NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

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October 22, 1985

Docket No. 50-245
B11804

Director of Nuclear Reactor Regulation
Attn: Mr. Christopher I. Grimes, Chief
Systematic Evaluation Program Branch
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

References: (1) J. F. Opeka letter to C. I. Grimes, dated May 17, 1985.

(2) H. L. Thompson letter to J. F. Opeka, dated July 31, 1985.

Gentlemen:

Millstone Nuclear Power Station, Unit No. 1
Integrated Safety Assessment Program

In Reference (1), Northeast Nuclear Energy Company (NNECO) provided a proposed scope for the Integrated Safety Assessment Program (ISAP) review of Millstone Unit No. 1. In Reference (2), the Staff formally issued the results of the ISAP screening review process, establishing the scope of ISAP for Millstone Unit No. 1 and initiating issue-specific evaluations. Reference (1) also indicated that for each issue or topic included in ISAP, NNECO would provide a discussion of the safety objective and an evaluation of the plant design with respect to the issue being addressed to identify specific items to be considered in the integrated assessment. In accordance with this commitment, reviews for the following ISAP topics are attached.

- ISAP Topic 1.45 - "Systems Interactions"

If you have any questions concerning the attached reviews, please contact us.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

J. F. Opeka
J. F. Opeka
Senior Vice President

E. J. Mroczka
By: E. J. Mroczka
Vice President

cc: J. A. Zwolinski

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Docket No. 50-245

ISAP TOPIC NO. 1.45

SYSTEMS INTERACTIONS

October, 1985

ISAP Topic No. 1.45
Systems Interactions

I. Introduction

Current licensing requirements are founded on the principle of defense in-depth. Adherence to this principle results in requirements such as physical separation and independence of redundant safety systems and protection against events such as high energy line ruptures, missiles, high winds, flooding, seismic events, fires, and operator errors. These design provisions supplemented by the review procedures of the Standard Review Plan which require interdisciplinary reviews and which account, to a large extent, for review of potential systems interactions, provide for an adequately safe situation with respect to such interactions. The quality assurance program which is followed during the design, construction and operational phases for each plant is expected to provide added assurance against the potential for adverse systems interactions.

Unresolved Safety Issue (USI) A-17, "Systems Interactions in Nuclear Power Plants," addresses the development of a systematic process to review plant systems to determine their impact on other plant systems. The purpose of the task is to identify where the present design, analysis and review procedures may not acceptably account for potentially adverse systems interactions and to recommend the regulatory action that should be taken to rectify deficiencies.

The purpose of this topic is to provide the status of USI A-17 for Millstone Unit No. 1.

II. Review Criteria

1. USI A-17, "Systems Interactions in Nuclear Power Plants"
2. USI A-47, "Safety Implications of Control Systems"
3. NUREG-0737, Supplement 1
4. Regulatory Guide 1.97

III. Related Topics/Interfaces

1. ISAP Topic No. 1.07, "Control Room Design Review"
2. ISAP Topic No. 1.08, "Safety Parameter Display System"
3. ISAP Topic No. 1.09, "Regulatory Guide 1.97 Instrumentation"
4. ISAP Topic No. 1.10, "Emergency Response Facilities Instrumentation"

IV. Evaluation

By letter dated July 7, 1982 (Reference 1), NNECO was requested to provide the NRC with the status of the progress towards completion of the USIs at Millstone Unit No. 1. Although not specifically applicable to Millstone Unit No. 1, Reference 2 requested licensees to confirm the applicability of the NRC Staff generic positions and conclusions developed on individual USIs. On October 13, 1982 (Reference 3), NNECO presented its position on each USI applicable to Millstone Unit No. 1; USI A-17, "Systems Interactions in Nuclear Power Plants," was addressed in this submittal.

In Reference 3, NNECO agreed with the NRC's assessment that licensing procedures that were followed for plants now operating provide reasonable assurance against potentially adverse systems interactions. NNECO agrees that the design of operating plants has been shown to provide an acceptable level of protection against these hazards.

