

# Maine Yankee

RELIABLE ELECTRICITY FOR MAINE SINCE 1972

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January 4, 1991  
MN-90-124

SEN-90-338

UNITED STATES NUCLEAR REGULATORY COMMISSION  
Attention: Document Control Desk  
Washington, DC 20055

References: (a) License No. DPR-36 (Docket No. 50-309)  
(b) MYAPCo Letter to USNRC dated March 24, 1986  
(c) USNRC Letter to MYAPCo dated February 19, 1987 (Generic Letter 87-02)  
(d) MYAPCo Letter to USNRC dated February 26, 1987 (MN-87-22)  
(e) USNRC Letter to MYAPCo dated March 26, 1987  
(f) USNRC Letter to MYAPCo dated April 23, 1990  
(g) MYAPCo Letter to USNRC dated June 30, 1987 (MN-87-67)

Subject: Seismic Qualification of Equipment at Maine Yankee

Gentlemen:

This memo is in response to Reference (f). Several years ago Maine Yankee voluntarily agreed to participate in the NRC's Seismic Design Margin Program with the understanding that satisfactory resolution under that program would resolve the various seismic issues confronting Maine Yankee (which included A-46). The seismic Safety Evaluation issued upon completion of the Margins Program, states "...all the issues associated with the design basis...for the MYNPS and hence the seismic design adequacy of the plant are considered resolved."

Since close-out of the Seismic Margins Program and receipt of the SER, the proposed resolution of A-46 has broadened substantially with respect to the required documentation. We do not believe that the evolution of additional prescription and documentation has materially improved the program. Further we know of no new substantive seismic issues, from either earthquake experience or plant walkdowns that challenge the adequacy of the Maine Yankee Seismic Margin Program or the seismic SER. Maine Yankee has acknowledged the need to perform some evaluation for the potential effects of relay chatter once the issue was better understood. Maine Yankee has recently had a team trained through participation in the SQUG Relay Review training program in preparation for a relay review. We believe this remains the only seismic related issue that has not been fully resolved.

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# Maine Yankee

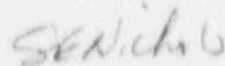
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The attachment to this letter provides a review of seismic issues at Maine Yankee and our basis for concluding that the technical aspects of A-46 have been resolved. We believe that we have been proactive and have proceeded in good faith to resolve NRC concerns related to the seismic adequacy of the Maine Yankee design. We consider that imposition of any additional requirements related to USI/A-46 would be a backfit and we would respectfully request NRC review pursuant to 10 CFR 50.109, prior to the imposition of any such requirements.

The NRC and the industry continue work on determining the extent of the relay chatter issue, and what associated generic issues, if any, require resolution. Maine Yankee continues to follow this matter, and will address relay chatter upon determination of required industry actions.

Very truly yours,



S. E. Nichols, Manager  
Nuclear Engineering & Licensing

SEN:SJJ

c: Mr. Eric J. Leeds  
Mr. Charles S. Marschall  
Mr. Thomas T. Martin

USI A-46, ADEQUACY OF DESIGN AND IMPLEMENTATION

USI A-46, first declared an Unresolved Safety Issue in February of 1981, was concerned with a perception of changing seismic qualification during the course of development of the commercial nuclear program. As a result, the margins of safety provided in existing equipment to resist seismically-induced loads and perform the intended safety functions were postulated to possibly vary considerably.

The initial staff guidance for resolution for A-46, NUREG-1030, was issued in early 1987 nearly coincident with the completion of the MYAPS Seismic Design Margins Program (SDMP) and the subsequent issuance of an SER. The concern as expressed in the NUREG was for the "margin of safety provided in existing nuclear power plant equipment to resist seismically induced loads and to perform their intended safety function." The NUREG required a reassessment of the adequacy of the installed equipment to ensure the ability to bring the plant to a safe shutdown condition when subject to a seismic event.

Significantly, the A-46 program does not question the adequacy of the design basis earthquake (DBE) for the older pre-IEEE 344/75 plants, only the adequacy of the implementation of seismic design for the DBE. Further, its focus is limited to equipment required to achieve and maintain the plant in a hot, safe-shutdown condition.

ADEQUACY OF THE DESIGN BASIS EARTHQUAKE

Maine Yankee was originally designed a 0.1g Housner spectra plant. Following two earthquakes, a small magnitude 4 occurring about 10 kilometers west of the plant in April 1979, and a larger magnitude 5.75 occurring in New Brunswick, Canada in January 1982, the NRC staff questioned the adequacy of implementation of seismic design to the DBE (the A-46 issue) and also the DBE. After a meeting in May of 1982 with the NRC staff, Maine Yankee undertook geological/seismological studies and instituted a series of voluntary reviews and walkdowns. The program in this early stage focused primarily on equipment required to achieve and maintain hot safe shutdown, the A-46 equipment scope.

Seismic adequacy was verified through a combination of analysis and walkdowns. Anchorage strength and potential seismic interaction were of prime concern. The Maine Yankee program benefitted from the direct participation of recognized expert consultants who would later play key roles in developing the technical background for NUREG 1030 and the SQUG A-46 program, including Robert Kennedy, John Stevenson, and Peter Yanev.

Because the DBE was at issue, these reviews were not performed to the original plant DBE but, similar to the later NRC Seismic Margins Program, to a multiple of the DBE. A Regulatory Guide 1.60 shape anchored at 0.2g was used as the screening level earthquake for these reviews.

