



Commonwealth Edison

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September 20, 1985

Mr. James G. Keppler
Regional Administrator
U.S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

Subject: Zion Nuclear Power Station Unit 2
Inspection Report No. 50-304/85-006
NRC Docket No. 50-304

- References (a): April 15, 1985 letter from G. G. Zech
to Cordell Reed.
- (b): August 21, 1985 letter from J. J.
Harrison to Cordell Reed.
- (c): April 10, 1984 letter from F. G. Lentine
to H. R. Denton.
- (d): November 21, 1984 letter from S. A. Varga
to D. L. Farrar.

Dear Mr. Keppler:

Reference (a) transmitted the report of a special team inspection conducted by Mr. G. T. Hubbard and other NRC representatives on January 14-18, 1985, at the offices of Commonwealth Edison Company and Sargent & Lundy in Chicago, Illinois, and at Zion Station Unit 2, Zion, Illinois, of activities authorized by NRC License No. DPR-48. The purpose of this inspection was to review the implementation of the program developed for establishing and maintaining the qualification of electric equipment within the scope of 10 CFR 50.49.

Reference (a) identified four items as Potential Enforcement/Unresolved Items and referred them to the NRC Region III office for further action. Reference (b) classified two of these four items as examples of a violation of 10 CFR 50.49. The remaining two items remain classified as Potential Enforcement/Unresolved Items.

There has been considerable discussion with members of your office concerning the classification and precise issues surrounding the two examples that have been characterized as a single item of noncompliance in reference (b). In order to preclude any misunderstanding, Commonwealth Edison Company's response to the two examples of violation are addressed separately in Attachments 1 and 2.

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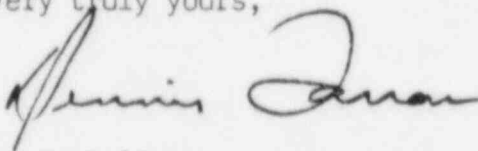
Note that Attachment 2 addresses two areas of confusion concerning example b of the violation. Specifically, the need for a Justification for Interim Operation (JIO) and the example selected are discussed. These problems were discussed with Mr. J. J. Harrison of your office on August 28, 1985.

Reference (b) also requested that Commonwealth Edison Company submit a justification for both the removal of certain TER items from the EQ program and the adequacy of the environmental profile established for Zion's EQ program. These justifications are contained in Attachments 3 and 4, respectively.

Attachment 3 concludes that the removal of the TER items was reviewed and approved by the NRC/NRR in reference (d). Attachment 4 demonstrates the adequacy of the environmental profile utilized and reaffirms Commonwealth Edison Company's compliance with 10 CFR 50.49.

If any questions arise concerning this matter, please direct them to Commonwealth Edison's Nuclear Licensing Department.

Very truly yours,


for L. O. DelGeorge
Assistant Vice President

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Attachments

cc: J. A. Norris - NRR
Zion Resident Inspector

ATTACHMENT 1

ZION NUCLEAR POWER STATION UNIT 2

RESPONSE TO NOTICE OF VIOLATION

EXAMPLE a

ITEM OF NONCOMPLIANCE

10 CFR 50.49, Paragraph (f) requires each item of electrical equipment important to safety be qualified by one of several methods involving testing and/or analysis:

Contrary to the above:

- a. Commonwealth Edison Company has installed qualified limitorque valve operators in Zion Unit 2 in a configuration different from the configuration which was qualified by testing and/or analysis. This is exemplified by the fact that limitorque valve operators were installed inside Zion Unit 2 containment with plastic shipping caps installed on the valve operator gear case grease relief valve.
- b. Commonwealth Edison Company has installed qualified junction boxes in Zion Unit 2 in a configuration different from the configuration which was qualified by testing and/or analysis. This is exemplified by the fact that the junction boxes were qualified with bottom or side conduit entries and several were installed with top conduit entries.

CORRECTIVE ACTION TAKEN AND RESULTS ACHIEVED

The plastic shipping caps were removed from all affected valve operators on both Zion units by January 18, 1985

CORRECTIVE ACTION TAKEN TO AVOID FURTHER NONCOMPLIANCE

It has been Commonwealth Edison Company's position that the presence of the shipping cap was a condition unrelated to the qualification of the valve operators. This belief has subsequently been reinforced by discussions with Limitorque, the operator's manufacturer.

The following events will likely occur in the event of a LOCA with the plastic cap remaining in place:

- a) The internal pressure would build up to a point where the relief would open and the grease under pressure would blow the cap, thereby eliminating the cap or,
- b) The temperature during the LOCA would melt the cap and, if the relief did open, it would blow out any of the remaining plastic in the opening.