On February 16, 1984, a new Task Action Plan for USI A-17 was issued. The Task Action Plan changes were the result of an overall reassessment of the program following the assignment of a dedicated Task Manager in the Generic Issues Branch and July 14, 1983 ACRS comments (Reference 4) on the USI A-17 program. The changes were intended to provide a more definitive scope for this Unresolved Safety Issue, in order to develop the technical resolution by the end of FY 85. The scope of USI A-17 has been limited to consideration of functionally coupled, spatially coupled and induced human coupled interactions which could degrade a safety function. Common mode failures and external events are not directly considered in this program.

The status of USI A-17 was reviewed by the ACRS Combined Subcommittees on Reactor Operations and Reliability and Probabilistic Assessment on November 14, 1984. Preliminary overall conclusions of the USI A-17 resolution program are:

1. A large number of adverse interaction events (both functionally coupled and spatially coupled) are very plant-specific.

2. Subtle interactions may exist in complicated systems which have characteristics such as:

   - o dual roles,
   - o critical timing/sequencing,
   - o no "safe-failure" mode,
   - o nonsafety to safety interfaces,
   - o interconnections between redundant trains.

3. Designed-in cross-ties or crossovers may add flexibility but also introduce the potential for adverse systems interactions.

NUREG-0606 (Reference 5) indicates that all technical evaluations of USI A-17 tasks are essentially complete, and the final resolution will be issued mid-1986. NNECO intends to evaluate the results of such resolution for applicability to Millstone Unit No. 1.

V. Conclusions

The NRC has concluded in Reference 7 that:

- o "The Systematic Evaluation Program has been completed for Millstone Unit No. 1. Although the Systematic Evaluation Program objective was not intended to resolve USI A-17 on Millstone Unit No. 1, the acceptance criteria for the topics within SEP are derived from the acceptance criteria within the SRP. Some of the acceptance criteria inherently address potentially adverse systems interactions. The corrective actions resulting from the SEP reviews will help preclude

adverse systems interactions for the operating plants reviewed, in the same way the SRP review provides protection against systems interactions."

- o "Operating reactor experience is continually monitored to detect precursors to various event sequences. As such events occur, corrective actions are taken for all affected facilities. Thus, the performance of a systematic review of older plants against current requirements and the continuing generic reaction to isolated events contribute to the prevention of adverse systems interactions in operating plants."

And finally:

- o "Based on the foregoing discussion, the Staff concludes there is reasonable assurance that Millstone 1 can be operated before the ultimate resolution of this generic issue without endangering the health and safety of the public."

In light of the above, there is clearly no compelling need for NNECO to take action unique to this issue at this time. Through identification of potential systems interactions via a) the Millstone Unit No. 1 PSS, b) an assessment of the potential safety significance of this USI to Millstone Unit No. 1 in the context of the Integrated Safety Assessment phase of ISAP and c) the actions noted above; NNECO feels that the appropriate actions to resolve this USI for Millstone Unit No. 1 are being taken.

VI. References

1. G. Lainas letter to W. G. Counsil, dated July 7, 1982.

2. D. M. Crutchfield letter to J. A. Kay, dated August 17, 1982 (Docket No. 50-29).

3. W. G. Counsil letter to D. M. Crutchfield, dated October 13, 1982.

4. J. J. Ray letter to W. J. Dircks, "ACRS Comments on USI A-17, Systems Interaction," July 14, 1983.

5. NUREG-0606, "Unresolved Safety Issues Summary," Volume 7, No. 2, U.S. Nuclear Regulatory Commission, May 17, 1985.

6. NUREG-0933, Revision 2, "A Prioritization of Generic Safety Issues," U.S. Nuclear Regulatory Commission, June 30, 1985.

7. Draft NUREG-1143, Safety Evaluation Report Related to the Full-Term Operating License for Millstone Nuclear Power Station, Unit No. 1, dated July 24, 1985.