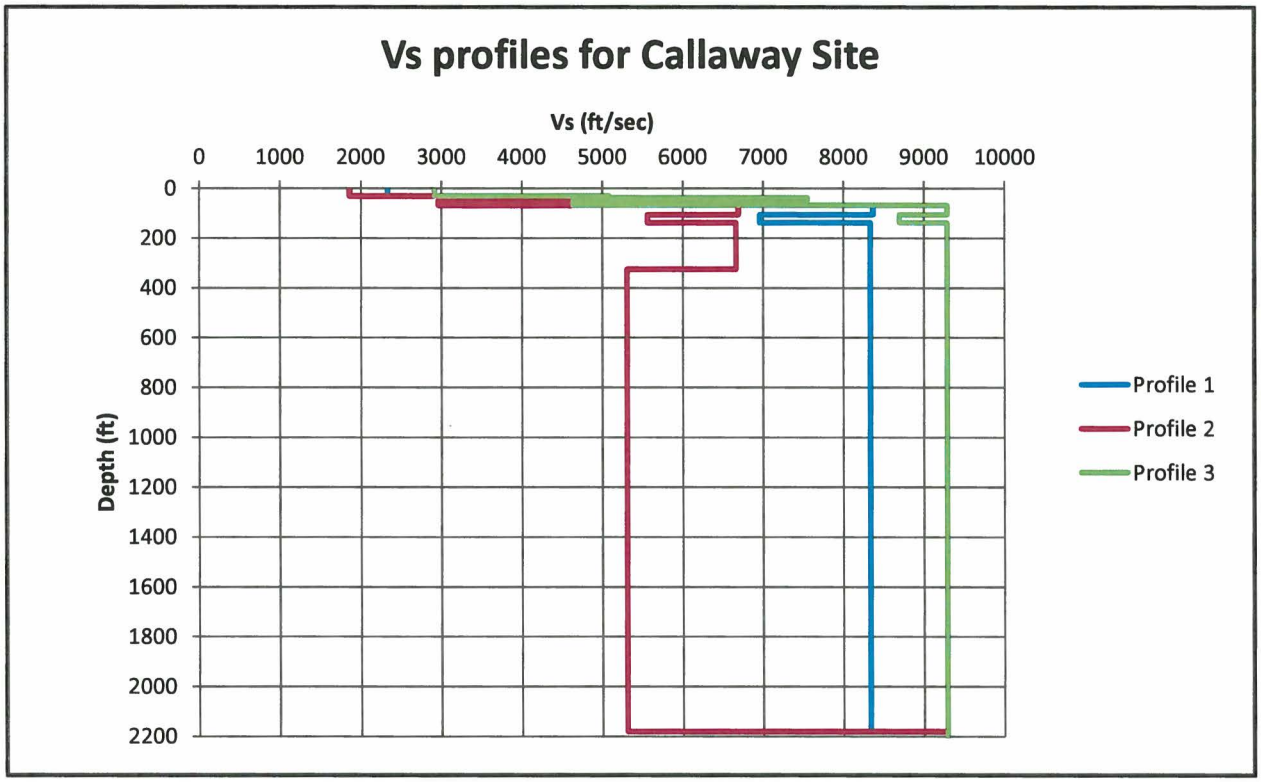

Figure 2. Vs profiles for Callaway Nuclear Power Plant

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Table 1. Layer thicknesses, depths, and Vs for 3 profiles, Callaway Nuclear Power Plant