ATTACHMENT 1

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This is further substantiated by the testing performed on a similar operator and documented in Limitorque Test Report B0003. This operator, which did not have a grease relief valve installed on the gear box housing, was subjected to a temperature of 250°F and a pressure of 25 psig. This operator successfully completed the qualification testing, thus demonstrating that the presence or absence of the entire grease relief valve, has little or no effect on the qualification. Obviously, the presence of the shipping cap on this valve is of even less significance.

Commonwealth Edison Company believes that the Limitorque operators have been installed in a configuration that was consistent with the configuration qualified by testing and analysis. All parameters important to qualification have been appropriately controlled. The presence of the shipping cap was a condition unrelated to the qualification of the valve operators. No further corrective action is necessary.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

The station is in compliance at this time.

ATTACHMENT 2

ZION NUCLEAR POWER STATION UNIT 2

RESPONSE TO NOTICE OF VIOLATION

EXAMPLE b

ITEM OF NONCOMPLIANCE:

10 CFR 50.49, Paragraph (f) requires each item of electrical equipment important to safety be qualified by one of several methods involving testing and/or analysis.

Contrary to the above:

- a. Commonwealth Edison Company has installed qualified Limitorque valve operators in Zion Unit 2 in a configuration different from the configuration which was qualified by testing and/or analysis. This is exemplified by the fact that Limitorque valve operators were installed inside Zion Unit 2 containment with plastic shipping caps installed on the valve operator gear case grease relief valve.
- b. Commonwealth Edison Company has installed qualified junction boxes in Zion Unit 2 in a configuration different from the configuration which was qualified by testing and/or analysis. This is exemplified by the fact that the junction boxes were qualified with bottom or side conduit entries and several were installed with top conduit entries.

DISCUSSION:

Numerous discussions were held in early August, 1985 with Messrs. J.F. Streeter, C. C. Williams, and A. S. Gautam of your office. These conferences were very beneficial in clarifying the various issues. As part of these teleconferences, Commonwealth Edison personnel corrected an inaccurate statement contained on page 9 of reference (a). That is, top entry junction boxes were a part of the testing performed at Wyle Labs and documented in Wyle Report 17657.

Both Commonwealth Edison and NRC/Region III personnel agreed during the teleconferences that this information may have been overlooked during the January, 1985 inspection. In addition, it was decided that the true issue was Commonwealth Edison's level of evaluation and documentation of the cumulative effect of leakage currents on certain control circuits. Thus, it appears the wording of example b is inappropriate.

In addition, Commonwealth Edison Company restated its belief that the qualification of the junction boxes and terminal blocks was never in question. Reassurance of this belief was provided by an analysis of the effect of leakage

ATTACHMENT 2

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currents that was performed subsequent to the January, 1985 inspection. Commonwealth Edison personnel stated that this analysis, and information pertaining to it, would be available for review by August 16, 1985. Thus, no formal justification for interim operation (JIO) was required. This conclusion is not consistent with reference (b), which states that the JIO, not the leakage current analysis, will be available for review by August 16, 1985.

In the interest of expediting this response, Mr. P. C. LeBlond contacted Mr. J. J. Harrison of your office on August 28, 1985 to discuss these two issues. It was agreed that Commonwealth Edison Company should clarify the issues surrounding the non-existence of a formal JIO, as discussed above. In addition, the Notice of Violation, example b, should be restated and the response should address the true issues involved.

Thus, the responses that follow address the issue of Commonwealth Edison Company's lack of an evaluation and documentation of the cumulative effect of leakage currents on control circuits. The subject of top entry junction boxes will not be addressed beyond that provided above.

CORRECTIVE ACTION TAKEN AND RESULTS ACHIEVED

A review of the control circuits has been conducted to determine if cumulative leakage current could pose an adverse affect on the operation of control equipment necessary to function in an accident environment. The controlled equipment consists of solenoid valves which control the air-operated containment isolation valves, and the solenoids which control the operation of the PORV's. Our engineering review has determined that all the containment isolation valves fail to the safe (accident) position upon the loss of electric power. Thus, in the unlikely event that the circuit experiences excessive leakage and the fuses blow, the valves would shift to the accident position. Our review of the solenoids associated with the PORVs has determined that operation of the PORVs is not required until after the period of chemical spray (depressurizing to go to cold shutdown). Thus, no operation of these valves would be required during the most susceptible period of the accident. From the testing done, it was demonstrated that once the chemical spray was stopped the leakage current fell to very low levels.

Therefore, the analysis performed demonstrates that the qualification of the junction boxes/terminal blocks is not adversely affected by the effects of leakage currents.

