



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
EVALUATION OF COMMONWEALTH EDISON COMPANY'S 120-DAY RESPONSE
TO SUPPLEMENT NO. 1 TO GENERIC LETTER 87-02
FOR THE DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3,
QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2,
AND ZION NUCLEAR POWER STATION, UNITS 1 AND 2
DOCKET NOS. 50-237, 50-249, 50-254, 50-265, 50-295, AND 50-304

1.0 BACKGROUND

By letter dated September 21, 1992, the Commonwealth Edison Company (CECo, the licensee) submitted its response to Supplement No. 1 to Generic Letter (GL) 87-02, "Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors, Unresolved Safety Issue (USI) A-46," dated May 22, 1992, for the Dresden Nuclear Power Station, Units 2 and 3, the Quad Cities Nuclear Power Station, Units 1 and 2, and the Zion Nuclear Power Station, Units 1 and 2. In Supplement No. 1 to GL 87-02, the staff requested that the licensee submit the following information within 120 days of the issue date of the supplement:

1. A statement whether you commit to use both the Seismic Qualification Utility Group (SQUG) commitments and the implementation guidance provided in the Generic Implementation Procedure, Revision 2 (GIP-2) as supplemented by the staff's Supplemental Safety Evaluation Report No. 2 (SSER No. 2) for the resolution of USI A-46. In this case, any deviation from GIP-2, as supplemented by the SSER No. 2, must be identified, justified, and documented. If you do not make such a commitment, you must provide your alternative for responding to GL 87-02.
2. A plant-specific schedule for the implementation of the GIP and submission of a report to the staff that summarizes the results of the USI A-46 review, if you are committing to implement GIP-2. This schedule shall be such that each affected plant will complete its implementation and submit the summary report within 3 years after the issuance of the SSER No. 2, unless otherwise justified.
3. The detailed information as to what procedures and criteria were used to generate the in-structure response spectra to be used for USI A-46 as requested in the SSER No. 2. The licensee's in-structure response spectra are considered acceptable for USI A-46 unless the staff indicates otherwise during a 60-day review period.

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In addition, the staff requested in SSER No. 2 that the licensee inform the staff, in the 120-day response, if it intends to change its licensing basis to reflect a commitment to the USI A-46 (GIP-2) methodology for verifying the seismic adequacy of mechanical and electrical equipment, prior to receipt of the staff's plant-specific safety evaluation resolving USI A-46. This report provides the staff's evaluation of the licensee's response.

2.0 EVALUATION

With regard to Item 1, the licensee stated that, "Specifically, CECO commits to the SQUG commitments as defined in the GIP and clarifications, interpretations, and exceptions identified in the SSER-2 and clarified in the referenced August 21, 1992, letter with no exceptions." It is noted that the referenced August 21, 1992, letter from SQUG to the NRC, responds to SSER No. 2. The licensee also stated that it "...will be guided by the remaining (non-commitment) sections of the GIP, i.e., GIP implementation guidance, which comprises suggested methods for implementing the applicable commitments." In addition, the licensee provided clarification as to how it intends to implement specific parts of the GIP.

The licensee's response is unclear as to whether or not the licensee intends to implement both the SQUG commitments and the implementation guidance. In accepting GIP-2 as a method for resolving USI A-46, it was the staff's understanding that the SQUG members who chose to implement GIP-2 would essentially use the entire procedure; including the SQUG commitments (which contain the general programmatic objectives and goals) and the implementation guidance (which contains the specific criteria and procedures to be used for the resolution of USI A-46). This understanding was the basis for the staff's position that was stated in SSER No. 2, i.e., if the licensee commits to use GIP-2 for the implementation of USI A-46, it must commit to both the SQUG commitments and the use of the entire implementation guidance provided in GIP-2 unless otherwise justified to the staff. In order to allow some flexibility in implementing GIP-2, the staff acknowledged in the supplement to GL 87-02 that SQUG members who commit to GIP-2 (both the SQUG commitments and the implementation guidance) may deviate from it provided that such deviations are identified, documented, and justified. However, it was also indicated in SSER No. 2 that if a licensee uses methods that deviate from the criteria and procedures described in the SQUG commitments and in the implementation guidance of GIP-2 without prior NRC approval, the staff may find the use of such methods unacceptable with regard to satisfying the provisions of GL 87-02.