The results of these investigations which lead to several upgrades, predominantly anchorage, were reported periodically to the Staff through a series of presentations in Washington. The final conclusion from this voluntary program was that Maine Yankee's hot, safe shut-down equipment (i.e., A-46 scope) could substantiate a design ruggedness equivalent to "design to .1g and function to .2g RG 1.60". These demand spectra are well above the 0.1g Housner spectra which is all that would be required for Maine Yankee to meet today's A-46 requirements.

NRC TRIAL SEISMIC MARGINS PROGRAM

Maine Yankee continued to work closely with the staff on the issue of seismic design adequacy over the subsequent several years. This joint effort culminated in our voluntary participation in the NRC sponsored Seismic Design Margins Program (SDMP) in 1986. Maine Yankee entered that program with the understanding that a favorable finding would close out, once and for all, Maine Yankee seismic design adequacy issues; including A-46.

In the SDMP the equipment list expands from the Hot Safe Shutdown to include equipment required for mitigation of the small break LOCA. The NRC consultants, and Maine Yankee engineers, verified anchorage adequacy on all required electrical and mechanical equipment. These reviews were performed to the screening level of NUREG/CR-0098 spectra anchored at 0.3g. This work was carefully documented in a three volume report, "Seismic Margin Review of Maine Yankee Atomic Power Station", NUREG/CR-4826, issued in early 1987.

Subsequent to completion of the program the NRC issued an SER to Maine Yankee that concluded: "the upgraded MYAPS will have a HCLPF capacity in the range of 0.27g. This capacity is significantly higher than the earthquake event defined by 50% spectrum of the NUREG/CR-0098 anchored at a peak acceleration of 0.18g. Therefore, all issues associated with the design basis for MYAPS and hence the seismic design adequacy of the plant are considered resolved."

We believe that these statements unambiguously confirm that Maine Yankee has adequately addressed any and all design adequacy concerns. Maine Yankee has met and fully addressed the issues of adequacy of DBE, adequacy of design to DBE, and adequacy of installation.

A-46 RESOLUTION - A MOVING TARGET

We recognize that, in the intervening years, the proposed resolution of A-46 has broadened substantially with respect to required documentation, and has also become highly prescriptive, witness the SQUG Generic Implementation Plan, Rev. 2 currently in finalization by the SQUG and review by the NRC. The ultimate path to closure for the Industry remains ambiguous.

Even today no other SQUG plant has fully completed its A-46 review. This is fully eight years after Maine Yankee performed its initial seismic walkdowns and upgrades and three years since the seismic SER for Maine Yankee. In our opinion, much of the evolution of additional prescription and documentation that has seriously delayed A-46 resolution has not materially improved the program.

Finally, we know of no substantive new seismic issues that have been identified either from earthquake experience or plant walkdowns in this intervening period that would challenge the adequacy of the SER conclusion. We have closely followed seismic developments through our continued sponsorship of a participant on the SQUG Steering Group and NUMARC's Seismic Issues Working Group.

### RELAY CHATTER

Industry studies of relay chatter have continued under the auspices of the Seismic Qualification Utility Group (SQUG) and recently a nuclear plant, Hatch, completed a relay review as the trial plant combining A-46 and the EPRI Seismic Margins program. Hatch identified only three relays for replacement after 2800 man hours of effort. These relays were already scheduled for replacement due to erratic performance. The Hatch review was to the more stringent 0.3g NUREG 0098 spectra, not their lessor SSE requirement.

The seismic experience data base continues to be expanded by EPRI/SQUG with an active search for any evidence of significant problems generated by relay chatter in real earthquakes. Serious plant upsets as a result of relay chatter during strong motion have yet to be observed.

A relay review is currently required by a draft Generic Letter for certain plants as a part of the resolution of the Seismic Severe Accident Policy. However, recent meetings with NRC management (August 14, 1990) suggest the strong possibility of a future scope reduction or perhaps even elimination of the relay chatter review requirement for many plants. Relay reviews are not proving to be cost beneficial sources of risk reduction.

Maine Yankee in preparation for the relay review has recently had a team trained through participation in the SQUG Relay Review training program. A consensus does not exist, as yet, regarding the appropriate level of effort to address the issue of potential relay chatter. Maine Yankee continues to follow this matter and will address relay chatter upon determination of required industry actions.

### OTHER SEISMIC ISSUES

Maine Yankee has continued to be proactive on seismic issues. We fund a participant in the NUMARC Seismic Issues Working Group and remain a fully paid member of the SQUG.

Maine Yankee has also participated in the EPRI studies culminating in the reports, NP-5930, entitled "A Criteria for Determining Exceedance of the Operating Basis Earthquake", July 1988, which, while still in review by the Staff, have been very favorably received. Maine Yankee has installed the new EPRI/NUMARC seismic instrumentation of NP-6695, "Guidelines for Nuclear Plant Response to an Earthquake", December 1989, to allow rapid assessment of potential for damage from any earthquake we may experience. We believe that this is the first installation of this special earthquake damage potential evaluation instrumentation at any plant in the country.

### CONCLUSION

Maine Yankee has fully and adequately addressed all identified seismic concerns, and is, in fact, an industry leader in this regard. We believe that through our combined series of reviews, we have fully met or exceeded the intent of USI A-46 resolution. Through our extensive use of nationally recognized seismic consultants for both the evaluation teams and peer review panels and significant NRC participation, we believe our program collectively to be not only equivalent, but superior to that currently proposed. Furthermore, our reviews and upgrades are fully completed, not still in the speculative planning stage.

We remain committed to resolution of the potential relay chatter issue through a jointly agreed upon program. We request that any other staff requirements for Maine Yankee effort on seismic issues be evaluated pursuant to the Backfit Rule.