CORRECTIVE ACTION TAKEN TO AVOID FURTHER NONCOMPLIANCE

Any long term monitoring devices installed in the future will utilize splices, thus eliminating the potential for leakage currents. In addition, it has been a general design practice to place control devices and instrumentation

ATTACHMENT 2

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on separate circuits. This practice will preclude the potential for a newly installed, spliced instrument being powered by a circuit that might exhibit high leakage currents.

Any future control devices will continue to be designed to fail to the accident position following a loss of power.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

The station is in compliance at this time.

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ATTACHMENT 3

JUSTIFICATION FOR THE REMOVAL OF TER

ITEMS 41, 79, 80, and 81

A meeting was held with members of your staff on January 25 and 26, 1984 to discuss the resolution for all deficiencies noted in the SERs and TERs for the Zion, Dresden and Quad Cities Stations. The general methodology for compliance with 10 CFR 50.49 was also discussed. Reference (c) documented the material presented at that meeting.

The transmittal letter for reference (c) stated in part;

"As discussed with your staff, equipment items installed as a result of TMI Lessons Learned implementation (NUREG-0737), have been removed from the environmental qualification program pending completion of the control room design review, Regulatory Guide 1.97, Revision 2 implementation, and final NUREG-0737 implementation. The need for qualification of specific items of post-accident monitoring equipment will be determined during the Regulatory Guide 1.97 resolution process."

In addition, page 33 of the attached meeting material stated;

"The following TER Items which are associated with the TMI modifications are also part of this review (TER Items: 41, 79, 80, 81, 82, 83) and have been deleted from the Environmental Qualification Review at the present time since the licensee is not taking credit for any of this equipment operating."

Reference (d) transmitted SERs for Zion's EQ program. These SERs acknowledged the information discussed above and provided specific approval of this methodology. Page 7 of the SERs state in part;

"With regard to paragraph (b)(3) of 10 CFR 50.49, the licensee position is stated in the April 10, 1984 letter for identification of post-accident monitoring equipment which requires environmental qualification to meet the intent of Regulatory Guide 1.97....

We find the licensee's approach to identifying equipment within the scope of paragraph (b)(3) of 10 CFR 50.49 acceptable since it is in accordance with the requirements of that paragraph."

Thus, Commonwealth Edison Company's justification for the removal of these items from the EQ program is that the identification of "certain post-accident monitoring equipment" should occur during the Regulatory Guide 1.97 review. This logic was presented to the NRC in a timely fashion and has been formally accepted by NRC.

ATTACHMENT 4

JUSTIFICATION OF ZION'S ENVIRONMENTAL PROFILE

Commonwealth Edison began the process of identification specification, and procurement of replacement equipment in response to I.E. Bulletin 79-01B, well before the issuance of 10 CFR 50.49. Extensive interaction had already taken place between CECO and the NRC staff when the NRC issued its SER dated December 14, 1982. That SER stated:

"Section 4.3.2 of the FRC TER identifies a concern regarding incontainment environmental service conditions. The staff has reviewed this concern and concludes that the containment temperature/pressure profiles for the worst case LOCA given in Figures 6.3.1 and 6.3.2 of the FSAR are acceptable for use in equipment environmental qualification."

Following the issuance of 10 CFR 50.49, CECO continued the qualification efforts begun earlier, with no change in the environmental service conditions previously approved. Our continued use of the LOCA profile was documented in the May 1983, submittal provided in accordance with 10 CFR 50.49, and was discussed at the January 25, 1984, TER resolution meeting in the NRC's offices. The NRC's letter of November 21, 1984 (reference (d)) confirmed the acceptability of our EQ program and did not raise any new concerns about environmental service conditions.

During the January, 1985 inspection, the NRC identified three equipment items (Conax seals, Namco limit switches, Raychem splices) that they believed should have been "upgraded" by the performance of a MSLB analysis. Additional review of our procurement documents revealed that the Namco limit switches were purchased prior to the effective date of 10 CFR 50.49, which would exempt these items from the upgrading requirement. The remaining items, Raychem splices and Conax seals, have been qualified to temperatures of 400°F and 361°F, respectively, which are well in excess of the LOCA temperature of 271°F. The qualification temperatures also compare favorably with the Byron MSLB temperature of 320°F.

It is Commonwealth Edison's position that the upgrading provisions of 10 CFR 50.49 pertain only to the qualification methods used and the documentation developed. The upgrading provisions do not apply to any re-evaluation or recalculation of the environmental parameters presently accepted by the NRC staff. This pre-existing body of analyses forms the basis for the electrical qualification of equipment. This position is consistent with that of the Utility Group on Environmental Qualification, which is attached.

Commonwealth Edison's EQ program will continue to use the previously approved LOCA profile as the sole set of environmental service conditions for in-containment use.

