



PECO NUCLEAR

A Unit of PECO Energy

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U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Subject: Peach Bottom Atomic Power Station, Units 2 and 3
Senior Seismic Review and Advisory Panel (SSRAP) and
Nuclear Regulatory Commission (NRC) Reviews

Reference: Letter from James A. Hutton, PECO Energy Company, to
USNRC dated October 6, 1999

Dear Sir:

The reference letter provided excerpts from Generic Implementation Procedure, Revision 2, as Appendix 1 and Appendix 2 to Attachment 2 which consisted of "Seismic Demand Criteria" and Section 8, "Senior Seismic Review and Advisory Panel (SSRAP) and Nuclear Regulatory Commission (NRC) Reviews," respectively. Each of the pages of Appendix 1 and Appendix 2 were stamped "Proprietary." This information was initially considered proprietary, but is no longer proprietary and therefore was not requested to be withheld from public disclosure in accordance with 10 CFR 2.790 in the reference letter.

To eliminate any uncertainty on the proper treatment of information in Appendix 1 and Appendix 2, the same information is enclosed with this letter without being stamped "Proprietary."

If you have any questions, please do not hesitate to contact us.

Very truly yours,

James A. Hutton
Director - Licensing

Enclosure

cc: H. J. Miller, Administrator, Region I, USNRC
A. C. McMurtry, USNRC Senior Resident Inspector, PBAPS

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Appendix 1

**Excerpt from GIP-2, Reference 25
Results of BWR Trial Plant Review**

Seismic Demand Criteria

SEISMIC DEMAND CRITERIA

APPLICATION	DEMAND CRITERIA
1. Equipment in experience data base and less than 40' above 243', and fundamental frequency greater than 8 Hz.	1. Compare ground spectra with bounding spectrum (Figure 3.1 in SSRAP report).
2. Equipment in experience data base over 40' above 243' (over 281' elevation) or fundamental frequency less than 8 Hz.	2. Compare amplified floor response spectra with 1.5 x bounding spectrum (Figure R1, ..., Rn, T1, ..., Tn).
3. Equipment covered by GERS (any elevation, frequency).	3. Compare amplified floor spectra (median-centered) with 2/3 x GERS for specific equipment class.
4. Anchorage evaluation and equipment-specific stress checks (excluding valves):	4.
<ul style="list-style-type: none"> - Equipment within 40' of "grade" (elevation 281' and below) and fundamental frequency less than 8 Hz. - Equipment at any elevation. - Equivalent static load factor for all equipment (except valves). - Static load check for valve operator/yoke checks. 	<ul style="list-style-type: none"> - Utilize accelerations from (1.5 x ground spectra) x 1.25. - Utilize accelerations from median-centered amplified floor response spectra x 1.25. - Using appropriate spectra with multiplier, use: <ul style="list-style-type: none"> - Peak acceleration for flexible equipment. - ZPA for rigid equipment. - Acceleration at calculated fundamental frequency. - 3G, Weak direction.

*Note: In general, for equipment with fundamental frequency greater than 8 Hz and within 40' of grade, 1.5 x ground spectra may be used as an estimate of median-centered amplified floor response spectra.

Appendix 2

Excerpt from GIP-2, Reference 25 Results of BWR Trial Plant Review

Section 8 Senior Seismic Review and Advisory Panel (SSRAP) and Nuclear Regulatory Commission (NRC) Reviews

Section 8

SENIOR SEISMIC REVIEW AND ADVISORY PANEL (SSRAP) AND
NUCLEAR REGULATORY COMMISSION (NRC) REVIEWS

Representatives of SSRAP and the NRC attended the NMP-1 walkdown on February 1st through 3rd (Days 8 through 10). On February 1st, following radiation protection training and dosimetry issuance, the SSRAP and NRC representatives were briefed on the organization and conduct of the NMP-1 walkdown. The indoctrination and pre-walkdown materials covered by SQUG for the walkdown participants were also reviewed with SSRAP and the NRC. The indoctrination/training materials are given in Appendix C and include information on the organization and schedule of the walkdown, the rules of conduct in the plant, plant-specific data on the seismic demand levels for the walkdown, and summary information on GIP requirements for review of seismic demand versus capacity, equipment caveats, anchorage evaluation and evaluation of interactions.

The NMP-1 seismic demand information used for this walkdown was discussed in some detail. SQUG representatives explained that the seismic ground motion used as a basis for the walkdown is a plant-specific, uniform hazard, ground-motion spectra developed by A. Cornell and R. McGuire and is anchored at 0.13 G. This ground-motion spectra envelopes the NMP-1 FSAR licensing basis SSE spectra which is anchored at 0.11 G. The NMP-1 uniform hazard ground-motion spectra is shown in Appendix C. Also in this Appendix are amplified floor response spectra developed for NMP-1 using modern reactor and turbine building models and the 0.13 G uniform hazard ground-motion spectra. Mr. Djordjevic (Stevenson & Associates) reviewed the bases for the amplified floor response spectra and indicated that they are being used as mean-centered, realistic spectra. Dr. Kennedy (SSRAP) expressed the view that he believes the floor response spectra are conservative and generally in accordance with current Standard Review Plan criteria. As

a result, SSRAP considers that it is not necessary to utilize the additional factors of safety recommended by SSRAP for use with mean-centered spectra (1.5 for use of GERS and 1.25 for anchorage evaluation) in using the NMP-1 floor response spectra during this walkdown.

