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U.S. NUCLEAR REGULATORY COMMISSION

MEMORANDUM FOR: James P. Knight, Assistant Director for Components & Structures Engineering, DE

FROM: Robert E. Jackson, Chief
Geosciences Branch, DE

SUBJECT: GEOSCIENCES BRANCH INPUT FOR SEISMIC QUALIFICATION OF MECHANICAL AND ELECTRICAL EQUIPMENT

As you have requested we have made an estimate of the peak acceleration and response spectrum for the 4 operating plants listed in the July 7, 1981 draft letter from G. Bagchi of the Equipment Qualifications Branch. These 4 plants are Maine Yankee, Fort Calhoun, Rancho Seco and Indian Point. The peak accelerations listed below do not represent new staff positions but are our most knowledgeable estimate based on what would currently be acceptable for a new plant being built at these sites. A range of values has been given, however, if a single number is needed we suggest that use of the upper value with the understanding that the specific site value may change if a more detail review were undertaken. This might involve utilizing techniques such as site specific spectra or a probability analysis. The values listed below except for Rancho Seco, have been taken from the March 24, 1980 Jackson to Kuo memo on Seismic Review of Operating Plants which has been included as an attachment. The value for Rancho Seco is based on judgement of the staff and is highly dependent on the proximity to a fault which is undergoing review to determine its capability.

Maine Yankee:	SSE .13 to .25g	RG 1.60
	OBE .07 to .13g	RG 1.60
Fort Calhoun:	SSE .13 to .25g	RG 1.60
	OBE .07 to .13g	RG 1.60
Indian Point:	SSE .13 to .20g	RG 1.60
	OBE .07 to .10g	RG 1.60
Rancho Seco:	SSE .25 to .33g	RG 1.60
	OBE .13 to .17g	RG 1.60

S. Brocoum

Robert E. Jackson, Chief
Geosciences Branch, DE

8/21

cc: J. Knight
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ESTIMATED POSSIBLE SSE RANGES FOR OPERATING PLANTS BASED ON RECENT STAFF LICENSING DECISIONS

Name of Plant	Tectonic Province	SSE Intensity (MM)	SSE "g" value	Seismologic, Geologic and Geotechnical Engineering Concerns
Arkansas	Central Stable Region (CSR)	VII to VII-VIII	.13 -.20	Effect of Mississippi Embayment seismicity
Beaver Valley	Appalachian Plateau	VI-VII to VII	.10-.13	Liquefaction
Big Rock Point	CSR	VI-VII to VII-VIII	.10-.20	Possible solution cavity
Browns Ferry	CSR	VII to VII-VIII	.13-.20	Effect of Mississippi Embayment seismicity
Brunswick	Atlantic Coastal Plain (ACP)	VII	.13	Effect of Charleston seismicity
Calvert Cliffs	ACP	VII	.13	
Cooper	CSR	.II to VIII	.13-.25	Effect of Nemaha Uplift seismicity
Crystal River	Gulf Coastal Plain (GCP)	VI to VII	.10-.13	Solution cavities
Davis-Besse	CSR	VII-VIII	.20	Effects of Findlay Arch and Anna, Ohio seismicity
Donald C. Cook	CSR	VI-VII to VII-VIII	.10-.20	
Dresden	CSR	VII-VIII	.20	Leaky dike-failed once
Duane Arnold	CSR	VII to VII-VIII	.13-.20	Solution cavities
Edwin I. Hatch	ACP	VII	.13	Effect of Charleston seismicity: resolve tech. spec. on settlement