NUCLEAR UTILITY GROUP ON EQUIPMENT QUALIFICATION

GROUP POSITION REGARDING THE USE OF
EXISTING ENVIRONMENTAL PROFILES FOR THE
QUALIFICATION OF REPLACEMENT EQUIPMENT

BACKGROUND

It has come to the Group's attention that the NRC in a recent equipment qualification audit of operating plant stated that the environmental parameter profiles used for the qualification of replacement equipment did not meet the specific requirements of Category I of NUREG-0588. In particular, a main steam line break (MSLB) environmental profile had not been included in the qualification profile for the replacement equipment. The Staff indicated that the upgrading of qualification for replacement equipment to the Category I standard should also include the specific inclusion of the MSLB parameters in the environmental qualification profile.

The Staff interpretation is not in conformance with our understanding of the EQ rule's upgrading provisions based on the Group's participation in the rulemaking process and previous discussions with the NRC Staff. The Group maintains that the upgrading of equipment qualification pertains only to the qualification methods used and documentation developed. The upgrading provisions do not apply to any re-evaluation or recalculation of the environmental parameters presently accepted by the Staff and used for the qualification of existing equipment.

DISCUSSION:

Paragraph (1) of 50.49 addresses the upgrading of qualification for replacement equipment. Based on the rulemaking proceedings, it is apparent that this upgrading pertained only to the use of the latest qualification methods and documentation as discussed in IEEE Std 323-1974 and amplified in Staff guidance documents. These updated methods addressed the use of sequential vs. separate effects testing, margins, proper test sequence, and age-degradation, among other issues. The documentation requirements included the development of acceptance criteria, the retention of critical test data and the issuance of qualification reports. These topics, which are the substantial differences between the 1971 and 1974 versions of IEEE Std 323, formed the basis for the rulemaking including its specific provision for upgrading the qualification of replacement equipment.

It has been and continues to be the Group position that the upgrading provisions of the rule do not apply to the methods used to define the environmental parameters to be used to qualify such replacement equipment. The Group maintains that the environmental parameters presently defined by licensees and

approved by the NRC Staff to qualify existing equipment also apply to the qualification of replacement equipment. These environmental parameters are based on either docketed plant-specific analysis reviewed and approved by the NRC or conservative bounding values proposed by the Staff and used by licensees in lieu of plant-specific analysis.

With respect to specific accident environmental parameters the Group offers this summary of the methods to be used to define accident environmental conditions for existing and replacement equipment:¹

- (1) In-containment LOCA temperature, pressure and chemical spray conditions will be based on previously docketed plant-specific values. For pressure suppression containments (BWRs and ice condenser containments), the envelope values identified in Appendix C to NUREG-0588 and the DOR Guidelines Section 4.1 may be used in lieu of the plant-specific analysis. For all containment types a bounding temperature value of T_{sat} for PWR, and $T_{\text{sat}} + 20^{\circ}\text{F}$ for BWRs may also be used.
- (2) In-containment LOCA radiation conditions will be based on previously docketed plant-specific analysis using TID-14844 source terms assumptions. For PWRs with dry-type containments, the bounding value of 4×10^7 rads may also be used in lieu of plant-specific analysis.
- (3) In-containment MSLB temperature and pressure conditions will be based on previously docketed plant-specific values. For plants with automatic spray systems not subject to disabling single component failures, the LOCA parameters may be used in lieu of a plant-specific MSLB analysis.

The Group's interpretation of the upgrading provisions of 50.49(1) has been supported by previous Staff discussions, NRC documents and transcripts, and the rulemaking proceedings. Neither the original basis for the rulemaking, or the rulemaking proceedings themselves brought into question the environmental parameters used to meet the DOR Guidelines or NUREG-0588 Category II. Rather, the rulemaking was instituted to codify the use of the latest qualification techniques contained in the 1974 version of IEEE Std 323.

As a practical matter, it is also clear that any such recalculations (using the most recent Staff approved methodologies and assumptions) of previously docketed accident analysis solely for the purpose of procuring replacement equipment would encumber rather than facilitate the licensee's efforts to upgrade qualification methods for such equipment. For example, redevelopment of such environmental definitions will create dual environmental

¹ This summary information has been extracted from various NRC documents including the DOR Guidelines, Generic Letter 82-09, and NUREG-0588.

parameters against which adjacent plant equipment (one item of replaced equipment and one original) would have to be judged. From a cost-benefit standpoint, the arbitrary creation of such dual parameters provides little or no incremental improvement in plant safety, and therefore does not justify the expenditure for plants presently using previously reviewed and approved plant parameters.

Finally, the Group notes that no technical basis exists to question previously docketed and accepted plant-specific accident parameters or conservatively selected bounding values. The unnecessary redevelopment of any accident environmental parameters may inappropriately bring into question other valid technical conclusions, outside of equipment qualification, which were based on these previously docketed plant analysis.