NEXTera ENERGY
DUANE ARNOLD

September 11, 2013

NG-13-0364
10 CFR 50.54(f)

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

Duane Arnold Energy Center
Docket No. 50-331
Renewed Op. License No. DPR-49

NextEra Energy Duane Arnold, LLC Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding 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

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

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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, NRC agreed with this recommendation.

The enclosed response contains the requested descriptions of subsurface materials and properties and base case velocity profiles for the Duane Arnold Energy Center. The information in the enclosure is considered an interim product of seismic hazard development efforts being performed for the industry by EPRI. NextEra Energy Duane Arnold, LLC will provide the complete and final seismic hazard reports to the NRC in our seismic hazard submittals by March 31, 2014 in accordance with Reference 5.

This letter contains no new regulatory commitments.

If you have any questions or require additional information, please contact Ken Putnam at 319-851-7238.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on September 11, 2013

Richard L. Anderson
Vice President, Duane Arnold Energy Center
NextEra Energy Duane Arnold, LLC

Enclosure

cc: Regional Administrator, USNRC, Region III
Resident Inspector, USNRC, Duane Arnold Energy Center
Project Manager, USNRC, Duane Arnold Energy Center

Attachment to NG-13-0364

NextEra Energy Duane Arnold, LLC Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding 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

5 pages follow

Duane Arnold Site Description

The basic information used by EPRI to create the site geologic profile at the Duane Arnold Energy Center is shown in the attached Figure 2.5-9 taken directly from Reference 1. The foundation of the Reactor Building is approximately 50 foot below grade, and this location is taken as the SSE Control Point. The profile was modeled up to this location. For dynamic properties of soft rock layers, modulus and damping curves were represented with two models. The first model used rock curves taken from Reference 2; the second model assumed linear behavior. These dynamic property models were weighted equally.

The three base-case shear-wave velocity profiles used to model amplification at the site are shown in Figure 1. 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 2.

References

1. *Updated Final Safety Analysis Report for Duane Arnold Energy Center*, Revision 22, May, 2013, Section 2.5.2, Vibratory Ground Motion.

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

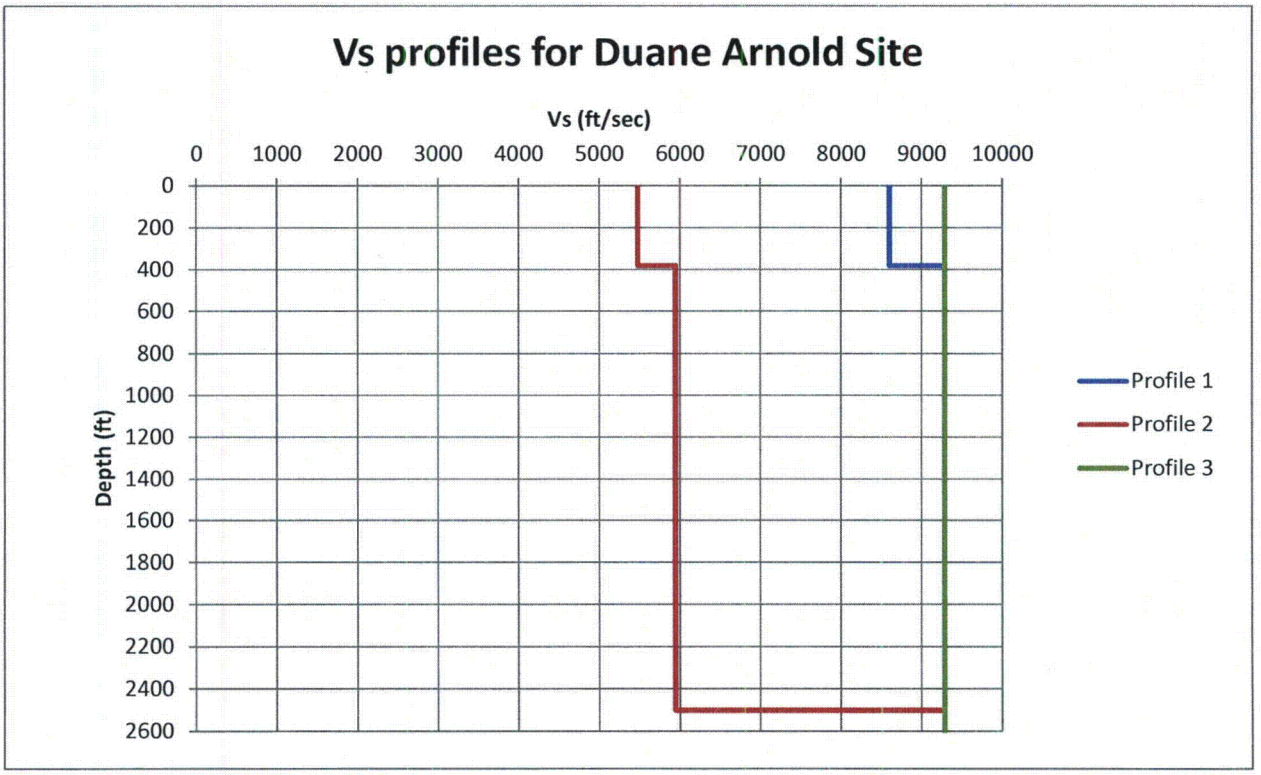
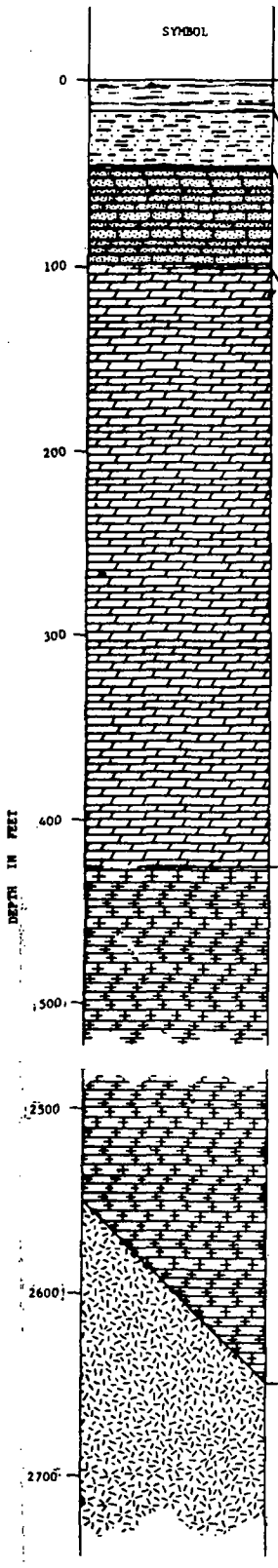