ESTIMATED POSSIBLE SSE RANGES FOR OPERATING PLANTS BASED ON RECENT STAFF LICENSING DECISIONS

Name of Plant	Tectonic Province	SSE Intensity (MM)	SSE "g" value	Seismologic, Geologic and Geotechnical Engineering Concerns
Fort Calhoun	CSR	VII to VIII	.13-.25	Effects of seismicity associated with Midcontinent Geophysical Anomaly and Nemaha Uplift; Thurman-Wilson Fault; pile foundation; liquefaction
Fort St. Vrain	CSR	VII to VII-VIII	.13-.20	Near Western margin of tectonic province
Haddam Neck	New England Piedmont (NEP)	VII to VII-VIII	.13-.20	Effect of seismicity near East Haddam; Honey Hill fault
H. B. Robinson	ACP	VII	.13	Effect of Charleston seismicity
Humboldt Bay	N/A			Soil amplification of ground motion; Little Salmon fault and other faults; amount of fault offset; currently under review
Indian Point	NEP	VII to VII-VIII	.13-.20	Ramapo fault
James A. Fitzpatrick	CSR	VII to VII-VIII	.13-.20	Effect of St. Lawrence seismicity; glacial effects on faults; lateral s[illegible]
Joseph M. Farley	GCP	VI to VII	.10-.13	Check dams
Kewaunee	CSR	VII to VII-VIII	.13-.20	
LaCrosse	CSR	VII to VII-VIII	.13-.20	Liquefaction
Maine Yankee	NEP	VII to VIII	.13-.25	Effect of Boston-Cape Ann seismicity
Millstone	NEP	VII to VII-VIII	.13-.20	Effect of Boston-Cape Ann and East Haddam seismicity

ESTIMATED POSSIBLE SSE RANGES FOR OPERATING PLANTS BASED ON RECENT STAFF LICENSING DECISIONS

Name of Plant	Tectonic Province	SSE Intensity (MM)	"a" value	Seismologic, Geologic and Geotechnical Engineering Concerns
Monticello	CSR	VII to VII-VIII	.13-.20	Effect of Midcontinent Geophysical Anomaly seismicity
Nine Mile Point	CSR	VII to VII-VIII	.13-.20	Effect of St. Lawrence seismicity; glacial effects on faults; lateral squeeze
North Anna	NEP	VII	.13	
Oconee	NEP	VII to VII-VIII	.13-.20	Peservoir induced seismicity at Jocassee and Keowee; Jocassee d[illegible]; effect of Charleston seismicity
Oyster Creek	ACP	VII	.13	
Palisades	CSR	VI-VII to VII-VIII	.10-.20	
Peach Bottom	NEP	VII	.13	
Pilgrim	NEP	VII to VII-VIII	.13-.20	Effect of Boston-Cape Ann seismicity
Point Beach	CSR	VII to VII-VIII	.13-.20	
Prairie Island	CSR	VII to VII-VIII	.13-.20	
Quad-Cities	CSR	VII to VII-VIII	.13-.20	Solution cavities-migration off site
Rancho Seco	N/A			Foothills fault; currently under review
Robert E. Ginna	CSR	VII to VII-VIII	.13-.20	Clarendon Linden fault

ESTIMATED POSSIBLE SSE RANGES FOR OPERATING PLANTS BASED ON RECENT STAFF LICENSING DECISIONS

Name of Plant	Tectonic Province	SSE Intensity (MM)	SSE "g" value	Seismologic, Geologic and Geotechnical Engineering Concerns
Salem	ACP	VII	.13	Liquefaction on pipelines
San Onofre 1	N/A			Unit 1 under review; current OL review for units 2 and 3
Shippingport Atomic Power Station	Appalachian Plateau	VI-VII to VII	.10-.13	Poor foundations
St. Lucie	ACP	VI to VII	.10-.13	Integrity of soil slopes in canals.
Surry	ACP	VII	.13	
Three Mile Island	NEP	VII	.13	Repair of river screen house slopes; Dike repairs.
Trojan	N/A	VIII	.25	
Turkey Point	ACP	VI to VII	.10-.13	Possible solutioning
Vermont Yankee	NEP	VII to VIII	.13-.25	Effect of Boston-Ottawa seismic zone
Yankee-Rowe	NEP	VII to VII-VIII	.13-.20	Effect of Boston-Ottawa seismic zone; upstream and on-site dams
Zion	CSR	VII-VIII	.20	

Note - These g-values are the anchor points for Regulatory Guide 1.60 spectra.