PSEG

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Nuclear Business Unit

MAR 3 2000

LR-N000071
LCR H98-10

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

**RAI RESPONSE FOR
INCREASE OF ALLOWABLE MSIV LEAKAGE RATE AND DELETION OF
MSIV SEALING SYSTEM TECHNICAL SPECIFICATION CHANGES
HOPE CREEK GENERATING STATION
FACILITY OPERATING LICENSE NPF-57
DOCKET NO. 50-354**

Gentlemen:

This letter provides Public Service Electric & Gas Company's (PSE&G's) response to an NRC request for additional information (RAI) dated January 6, 2000. The RAI concerned a Hope Creek License Change Request (LCR H98-10), submitted on December 28, 1998, which proposed a revision to the Technical Specifications (TS) to permit an increase in the allowable leak rate for the main steam isolation valves (MSIVs) and to delete the MSIV sealing system.

Attachment 1 of this letter contains PSE&G's response to the RAI questions. PSE&G has concluded that the information contained in Attachment 1 does not alter the conclusions reached in the 10CFR50.92 No Significant Hazards analysis previously submitted with LCR H98-10.

Should you have any questions regarding this request, please contact Mr. James Priest at 856-339-5434.

Sincerely,

D. F. Garchow

D. F. Garchow
Vice President – Technical Support

Affidavit
Attachment

JPP

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File Nos. 2.3.1 (Hope Creek LCR H98-10)

REF: LR-N000071
LCR H98-10

STATE OF NEW JERSEY)
) SS.
COUNTY OF SALEM)

D. F. Garchow, being duly sworn according to law deposes and says:

I am Vice President – Technical Support of Public Service Electric and Gas Company, and as such, I find the matters set forth in the above referenced letter, concerning Hope Creek Generating Station, Unit 1, are true to the best of my knowledge, information and belief.

D. F. Garchow

Subscribed and Sworn to before me
this 3 day of March, 2000

Sheri L Hutton
Notary Public of New Jersey

My Commission expires on 12/8/2003

RESPONSE TO RAI QUESTIONS:

NRC Question 1:

In Figures 3-1 through 3-3 of EQE's November 12, 1998 report (Attachment 4 to your December 28, 1998 letter), size and dimension comparisons were made between the Hope Creek condenser and condensers at the earthquake experience database sites of Ormond Beach and Moss Landing. However, as shown in Figures 3-5 and 3-6 to demonstrate the adequacy of the Hope Creek condenser anchorage, you used condenser anchorages at the sites of El Centro and Moss Landing. Explain why you used different sets of database sites for different aspects of condenser comparison. Also, in Question No. 9 of the NRC staff's request for additional information (RAI) dated July 1, 1999, the staff requested that you provide the Ormond Beach response spectrum. You responded by stating that the Ormond Beach spectra were not used to demonstrate the anchorage adequacy of the Hope Creek condenser. Explain why you used Ormond Beach's dimensional data without providing and justifying the validity of its associated response spectra.

In addition to the above, the staff is concerned about the lack of sufficient earthquake experience condenser data provided by EQE, Inc. In its March 3, 1999, safety evaluation of the Boiling Water Reactor Owners' Group (BWROG) topical report, NEDC-31858P, Revision 2, September 1993, the staff stated that at the present time, there is no standard, endorsed by NRC, that provides guidance for determining what constitutes an acceptable number of earthquake recordings that should be provided by licensees that utilize the BWROG methodology. Therefore, individual licensees are responsible for ensuring the sufficiency of the earthquake experience data to be submitted for staff review. Based on the above, you are requested to provide sufficient earthquake experience condenser data for staff review. If sufficient data is not provided for the condenser, the NRC may require that the condenser be analytically evaluated against all the pertinent operating and design loadings, in accordance with the plant's design basis methodology and criteria.