Figure 1. Vs profiles for Duane Arnold Site

Table 2. Layer Thicknesses, Depths, And Vs For 3 Profiles, Duane Arnold Site

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	8600		0	5477		0	9285
10.0	10.0	8600	10.0	10.0	5477	10.0	10.0	9285
10.0	20.0	8600	10.0	20.0	5477	10.0	20.0	9285
10.0	30.0	8600	10.0	30.0	5477	10.0	30.0	9285
10.0	40.0	8600	10.0	40.0	5477	10.0	40.0	9285
10.0	50.0	8600	10.0	50.0	5477	10.0	50.0	9285
10.0	60.0	8600	10.0	60.0	5477	10.0	60.0	9285
10.0	70.0	8600	10.0	70.0	5477	10.0	70.0	9285
10.0	80.0	8600	10.0	80.0	5477	10.0	80.0	9285
10.0	90.0	8600	10.0	90.0	5477	10.0	90.0	9285
10.0	100.0	8600	10.0	100.0	5477	10.0	100.0	9285
10.0	110.0	8600	10.0	110.0	5477	10.0	110.0	9285
10.0	120.0	8600	10.0	120.0	5477	10.0	120.0	9285
10.0	130.0	8600	10.0	130.0	5477	10.0	130.0	9285
10.0	140.0	8600	10.0	140.0	5477	10.0	140.0	9285
10.0	150.0	8600	10.0	150.0	5477	10.0	150.0	9285
10.0	160.0	8600	10.0	160.0	5477	10.0	160.0	9285
10.0	170.0	8600	10.0	170.0	5477	10.0	170.0	9285
10.0	180.0	8600	10.0	180.0	5477	10.0	180.0	9285
10.0	190.0	8600	10.0	190.0	5477	10.0	190.0	9285
10.0	200.0	8600	10.0	200.0	5477	10.0	200.0	9285
10.0	210.0	8600	10.0	210.0	5477	10.0	210.0	9285
10.0	220.0	8600	10.0	220.0	5477	10.0	220.0	9285
10.0	230.0	8600	10.0	230.0	5477	10.0	230.0	9285
10.0	240.0	8600	10.0	240.0	5477	10.0	240.0	9285
10.0	250.0	8600	10.0	250.0	5477	10.0	250.0	9285
10.0	260.0	8600	10.0	260.0	5477	10.0	260.0	9285
10.0	270.0	8600	10.0	270.0	5477	10.0	270.0	9285
10.0	280.0	8600	10.0	280.0	5477	10.0	280.0	9285
10.0	290.0	8600	10.0	290.0	5477	10.0	290.0	9285
10.0	300.0	8600	10.0	300.0	5477	10.0	300.0	9285
10.0	310.0	8600	10.0	310.0	5477	10.0	310.0	9285
10.0	320.0	8600	10.0	320.0	5477	10.0	320.0	9285
10.0	330.0	8600	10.0	330.0	5477	10.0	330.0	9285
10.0	340.0	8600	10.0	340.0	5477	10.0	340.0	9285
10.0	350.0	8600	10.0	350.0	5477	10.0	350.0	9285
10.0	360.0	8600	10.0	360.0	5477	10.0	360.0	9285
10.0	370.0	8600	10.0	370.0	5477	10.0	370.0	9285
10.0	380.0	8600	10.0	380.0	5477	10.0	380.0	9285

