Maine Yankee
RELIABLE ELECTRICITY SINCE 19

P.O. BOX 408 • WISCASSET, MAINE 04578 • (207) 882-6321

June 17, 1994
MN-94-61 JRH-94-145

UNITED STATES NUCLEAR REGULATORY COMMISSION
Attention: Document Control Desk
Washington, DC 20555

References:
(a) License No. DPR-36 (Docket No. 50-309)
(b) Maine Yankee Letter to the USNRC dated January 3, 1992
(c) Industry Approach to Seismic Severe Accident Policy Implementation, EPRI NP-7498, November 1991.
(d) Procedure for Evaluation Nuclear Power Plant Seismic Functionality, EPRI NP-7148, December 1990.
(e) NUREG-1488, "Revised Livermore Seismic Hazard Estimates for 69 Nuclear Power Plant East of the Rocky Mountains"
(f) "Individual Plant Examination of External Events", Letter to NUMARC Administrative Points of Contact, April 5, 1994.
(g) Comments by Chairman Selin, ANS Executive Conference, March 15, 1994.
(h) NRC Information Notice 94-32: Revised Seismic Hazard Estimates, dated April 29, 1994

Subject: Maine Yankee Relay Chatter Review Program for the Seismic Design Margins Program

Gentlemen:

Maine Yankee in Reference (b) committed to performing a "relay review" as the last remaining open item in the NRC sponsored Seismic Design Margins Program (SDMP). This memo describes the process being used to perform the relay review.

The MY SDMP relay review had been deferred pending industry activities to establish the approach and level of effort warranted. Subsequently, relay review methods have been developed, applied, and accepted by the staff. However, with the industry having performed relay evaluations at several plants, there remains yet a concern for the cost/benefit of such effort. For example, the following conclusions have been drawn by the Electric Power Research Institute in NP-7498 (Reference (c)). *"The SMA conducted for the Hatch Nuclear Plant clearly demonstrated that relay review is not cost effective."* Furthermore, *"Relay evaluations at three other plants have shown that the only relays that were found not to be sufficiently rugged were those on the low seismic ruggedness list..."* Finally, they add *"relay chatter has not been a significant issue at non-nuclear facilities and industrial facilities that were subject to ground motions on the order of 0.3g."*

A001
1/1

L:\94mn\9461

This suggests that the scope and effort of any relay review program should be carefully considered with a view to assuring consistency of costs with potential benefits. Based upon industry experience, it is clear that a cost-effective relay review would focus on the low seismic ruggedness relays identified by EPRI in Reference (d) (i.e., the so-called "bad actor" list). In fact, this scope of effort is consistent with plants that have been classified by the NRC as "Reduced Scope". This specific classification was based upon consideration of several factors, but most important was the probability of occurrence of an earthquake that would exceed the plant design basis. Ten plants were originally classified as reduced scope plants. These plants were characterized, at the time, by a mean annual probability of exceeding the SSE of about 1E-3/year. This probability is *higher* than that now predicted in the revised LLNL results for the Maine Yankee site, Reference (e). In fact, there has been a dramatic revision in perception of the probability of exceeding the SSE at Maine Yankee between 1982, the genesis period for the MY Seismic Design Margins Program, and today. The attached figure, reporting results of NRC funded research, shows that the *perceived probability* has declined from about 2E-2/year to about 2E-4/year, a reduction factor of 100. In the perception of the regulator, the estimated SSE return period has extended from fifty years to five thousand years.

This is a dramatic reduction. As the Nuclear Energy Institute (NEI) documents in Reference (f), these new LLNL results constitute significant new information and prompt a major change in seismic risk perspective. NEI concludes that most plants should reduce their seismic IPE effort. This NEI recommended revision to the level of effort is consistent with recent comments on IPEEE scope by the Commission Chairman, Reference (g). Finally, the NRC in Information Notice 94-32, Reference (h), notes that they are reviewing the scope of the current seismic IPEEE process to "identify plants whose scope of investigation can be reduced based on the new hazard information".

We are convinced that Maine Yankee is such a plant. On the basis of the above, Maine Yankee concludes that a "bad actor" relay review defines an appropriate scope for the Maine Yankee site. This review is in progress. Some elaboration of the review procedure is provided below to explain treatment of certain differences between the NRC SDMP and the EPRI Margins Program, specifically the limitations of direct application of the EPRI relay review program to an SDMP plant.