PSE&G Response:

To demonstrate the adequacy of the Hope Creek design, seismic analyses of the Hope Creek condenser were performed, as part of the original design of the condenser and as part of the MSIV Sealing System deletion evaluation. Although comparisons using the response spectra of El Centro and Moss Landing could be used to support the conclusions concerning the seismic adequacy of the Hope Creek design, the seismic

analyses, as described in the following paragraphs, provide the basis for the conclusion that the Hope Creek condenser would retain its structural integrity following a seismic event such that its function as a post-LOCA iodine plate-out structure is ensured. Ormond Beach data is not relied upon to reach the conclusions concerning the seismic adequacy of the Hope Creek design. The analyses (as well as confirmatory evaluations of earthquake experience comparisons presented for Moss Landing) demonstrate adequate seismic performance of both the condenser anchorage and the condenser shell.

Condenser Anchorage

Seismic analyses were performed on the condenser anchorage as part of the Hope Creek MSIV evaluation (Reference paragraph 1.3 of EQE Report 200235-R-01 and EQE Calculation 200235-C-1). Seismic demand at the condenser anchorage elevation is developed based on a Regulatory Guide 1.60 design spectrum anchored to a peak ground acceleration (PGA) of 0.2g, the safe shutdown earthquake (SSE) level for the Hope Creek plant. The condenser seismic demand is taken as 5% damped spectra broadened by ± 15% in accordance with plant design criteria. Condenser anchorage capacity was evaluated using methodology consistent with that described in the Generic Implementation Procedure (GIP) Revision 2A.

The seismic and operating loads were combined and shear and tension demands on the seven condenser anchorages were determined. The ratio of combined load demand to capacity is less than 1.0. The calculation concludes that the condenser anchorage has adequate capacity to resist the seismic and operating loads.

Condenser Shell

Calculations (10855-M4-129-6) were performed for the condenser as part of the original plant design. The design calculations include evaluation of combined axial and bending loads due to dead weight and seismic OBE. These design loadings result in less than approximately 10% of allowable stress. Based on these design calculations, the stresses for the Hope Creek SSE are estimated to be less than about 20% of design allowables, and thus has adequate capacity to resist the seismic and operating loads.

NRC Question 2:

In responding to Question No. 10 of the above stated RAI, you stated that the response spectrum of Moss Landing and Valley Steam power plants bound the Hope Creek design safe shutdown earthquake (SSE) spectra in the low and high frequencies of interest. By examining the spectral curves provided in Enclosure 2 to your response, the staff noted, however, that the Valley Steam spectrum is exceeded by the Hope Creek spectrum in a frequency range from around 6 to 21 Hz. Also, the Moss Landing spectrum is exceeded by the Hope Creek spectrum in a frequency range from around 4.2 to 13 HZ. Since the above frequency ranges are considered significant, please provide your justification for the validity of these two sites as viable database sites for Hope Creek.

PSE&G Response:

The response to this question is included in the response to NRC Question 3.

NRC Question 3:

Table 4-3 of EQE's November 12, 1998, report provides earthquake experience piping data from Valley Steam Plant Units 1 & 2 and El Centro Steam Plant. In view of Question No. 2 above, the staff questions the validity of the piping data provided from the Valley Steam Plant. Similar to Question No. 1 above, the staff also questions the sufficiency of the piping data that you provided to envelop the Hope Creek ALT pathway piping. In addition, provide the justification for not including piping larger than 4 inches in diameter in the above table.

PSE&G Response to Questions 2 and 3:

The piping relied upon to establish an Alternate Treatment Pathway includes both seismically analyzed and non-seismically designed systems. All piping greater than 4 inches in diameter was seismically designed and is part of the safety-related piping in the Main Steam System. Portions of main steam drain system piping designs that have not been seismically analyzed (less than or equal to 4 inches in diameter) were reviewed to demonstrate that piping and supports fall within the bounds of design characteristics found in selected conventional power plant steam piping.

The frequencies of interest for these non-seismically designed piping systems are predominantly in the low frequency portion of the spectra. The earthquake spectra for Moss Landing and Valley Steam power plants bound the Hope Creek design SSE spectra in these low frequencies.

Many of the earthquake experience database sites have experienced strong ground motions that are in excess of the Hope Creek SSE over the entire frequency range of 1 to 33 Hz. Earthquake database sites, which bound the Hope Creek design spectra over the low frequencies and higher frequencies, include the Petrolia Earthquake HWY 101 – Painter St. Overpass, Rio Dell, Landers Earthquake Coolwater Generating Station, and Whittier Narrows Earthquake Bulk Mail Center, Bell. Response spectra for these sites are presented in the GE NEDC-31858P-A Volume 1 (Tab 8), August 1999.

