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**BOSTON EDISON**

Pilgrim Nuclear Power Station  
Rocky Hill Road  
Plymouth, Massachusetts 02360

50.54(f)  
GL 87-02, Supp. 1

**E. T. Boulette, PhD**  
Senior Vice President - Nuclear

BEC0 94-16

February 9, 1994

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

License DPR-35  
Docket 50-293

ADDITIONAL RESPONSE TO GENERIC LETTER 87-02,  
SUPPLEMENT 1 (TAC NO. M69471)

As requested in Generic Letter (GL) 87-02 Supplement 1, Boston Edison previously submitted the Pilgrim design floor spectra for Staff review by letter dated September 21, 1992. NRC's reply dated November 18, 1992, transmitted a Safety Evaluation Report that concluded this spectra should be treated as "median centered response spectra". We request a re-evaluation of this conclusion for the Reactor, Turbine and Radwaste Buildings based on the additional information provided in this letter. We believe these design spectra have adequate margin to meet the "Conservative, design" definition contained in Section 4.2.4 of the Generic Implementation Procedure (GIP-2). This change would eliminate the potentially costly requirement for us to use increased factor penalties assigned by GIP-2 when making seismic capacity versus demand comparisons involving Generic Equipment Ruggedness Spectra and when performing electrical raceway Limited Analytical Reviews. Boston Edison will continue to treat the design floor spectra for the Intake and Diesel Generator Buildings as "median centered response spectra" for completion of the A46 program.

New Reactor Building floor spectra have been rigorously developed for a 0.15g Safe Shutdown Earthquake (SSE) using a state-of-the-art finite element model, soil-structure interaction analyses, and current Standard Review Plan criteria. These new floor spectra satisfy the "Conservative, design" definition of GIP-2, and are enveloped by the Pilgrim design floor spectra for the Reactor Building within the frequency range important to the A46 analysis scope of work. This demonstrates the conservatism resulting from the approaches and techniques used in the late 1960's to produce the Pilgrim design floor spectra. Enclosed for review are descriptions of the new modeling and analyses work, spectra comparison plots, and further discussion of our conclusions.

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We have made substantial progress in the development of our response to Supplement 1 of GL 87-02. In order to continue this work in the most efficient manner, we would appreciate an early reply to this request. Since this information is submitted in accordance with 10CFR50.54(f) as requested by Generic Letter 87-02, Supplement 1, we do not consider this subject to 10CFR170 fees. If you need additional information to assist your review, we would be pleased to furnish it.

*E. T. Boulette*  
E. T. Boulette

Commonwealth of Massachusetts)  
County of Plymouth )

Then personally appeared before me, E. T. Boulette, who being duly sworn, did state that he is Senior Vice President - Nuclear of Boston Edison Company and that he is duly authorized to execute and file the submittal contained herein in the name and on behalf of Boston Edison Company and that the statements in said submittal are true to the best of his knowledge and belief.

My commission expires:

*October 5, 1995*  
DATE *Peter M. Kahler*  
NOTARY PUBLIC

Attachments:

1. Discussion of Conclusions
2. Descriptions of New Modeling and Analysis Work
3. Spectra Comparison Plots

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Senior NRC Resident Inspector  
Pilgrim Nuclear Power Station

nas/GL8702

## ATTACHMENT 1

### DISCUSSION OF CONCLUSIONS

New Reactor Building floor spectra have been rigorously developed for a 0.15g Safe Shutdown Earthquake (SSE) using a state-of-the-art finite element model, soil-structure interaction analyses, and current Standard Review Plan criteria. The time history input is based on Regulatory Guide 1.60 requirement for free-field ground motions. The details of this work are presented in Attachment 2.

These new floor spectra satisfy the "Conservative, design" definition of GIP-2, and are enveloped by the Pilgrim design floor spectra for the Reactor Building within the frequency range important to the A46 analysis scope of work. Spectra comparisons are presented in Attachment 3. This demonstrates the conservatism resulting from the approaches and techniques used in the late 1960's to produce the Pilgrim design floor spectra.

Although comparable data is not available for the Turbine and Radwaste Buildings, the conservatism demonstrated by the Reactor Building response spectra results are expected to be present in these other structures as well for the following reasons:

- The Pilgrim design floor spectra for the Turbine and Radwaste Buildings were generated by Bechtel during the same period in time as the Reactor Building, and using the same approaches and techniques, described in FSAR Section 12.2.3.5.3.
- Like the Reactor Building, the Turbine and Radwaste Buildings are also embedded structures, and would be expected to similarly benefit from soil structure interaction effects. This has been demonstrated with approximate analyses performed to compute seismic demand for the IPE-External Events seismic PRA work. The relationship of these three buildings to each other and their foundation embedments are shown in figures contained in Section 12.1 of the Pilgrim FSAR.
- The original Bechtel analysis for each of the buildings used lumped mass stick models with soil springs and resulted in the calculation of building resonant frequencies. A listing of the first two modal frequencies for the Reactor, Turbine and Radwaste buildings is provided below for your information:

Bldg.	Dir.	Mode #1Hz	Mode #2Hz
Reactor	E-W	4.6	12.4
	N-S	4.5	11.7
Turbine	E-W	3.4	5.9
	N-S	4.5	7.0
Radwaste	E-W	9.6	22.2
	N-S	11.3	23.1

In conclusion, we believe the Pilgrim design response spectra for the Reactor, Turbine and Radwaste Buildings have adequate margin to meet the "Conservative, design" definition contained in Section 4.2.4 of the Generic Implementation Procedure (GIP-2).

## ATTACHMENT 2

### DESCRIPTION OF THE NEW MODELING AND ANALYSES WORK

This attachment consists of the following engineering reports:

- EQE Engineering Report No. 42103-R-001 entitled "Seismic Reanalysis of Reactor Building, Pilgrim Nuclear Power Station", dated July 1993 (BECO document reference SUDDS/RF 93-140).
- Stevenson & Associates Calculation No. 91C2672-C-002 entitled "Soil Properties for the Soil Structure Interaction Analysis for the Pilgrim Site", dated January 1993 (BECO document reference SUDDS/RF 93-029).

September 21, 1993

42103-O-012  
NE-93-133

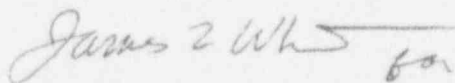
Mr. J.G. Dyckman  
Civil/Structural Division Manager  
Boston Edison Company  
25 Braintree Hill Office Park  
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Subject: EQE Copyright Statement

Dear Sir:

EQE Incorporated grants permission to Boston Edison Company to reproduce copies of all documents created under purchase order LBR 107049 (EQE Project No. 42103). This permission is granted for internal use only, and for use by 3rd party organizations for future work on Pilgrim Station.

Very truly yours,



Paul D. Baughman  
Northeast Regional Manager

JLW:cjd