



**Wisconsin Electric** POWER COMPANY  
231 W. MICHIGAN, P.O. BOX 2046, MILWAUKEE, WI 53201

August 31, 1979

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  
IE BULLETIN 79-02  
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  $6 \times 10^{-4}$  per year.

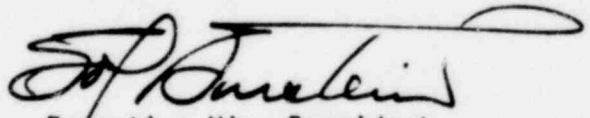
During a review of these calculations, we have determined that errors existed in two of three equations used for attenuation of ground motion from the earthquake epicenter to the Haven site. These errors resulted in over-estimation of the average OBE recurrence interval. In addition to these errors, 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,

Sol Burstein

Enclosures

  
Executive Vice President  
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TABLE 1  
ANALYSIS OF EARTHQUAKE INTENSITY AT SITE

Attenuation Law	$\sigma$	$I_L$	$I_u$	Rate	Rone (km)	Annual Risk at the Site of Exceeding Intensity		
						VI	VII*	VIII
Brazeo	0.001	4	7.0	0.845	40	$6.75 \times 10^{-4}$	0.0	0.0
	0.001	4	7.5	0.845	40	$1.18 \times 10^{-3}$	$7.10 \times 10^{-5}$	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	$4.11 \times 10^{-3}$	$2.47 \times 10^{-4}$	0.0
	0.001	6	8.0	0.247	40	$5.67 \times 10^{-3}$	$6.70 \times 10^{-4}$	0.0
Gupta & Nuttli	0.536	4	7.0	0.845	23	$5.78 \times 10^{-4}$	$6.78 \times 10^{-5}$	$1.63 \times 10^{-6}$
	0.536	4	7.5	0.845	23	$7.81 \times 10^{-4}$	$1.22 \times 10^{-4}$	$7.74 \times 10^{-6}$
	0.536	4	8.0	0.845	23	$1.03 \times 10^{-3}$	$1.79 \times 10^{-4}$	$2.10 \times 10^{-5}$
	0.536	6	7.0	0.247	23	$2.39 \times 10^{-3}$	$2.80 \times 10^{-4}$	$6.73 \times 10^{-6}$
	0.536	6	7.5	0.247	23	$2.72 \times 10^{-3}$	$4.25 \times 10^{-4}$	$2.70 \times 10^{-5}$
	0.536	6	8.0	0.247	23	$3.29 \times 10^{-3}$	$5.74 \times 10^{-4}$	$6.73 \times 10^{-5}$
Howell & Schultz	0.64	4	7.0	0.845	25.5	$8.38 \times 10^{-4}$	$9.98 \times 10^{-5}$	$4.63 \times 10^{-6}$
	0.64	4	7.5	0.845	25.5	$1.16 \times 10^{-3}$	$1.72 \times 10^{-4}$	$1.41 \times 10^{-5}$
	0.64	4	8.0	0.845	25.5	$1.53 \times 10^{-3}$	$2.60 \times 10^{-4}$	$3.09 \times 10^{-5}$
	0.64	6	7.0	0.247	25.5	$3.46 \times 10^{-3}$	$4.12 \times 10^{-4}$	$1.91 \times 10^{-5}$
	0.64	6	7.5	0.247	25.5	$4.05 \times 10^{-3}$	$5.98 \times 10^{-4}$	$4.93 \times 10^{-5}$
	0.64	6	8.0	0.247	25.5	$4.91 \times 10^{-3}$	$8.33 \times 10^{-4}$	$9.91 \times 10^{-5}$
<u>Risk Per Year</u>								
Average						$2.38 \times 10^{-3}$	$2.90 \times 10^{-4}$	$1.94 \times 10^{-5}$
Maximum						$5.67 \times 10^{-3}$	$8.33 \times 10^{-4}$	$9.91 \times 10^{-5}$
Minimum						$5.78 \times 10^{-4}$	0.0	0.0
<u>Return Period (Years)</u>								
Average						419	3448	51,546
Maximum						1730	--	--
Minimum						176	1200	10,091

TABLE 1 (cont'd)

ANALYSIS OF EARTHQUAKE INTENSITY AT SITE

Attenuation Laws

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

Definitions

$\sigma$	is standard deviation
$I_L$	is lower bound intensity of source area
$I_u$	is upper bound intensity of source area
Rate	is annual rate of occurrence of earthquake $\geq I_0$
$R_0$	is radius from epicenter for which there is no attenuation

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