NRC Question 4:

In relation to the bounding seismic analysis for the MSIV ALT pathway piping (Calculation No. 200965-C-001), which was provided with your submittal dated October 15, 1999, you stated that the dynamic analysis was performed utilizing the modal superposition response spectrum analysis method with modes up to 33Hz and with missing mass corrections. Provide all the natural frequencies, up to 33Hz, of the normal modes that were considered in the above bounding seismic analysis. Also, discuss the modal participation of each of the first few significant modes in the analysis.

PSE&G Response:

Natural frequencies and modal participation factors up to 33 Hz for the MSIV ALT pathway piping model seismic analysis are shown in Table 1. The first two significant modes are 0.71 Hz with an X participation factor of 2.085 and 1.31 Hz with a Z participation factor of –3.059.

Table 1
MSIV ALT Pathway Piping Model
Natural Frequencies and Modal Participation Factors

MODE NUMBER	FREQUENCY (Hertz)	PARTICIPATION FACTORS		
		X	Y	Z
1	0.71	2.085	-0.001	0.028
2	1.31	-0.482	-0.144	-3.059
3	2.02	0.258	0.030	0.159
4	2.29	-0.392	0.164	1.231
5	2.45	-0.558	0.653	2.028
6	2.79	-0.289	-0.059	-0.026
7	2.93	1.745	-0.168	0.132
8	3.15	-0.371	0.033	-0.108
9	4.33	-0.454	1.205	0.002
10	4.40	1.710	-0.486	0.144
11	4.43	-0.339	1.199	-0.713
12	4.65	-0.365	-1.329	0.118
13	5.34	0.251	-0.547	0.024
14	5.59	-0.745	-0.350	0.370
15	6.10	-0.024	0.163	-0.055
16	6.21	-0.029	-0.688	0.529
17	6.33	-0.001	-0.676	-0.832
18	6.60	0.580	-0.475	0.400
19	6.74	0.328	0.848	-0.515
20	7.09	0.959	-0.052	0.082
21	8.41	0.919	0.107	-0.106
22	9.09	-0.919	-0.126	0.071
23	9.62	-0.158	-0.134	-0.157
24	10.65	-0.113	0.173	-0.213
25	10.70	-0.274	-0.129	0.070
26	11.42	-0.228	0.700	0.207
27	11.46	-0.109	0.245	-0.322
28	13.12	0.199	0.002	0.005
29	14.11	0.083	-0.295	0.131
30	14.54	0.068	-0.135	-0.152
31	15.30	-0.092	0.173	-0.018
32	15.72	-0.052	-0.802	0.060
33	16.14	-0.020	0.133	-0.108

MODE NUMBER	FREQUENCY (Hertz)	PARTICIPATION FACTORS		
		X	Y	Z
34	16.02	-0.001	0.115	0.339
35	17.84	0.305	-0.025	0.095
36	17.97	-0.163	-0.061	-0.009
37	18.34	-0.110	-0.301	0.079
38	18.36	0.238	0.096	-0.062
39	19.53	0.088	-0.038	-0.061
40	19.84	0.044	-0.269	-0.023
41	20.45	-0.320	0.289	-0.082
42	21.14	0.761	0.001	0.012
43	21.85	0.077	-0.398	-0.265
44	22.08	0.056	-0.004	-0.007
45	22.58	0.132	-0.032	0.017
46	22.75	0.467	0.350	-0.064
47	23.89	0.004	0.051	0.065
48	24.54	0.033	-0.418	-0.153
49	26.15	-0.464	0.002	0.000
50	27.56	0.036	1.024	-0.113
51	28.36	0.196	0.372	-0.041
52	28.80	0.054	-0.002	0.018
53	29.33	-0.032	0.207	-0.103
54	30.20	0.024	0.446	0.118
55	32.34	0.089	0.005	-0.198
56	32.36	-0.125	0.005	0.013