Profile 1			Profile 2			Profile 3		
thickness(ft)	depth (ft)	Vs(ft/s)	thickness(ft)	depth (ft)	Vs(ft/s)	thickness(ft)	depth (ft)	Vs(ft/s)
	0	2329		0	1864		0	2912
5.0	5.0	2329	5.0	5.0	1864	5.0	5.0	2912
5.0	10.0	2329	5.0	10.0	1864	5.0	10.0	2912
5.0	15.0	2329	5.0	15.0	1864	5.0	15.0	2912
5.0	20.0	2329	5.0	20.0	1864	5.0	20.0	2912
1.5	21.5	2329	1.5	21.5	1864	1.5	21.5	2912
5.0	26.5	2329	5.0	26.5	1864	5.0	26.5	2912
5.0	31.5	2329	5.0	31.5	1864	5.0	31.5	2912
6.6	38.1	4068	6.6	38.1	3255	6.6	38.1	5085
10.5	48.6	6037	10.5	48.6	4829	10.5	48.6	7546
1.4	50.0	3707	1.4	50.0	2966	1.4	50.0	4634
6.2	56.2	3707	6.2	56.2	2966	6.2	56.2	4634
6.2	62.4	3707	6.2	62.4	2966	6.2	62.4	4634
6.2	68.6	3707	6.2	68.6	2966	6.2	68.6	4634
9.4	78.0	8366	9.4	78.0	6693	9.4	78.0	9285
9.4	87.4	8366	9.4	87.4	6693	9.4	87.4	9285
9.4	96.9	8366	9.4	96.9	6693	9.4	96.9	9285
9.4	106.3	8366	9.4	106.3	6693	9.4	106.3	9285
6.8	113.1	6955	6.8	113.1	5564	6.8	113.1	8694
6.8	120.0	6955	6.8	120.0	5564	6.8	120.0	8694
9.6	129.6	6955	9.6	129.6	5564	9.6	129.6	8694
9.6	139.1	6955	9.6	139.1	5564	9.6	139.1	8694
11.1	150.2	8333	11.1	150.2	6667	11.1	150.2	9285
11.1	161.3	8333	11.1	161.3	6667	11.1	161.3	9285
11.1	172.4	8333	11.1	172.4	6667	11.1	172.4	9285
11.1	183.5	8333	11.1	183.5	6667	11.1	183.5	9285
11.1	194.6	8333	11.1	194.6	6667	11.1	194.6	9285
11.1	205.6	8333	11.1	205.6	6667	11.1	205.6	9285
11.1	216.7	8333	11.1	216.7	6667	11.1	216.7	9285
11.1	227.8	8333	11.1	227.8	6667	11.1	227.8	9285
11.1	238.9	8333	11.1	238.9	6667	11.1	238.9	9285
11.1	250.0	8333	11.1	250.0	6667	11.1	250.0	9285
25.0	275.0	8333	25.0	275.0	6667	25.0	275.0	9285
25.0	300.0	8333	25.0	300.0	6667	25.0	300.0	9285
25.0	325.0	8333	25.0	325.0	6667	25.0	325.0	9285
25.0	350.0	8333	25.0	350.0	5308	25.0	350.0	9285
25.0	375.0	8333	25.0	375.0	5308	25.0	375.0	9285
25.0	400.0	8333	25.0	400.0	5308	25.0	400.0	9285

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Profile 1			Profile 2			Profile 3		
thickness(ft)	depth (ft)	Vs(ft/s)	thickness(ft)	depth (ft)	Vs(ft/s)	thickness(ft)	depth (ft)	Vs(ft/s)
25.0	425.0	8333	25.0	425.0	5308	25.0	425.0	9285
25.0	450.0	8333	25.0	450.0	5308	25.0	450.0	9285
25.0	475.0	8333	25.0	475.0	5308	25.0	475.0	9285
25.0	500.0	8333	25.0	500.0	5308	25.0	500.0	9285
33.6	533.6	8333	33.6	533.6	5308	33.6	533.6	9285
33.6	567.2	8333	33.6	567.2	5308	33.6	567.2	9285
33.6	600.9	8333	33.6	600.9	5308	33.6	600.9	9285
33.6	634.5	8333	33.6	634.5	5308	33.6	634.5	9285
33.6	668.1	8333	33.6	668.1	5308	33.6	668.1	9285
84.1	752.2	8333	84.1	752.2	5308	84.1	752.2	9285
84.1	836.2	8333	84.1	836.2	5308	84.1	836.2	9285
168.1	1004.3	8333	168.1	1004.3	5308	168.1	1004.3	9285
168.1	1172.4	8333	168.1	1172.4	5308	168.1	1172.4	9285
168.1	1340.5	8333	168.1	1340.5	5308	168.1	1340.5	9285
168.1	1508.7	8333	168.1	1508.7	5308	168.1	1508.7	9285
168.1	1676.8	8333	168.1	1676.8	5308	168.1	1676.8	9285
168.1	1844.9	8333	168.1	1844.9	5308	168.1	1844.9	9285
168.1	2013.0	8333	168.1	2013.0	5308	168.1	2013.0	9285
168.1	2181.1	8333	168.1	2181.1	5308	168.1	2181.1	9285
3280.8	5461.9	9285	3280.8	5461.9	9285	3280.8	5461.9	9285