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)
5.9	385.9	9285	5.9	385.9	5942	5.9	385.9	9285
26.0	412.0	9285	26.0	412.0	5942	26.0	412.0	9285
26.0	438.0	9285	26.0	438.0	5942	26.0	438.0	9285
26.0	464.0	9285	26.0	464.0	5942	26.0	464.0	9285
26.0	490.0	9285	26.0	490.0	5942	26.0	490.0	9285
26.0	516.0	9285	10.9	500.9	5942	10.9	500.9	9285
38.4	554.4	9285	53.6	554.4	5942	53.6	554.4	9285
38.4	592.9	9285	38.4	592.9	5942	38.4	592.9	9285
38.4	631.3	9285	38.4	631.3	5942	38.4	631.3	9285
38.4	669.7	9285	38.4	669.7	5942	38.4	669.7	9285
38.4	708.1	9285	38.4	708.1	5942	38.4	708.1	9285
57.8	766.0	9285	57.8	766.0	5942	57.8	766.0	9285
106.2	872.2	9285	106.2	872.2	5942	106.2	872.2	9285
151.3	1023.5	9285	151.3	1023.5	5942	151.3	1023.5	9285
164.0	1187.5	9285	164.0	1187.5	5942	164.0	1187.5	9285
164.0	1351.6	9285	164.0	1351.6	5942	164.0	1351.6	9285
164.0	1515.6	9285	164.0	1515.6	5942	164.0	1515.6	9285
164.0	1679.7	9285	164.0	1679.7	5942	164.0	1679.7	9285
164.0	1843.7	9285	164.0	1843.7	5942	164.0	1843.7	9285
164.0	2007.7	9285	164.0	2007.7	5942	164.0	2007.7	9285
164.0	2171.8	9285	164.0	2171.8	5942	164.0	2171.8	9285
164.0	2335.8	9285	164.0	2335.8	5942	164.0	2335.8	9285
164.0	2499.9	9285	164.0	2499.9	5942	164.0	2499.9	9285
3280.8	5780.7	9285	3280.8	5780.7	9285	3280.8	5780.7	9285



SYMBOL	DESCRIPTION	COMPRESSIONAL WAVE VELOCITY (FT/SEC)	POISSON'S RATIO (ESTIMATED)	SHEAR WAVE VELOCITY (FT/SEC) (COMPUTED)	TOTAL UNIT WEIGHT (LBS/CU. FT.)
	ALLUVIAL	1140	0.37	500	120
	SAND	5500±300			
	GLACIAL TILL	6100±300	0.45	1800	135
	WAPSIPINICON FORMATION (LIMESTONE AND DOLOMITE)	14,000±500	0.20	8600	160
	SILURIAN (LIMESTONE AND DOLOMITE)	14,000±500	0.20	8600	160 (ESTIMATED)
	ORDOVICIAN AND CAMBRIAN SEDIMENTS (PREDOMINATELY DOLOMITE)	16000±2000 (ESTIMATED)	.20	9800	155 (ESTIMATED)
	PRECAMBRIAN BASEMENT (IGNEOUS AND METAMORPHIC ROCKS)	18,000±2000 (ESTIMATED)	.15	11500	175 (ESTIMATED)

NOTE:
PHYSICAL PROPERTIES ARE MEASURED VALUES UNLESS NOTED OTHERWISE.

DUANE ARNOLD ENERGY CENTER
IOWA ELECTRIC LIGHT & POWER COMPANY
UPDATED FINAL SAFETY ANALYSIS REPORT

Stratigraphic Section Showing Geophysical Data

Figure 2.5-9