The NRC SDMP differs from the EPRI margins program in that two unique hot shutdown/small break LOCA mitigation paths are not identified. The SDMP is more like a PRA in that the success contributions of a multitude of pathways are considered. Therefore, the SDMP equipment list involves many systems of varying levels of importance in achieving the seismic margin assessment objectives. While Maine Yankee believes that the NRC program leads to a greater "defense in depth", it complicates direct application of the path based relay review methods of NP 7148, Reference (d) to Maine Yankee.

Therefore, Maine Yankee will use the procedure described in Attachment 1 to satisfy the commitment for a "relay review" under the SDMP. In summary, Maine Yankee will search an existing electrical equipment data base to locate those relays identified by EPRI as potentially having low seismic ruggedness. For each of these relays, the system/function, and elementary/wiring diagram will be identified. There will be no prescreening to eliminate the need for review of some of the relays based upon system importance. All of these relays will be assumed to be potentially subject to chatter at the 0.3g margins level earthquake, regardless of mounting, location in cabinet, or building elevation. These are conservative assumptions.

If the results of relay chatter are benign or can be readily compensated for by credible operator action, this will be documented and the relay so dispositioned. If the relay cannot be dispositioned by the above, a cost/risk-reduction benefit assessment will be performed to determine if replacement by a seismically rugged equivalent is warranted. Results of all such evaluations will be documented and available for NRC audit. Based on past walkdowns at Maine Yankee, problems with relay mountings are not expected. However, because mounting adequacy has been identified as a potential issue in the seismic experience data base, a sampling verification of the adequacy of the mounting of essential relays will be performed. SQUG trained engineers will perform the relay walkdowns. In the event that questions are raised by these field walkdowns, the walkdown scope will be expanded and additional relay mountings will be inspected. Results and disposition of these investigations will also be documented.

A summary of the results of the relay reviews, including the considerations for plant alterations will be provided to the NRC as part of the IPE/EE submittal currently scheduled for mid 1995.

Maine Yankee is proceeding with the program outlined above. It is our judgement that completion of this program will fully satisfy our SDMP relay review commitment.

Please do not hesitate to contact me if you should have any questions in this matter.

Very truly yours,

James R. Hebert

James R. Hebert, Manager
Licensing & Engineering Support Department

Attachment 1

JRH/mwf

c: Mr. Thomas T. Martin
Mr. J. T. Yerokun
Mr. E. H. Trottier
Mr. Patrick J. Dostie

L:\94mn\9461

ATTACHMENT 1

RELAY REVIEW OUTLINE PROCEDURE

1. Obtain a complete relay database listing. Using the MIPPS TCL emulator, generate a sort of all equipment identified with the keyword "RELAY."

2. Print the complete relay database (sorted by manufacturer then model) showing the following fields:

   Equipment Number
   Manufacturer
   Model Number
   System ID

3. Identify bad actors in the relay database by comparing the manufacturers and model numbers of the relay database to the EPRI NP-7148 bad actor list.

4. Complete the identification of bad actors in the relay database by reviewing all relay model types to determine which are sudden pressure and/or mercury switches.

5. For the bad actor relays identified in steps 3 and 4, print a database sort that shows the following fields:

   Equipment Number
   Manufacturer
   Model Number
   System ID
   ESK Drawing (Electrical Elementary Diagram)
   FE Drawing (Electrical Wiring Diagram)

6. Using either the ESK, the FE, or both, determine the affects of relay contact chatter for each of the relays listed from step 5 (i.e., the bad actor relay sort).

7. In the margin of the bad actor relay sort, note a brief description of the consequences of relay chatter.

8. Document the above methodology and resulting relay chatter consequences in a formal analysis.

9. Within the analysis, logically group the relay chatter consequences (e.g., false alarm signals, equipment actuation/trip, turbine trip, etc.) and provide conclusions regarding the safety significance, or lack thereof, of each group of relay chatter consequences.

10. Complete the analysis by specifically identifying relays that may be subject to *potentially unacceptable* relay contact chatter.

Evolution of the Perceived LLNL Probability of Exceeding the SSE at Maine Yankee