A second area discussed regarding the seismic demand was the effective grade level at NMP-1. At this site, the turbine building is founded on rock at elevation 243 feet above sea level. The reactor building is founded on rock at 198 feet. Grade elevation is 261 feet. In the construction of the buildings, the sites were excavated to the foundation level, the buildings constructed, and the annular space between the building and the rock excavation was backfilled with crushed stone up to the 261 foot grade elevation. An elevation view of the plant is included in Appendix C. SQUG and NMPC representatives explained that while they believe lateral support is provided by the crushed stone backfill, it has been conservatively assumed for the purpose of this walkdown that the effective grade elevation is at about 240-243 feet. This elevation corresponds to the foundation of the turbine building and the elevation in the reactor building where the structure changes from an essentially monolithic concrete block structure (including the reactor base mat) to that of reinforced concrete walls and floors. Essentially no amplification is expected in the reactor building up to about 243 feet. On this basis, the elevations which are considered to be within 40 feet of effective grade, are those elevations in the reactor and turbine buildings up to and including the 281 foot elevation. SSRAP was in general agreement with this approach.

Prior to walkdown of the plant by SSRAP and NRC reviewers, the three SRTs described their progress to date, highlighting areas they particularly wanted the reviewers to evaluate. SSRAP and NRC representatives spent most of February 2nd performing independent walkdowns of NMP-1. Essentially all safe shutdown equipment was seen by them with the exception of the emergency condensers and related

equipment, several reactor coolant system instruments, several reactor coolant system isolation valves, core spray and containment spray pumps in the basement corner rooms and the equipment in the drywell, all of which were inaccessible due to the need for radiation work permits (RWPs). Following this walkdown, Dr. Kennedy provided a summary of SSRAP's observations and conclusions:

1. The SSRAP walkdown was performed to determine how the seismic review teams (SRTs) were operating, to assess how the SRTs were evaluating and dispositioning the safe shutdown equipment, and to obtain a general sense of the seismic ruggedness of NMP-1.
2. SSRAP did not observe many seismic concerns and no serious seismic issues. The expected outliers identified by the SRTs were considered by SSRAP to be typical. Dr. Kennedy remarked that, in fact, there were fewer outliers than would be expected for a plant of this vintage. He believes that this is a result of the numerous seismic upgrades performed by NMPC over the years which were apparent to SSRAP during their walkdown.
3. It is SSRAP's judgment, based on their walkdown, that the SRT members received adequate training to perform the walkdown and that they were doing an adequate and qualified job of evaluating the seismic adequacy of the safe shutdown equipment. SSRAP generally expressed the opinion that when the SRTs reached different conclusions than SSRAP, the SRTs' conclusions were more conservative (i.e., the SRTs may have identified more outliers than would SSRAP). SSRAP is uncertain if the utility SRTs used during the trial plant walkdown are representative of the SRTs other utilities might use for their walkdowns, since SSRAP believes that the utility SRT members at the trial plant walkdown have considerable seismic experience. As a result, SSRAP continues to believe that it is essential that the SRT members have adequate qualifications and experience in seismic engineering.

Following Dr. Kennedy's summary report, NRC representatives presented their observations and conclusions. Dr. T. Y. Chang, USI A-46 Program Manager, reported the following:

1. The NRC generally agrees with the SSRAP review findings. The NRC believes that the walkdown has shown that the use of utility engineers is a viable approach provided the SRT members have the proper level of experience. The NRC still strongly believes that the qualifications of the SRT members are very important, irrespective of whether the members are utility employees or contractors. Further, the NRC believes that the training program is not enough to make an engineer a seismic expert. The SRT members should have the requisite seismic experience prior to their selection for training and the walkdowns.
2. The conduct of the NMP-1 walkdown was very smooth. The NRC commented that it is clear that the lessons learned from the Trial Plant 1 walkdown were factored into this walkdown in that there was a considerable amount of pre-walkdown planning which contributed to the smoothness of the walkdown.
3. The NRC was impressed with the layout of NMP-1. The plant is open and has considerable space which contributes to both good maintenance and a lack of seismic interaction hazards.
4. The NRC observed during their walkdown (as did the SRTs and SSRAP) that the quality of the anchor welds in some electrical cabinets was marginal.
5. The NRC noted that the relay review for NMP-1 was performed for a sample of typical safe shutdown circuits and did not cover every safe shutdown circuit and relay in the plant. They noted that the remaining circuits and relays need to be reviewed before the seismic review for NMP-1 is complete.

6. There was some discussion of the uniform hazard ground-motion spectra used for this walkdown. Since this spectra bounds the licensing basis ground-motion SSE spectra for NMP-1, the NRC concluded that this ground-motion spectra is acceptable and meets the requirements of USI A-46. The NRC also noted that they concur that the amplified floor spectra used for this walkdown are conservative spectra.