In light of the above, the staff interprets the licensee's response to Supplement No. 1 to GL 87-02 as a commitment to the entire GIP-2 including both the SQUG commitments and the implementation guidance and, therefore, considers it acceptable. If the staff's interpretation is incorrect, in accordance with Supplement No. 1 to GL 87-02, the licensee should provide for staff review, as soon as practicable prior to implementation, its alternative criteria and procedures for responding to GL 87-02.

In addition, the staff's response, dated October 2, 1992, to the August 21, 1992, SQUG letter is attached. The staff does not concur with all of SQUG's clarifications and positions as stated in that letter; thus, the licensee should not use the that letter as guidance in responding to Supplement No. 1 to GL 87-02. The licensee should refer to the Attachment to this SE for the staff's position on the SQUG letter.

The licensee provided the following two clarifications of its implementation program: (1) CECO will use previously performed anchorage evaluations to expedite and/or minimize the GIP verification efforts, and (2) CECO will use existing seismic qualification test reports to demonstrate operability for any equipment on its safe shutdown equipment list (SSEL) that was previously qualified to IEEE 344-1975. The staff finds that the first clarification is acceptable provided that the anchorage evaluations previously performed meet the criteria and procedures approved by the staff in SSER No. 2 (Section II.4.4). The staff also finds that the second clarification is acceptable.

With regard to Item 2, the licensee stated that it plans to submit a summary report to the NRC summarizing the results of the USI A-46 program at the Dresden Station, Units 2 and 3, and at Quad Cities Station, Units 1 and 2, by November 1995. This schedule is within the 3-year response period requested by the staff and is, therefore, acceptable. The licensee indicated that it plans to submit a summary report for Zion Station, Units 1 and 2, by June 1996. Although this submittal date exceeds the 3-year response period requested by the staff, the licensee indicated that the extension is justified because the existing plant refueling outage schedule controls the SQUG walkdown schedule. Based on Zion's outage schedule, the staff finds the proposed date to submit a summary report acceptable.

With regard to Item 3, the licensee has provided the relevant information regarding in-structure response spectra (IRS) for Dresden, Quad Cities and Zion nuclear power stations. Dresden Unit 2, a Systematic Evaluation Program (SEP) plant, has a safe-shutdown earthquake (SSE) peak ground acceleration of 0.20g. During the SEP review some of the vital structures, systems, and components were verified using either Regulatory Guide 1.60 spectra or the staff-developed SEP spectra, with the SSE-peak ground acceleration (PGA) of 0.13g. The 5% design response spectrum with the SSE-PGA of 0.20g envelopes the 5% SEP spectrum between the frequencies of 1.2 to 20 Hz. Thus, any of the above spectra may be used by the licensee to generate 'conservative, design' IRS for both units of the Dresden Nuclear Power Station. However, the licensee has not provided adequate information to make judgement regarding the acceptability of the resulting IRS, e.g., structural modeling, typical IRS at some elevations, and damping.

The licensee proposes to use the Dresden design basis spectra for the resolution of USI A-46 at Quad Cities. According to the Updated Final Safety Analysis Report (UFSAR), the SSE-PGA at Quad Cities is 0.24g. Thus, any of the spectra discussed in the above paragraph may be used by the licensee with the zero period ground acceleration adjusted to 0.24g to develop the IRS for both units of the Quad Cities Nuclear Power Station. As in the case of

Dresden, the licensee has not provided adequate information regarding the acceptability of the resulting IRS, e.g., the time-history utilized, structural modelling, damping values used, and broadening of IRS peaks.

Based on our review of the licensee's responses and the staff positions delineated in SSER No. 2, we conclude that the licensee's responses are inadequate for Dresden and Quad Cities stations and the licensee should provide additional information regarding structural modeling, typical IRS, and damping values used in the generation of IRS.

