

August 31, 1979

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Mr. J. G. Keppler, Director Office of Inspection and Enforcement Region III U. S. NUCLEAR REGULATORY COMMISSION 799 Roosevelt Road Glen Ellyn, Illinois 60137

Dear Mr. Keppler:

#### DOCKET NOS. 50-266 AND 50-301 <u>IE BULLETIN 79-02</u> POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

Our initial response of July 6, 1979 to IE Bulletin 79-02 referenced the seismic risk analysis contained in Appendix 2K of the Haven Nuclear Plant Site Addendum. This analysis estimated an average recurrence interval for an Operating Basis Earthquake (OBE) at the Haven site, approximately 30 miles south of Point Beach, of 1595 years. This would indicate a probability of an OBE at Point Beach of only about 6 x  $10^{-4}$  per year.

During a review of these calculations, we have determined that errors existed in two of three equations used for attenuation of ground motion from the earthquake spicenter to the Haven site. These errors resulted in overestimation of the average OBE recurrence interval. In addition to these errors, refinements in seismic risk calculations have been developed since the original analysis was performed. The calculations have been redone using revised equations representing the present state-of-the-art and indicate an average recurrence interval of 419 years or a probability of about  $2 \times 10^{-3}$  per year compared to the original estimates of 1595 years and  $6 \times 10^{-4}$  per year. The results of the revised seismic risk calculations are enclosed as Table 1 and should be substituted for Table 2K-3 in Appendix 4 of our July response.

The revised recurrence interval, while lower than original estimates, does not alter the conclusion in our response that continued plant operation is acceptable while the anchor bolt and pipe support plate verification program is being completed.

Very truly yours,

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Vice President

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Sol Burstein

Enclosures

TABLE 1 ANALYSIS OF EARTHQUAKE INTENSITY AT SITE

Annual Risk at the Site of Exceeding Intensity

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	Attenuation Law	4	It	I.	Rate	Rone (km)	VI	vir	VIII	
	Brazee	0.001	4	7.0	.0.845	40	6.75 x 10 <sup>-4</sup>	0.0	0.0	
		0.001	4	7.5	0.845	40	$1.18 \times 10^{-3}$	7.10 x 10 <sup>-5</sup>	0.0	
		0.001	4	8.0	0.845	40	$1.77 \times 10^{-3}$	$2.09 \times 10^{-4}$	0.0	
		0.001	6	7.0	0.247	40	$2.78 \times 10^{-3}$	0.0	0.0	
		0.001	6	7.5	0.247	40	$4.11 \times 10^{-3}$	2.47 x 10-4	0.0	
		0.001	6	8.0	0.247	40	5.07 x 10 <sup>-3</sup>	$6.70 \times 10^{-4}$	0.0	
	Gupta & Nuttli	0.536	4	7.0	0.845	23	5.78 x 10 <sup>-4</sup>	6.78 x 10 <sup>-5</sup>	1.63 x 10-6	
		0.536	4	7.5	0.845	23	7.81 x $10^{-4}$	1.22 x 10 <sup>-4</sup>	7.74 x 10 <sup>-6</sup>	
		0.536	4	8.0	0.845	23	$1.03 \times 10^{-3}$	$1.79 \times 10^{-4}$	2.10 x 10 <sup>-5</sup>	
		0.536	6	7.0	0.247	23	$2.39 \times 10^{-3}$	$2.80 \times 10^{-4}$	6.73 x 10 <sup>-6</sup>	
		0.536	6	7.5	0.247	23	$2.72 \times 10^{-3}$	4.25 x 10 <sup>-4</sup>	$2.70 \times 10^{-5}$	
		0.536	6	8.0	0.247	23	3.29 x 10 <sup>-3</sup>	5.74 x 10 <sup>-4</sup>	$6.73 \times 10^{-5}$	
	Howell & Schultz	0.64	4	7.0	0.845	25.5	8.38 x 10 <sup>-4</sup>	9.98 x 10 <sup>-5</sup>	$4.63 \times 10^{-6}$	
		0.64	4	7.5	0.845	25.5	$1.16 \times 10^{-3}$	1.72 x 10 <sup>-4</sup>	$1.41 \times 10^{-5}$	
		0.64	4	8.0	0.845	25.5	$1.53 \times 10^{-3}$	$2.60 \times 10^{-4}$	3.09 x 10 <sup>-5</sup>	
		0.64	.6	7.0	0.247	25.5	$3.46 \times 10^{-3}$	4.12 x 10 <sup>-4</sup>	1.91 x 10 <sup>-5</sup>	
		0.64	6	7.5	0.247	25.5	$4.05 \times 10^{-3}$	5.98 x 10-4	4.93 x 10 <sup>-5</sup>	
		0.64	6	8.0	0.247	25.5	4.91 x 10	8.33 x 10 <sup>-4</sup>	9.91 x 10 <sup>-5</sup>	
1044 213	Risk Per Year									
	Average						$2.38 \times 10^{-3}$	$2.90 \times 10^{-4}$	$1.94 \times 10^{-5}$	
	Maximum						$5.67 \times 10^{-3}$	8.33 x 10 <sup>-4</sup>	9.91 x 10 <sup>-5</sup>	
	Minimum	C					5.78 x 10 <sup>-4</sup>	0.0	0.0	
	Return Period	Years)			ж. .<					
	Average					*	419	3448	51,546	
	Maximum						1730			
	Minimum						176	1200	10,091	

# TABLE 1 (cont'd)

# ANALYSIS OF EARTHQUAKE INTENSITY AT SITE

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### Attenuation Lave

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Brazee	$I = 3.387 + I_0 - 0.894 \ln R - 0.00289 R$
Gupta & Nuttli	$I = 3.7 + I_0 - 1.173 \ln R - 0.0011R$
Howell & Shultz	$I = 3.278 + I_0 - 0.989 \ln R - 0.0029 R$

#### Definitions

5	is standard deviation
IL	is lower bound intensity of source area
I	is upper bound intensity of source area
Rate	is annual rate of our ence of earthquake $\geq$ Io
Rone	is radius from epicenter for which there is no attenuation

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