For Zion, Units 1 and 2, the SSE PGA is 0.17g. The design response spectra (DRS) are smoothed Housner type spectra. The time-history utilized for generating the IRS is the scaled NS 1940 El Centro earthquake record. The 5% damped response spectrum developed from the time-history envelopes the 5% damped DRS with a margin of 40% above the DRS between the frequencies of 1 to 50 Hz. The licensee states that these IRS should be considered as 'conservative, design' in-structure response spectra for verifying the plant equipment. The DRS is considered as non-conservative. However, the time-history used to generate the IRS compensates for the deficiency. The simplified lumped mass modelling, fixed base assumption and the method of considering the two horizontal components of the earthquake tends to add to the conservatism in the IRS. Overall, a review of some of the IRS provided in the UFSAR indicates that the amplifications and peak broadening of the IRS are reasonable.

Based on our review of the licensee's response and the staff positions delineated in SSER No. 2, we conclude that the licensee response is adequate and acceptable, and that the IRS developed by the licensee may be considered as 'conservative, design' in-structure response spectra for Zion Station. This conclusion is based on an assumption that the statements made in the submittal, including the procedures used in generation of the floor response spectra, correctly reflect the FSAR and other licensing basis. The staff may audit the process by which the IRS were generated.

The licensee indicated that it intends to change its licensing basis methodology, for the Dresden, Quad Cities, and Zion stations, via 10 CFR 50.59, for verifying the seismic adequacy of new, replacement, and existing electrical and mechanical equipment prior to receipt of a final plant-specific SE resolving USI A-46. The staff recognizes that the licensee may revise its licensing basis in accordance with 10 CFR 50.59 to reflect the acceptability of the USI A-46 (GIP) methodology for verifying the seismic adequacy of electrical and mechanical equipment covered by the GIP. However, if the licensee does not commit to implement both the SQUG commitments and the implementation guidance, and the licensee has not committed to any acceptable alternative criteria and procedures, then the staff does not believe that it is feasible, at this time, for the licensee to change its licensing basis in the manner described.

3.0 CONCLUSIONS

The staff interprets the licensee's response to Supplement No. 1 to GL 87-02 as a commitment to the entire GIP-2 including both the SQUG commitments and the implementation guidance and, therefore, considers it acceptable. If the licensee does not commit to implement the entire GIP-2, in accordance with Supplement No. 1 to GL 87-02, the licensee should provide for staff review, as soon as practicable prior to implementation, its alternative criteria and procedures for responding to GL 87-02. Additionally, the licensee should not merely follow the August 21, 1992, SQUG letter for implementing GIP-2, but should refer to the Attachment to this SE for the staff's response to the SQUG letter.

The staff finds that it is acceptable for the licensee to use previously performed anchorage evaluations for USI A-46 provided that the evaluations meet the criteria and procedures approved in SSER No. 2 (Section II.4.4). The staff also finds that it is acceptable to use existing seismic qualification test reports to demonstrate operability for Safe Shutdown Equipment List (SSEL) equipment that was qualified to IEEE 344-1975.

The implementation schedules proposed by the licensee for the Dresden and Quad Cities Nuclear Power stations are within the 3-year response period requested by the staff in Supplement No. 1 to GL 87-02 and are, therefore, acceptable. Although the licensee's proposed implementation schedule for Zion Station exceeds the 3-year response period requested by the staff, the licensee provided adequate justification for its schedule and, therefore, the schedule is acceptable.

The acceptability of the licensee's in-structure response spectra for Dresden, Units 2 and 3, and Quad Cities, Units 1 and 2, will be addressed in a future supplemental SE after the licensee submits the information requested. The licensee's response regarding in-structure response spectra for Zion, Units 1 and 2, is acceptable.

The staff recognizes that the licensee may revise its licensing basis in accordance with 10 CFR 50.59 to reflect the acceptability of the USI A-46 (GIP) methodology for verifying the seismic adequacy of electrical and mechanical equipment covered by the GIP. However, if the licensee does not commit to implement both the SQUG commitments and the implementation guidance, and the licensee has not committed to any acceptable alternative criteria and procedures, then the staff does not believe that it is feasible, at this time, for the licensee to change its licensing basis in the manner described.

Attachment:

Letter from J. G. Partlow (NRC) to
N. Smith (SQUG), dated October 2, 1992

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Dated: November 20, 1992