

June 8, 1990

Docket No. 50-29

Mr. John Haseltine
Project Director-Yankee Project
Yankee Atomic Electric Company
580 Main Street
Bolton, Massachusetts 01740-1398

Dear Mr. Haseltine:

SUBJECT: YANKEE ATOMIC PILOT EVALUATION REPORT FOR PLANT
LICENSE RENEWAL AT ROWE (TAC NO. 75795)

By letter dated November 30, 1989, Yankee Atomic Electric Company (YAEC) submitted Topical Report YAEC-1710, "Yankee Nuclear Power Station Pilot Evaluation Report for Plant License Renewal," for staff review and approval. By letter dated January 28, 1990, the staff determined that the rule-based computer program CODAT (Component Degradation Assessment Tool) needed to be reviewed as part of its review of Topical Report YAEC-1710 and requested its submittal for staff review and approval. By letter dated March 2, 1990, YAEC submitted the Topical Report YAEC No. 1727P, "Methodology for Identifying Potential Fluid Component Age-Related Degradation at the Yankee Nuclear Power Station."

Based on our review of Topical Report YAEC-1710, the staff has concluded that additional information is needed for us to complete our review and specific questions and comments are enclosed. Additional comments and questions on YAEC-1727P will be sent at a later date. In order for us to continue our review, we request that you prepare answers to the attached questions so that the issues can be discussed at a meeting to be held in June 1990.

The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents; therefore, OMB clearance is not required under P.L. 96-511.

Original signed by:
John W. Craig, Director
License Renewal Project Directorate
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Enclosure:
As stated

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Mr. John Haseltine

Yankee Rowe

cc:

Dr. Andrew C. Kadak, President
and Chief Operating Officer
Yankee Atomic Electric Company
580 Main Street
Bolton, Massachusetts 01740-1398

Thomas Dignan, Esquire
Ropes and Gray
225 Franklin Street
Boston, Massachusetts 02110

Mr. T. K. Henderson
Acting Plant Superintendent
Yankee Atomic Electric Company
Star Route
Rowe, Massachusetts 01367

Resident Inspector
Yankee Nuclear Power Station
U.S. Nuclear Regulatory Commission
Post Office Box 28
Monroe Bridge, Massachusetts 01350

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, Pennsylvania 19406

Robert M. Hallisay, Director
Radiation Control Program
Massachusetts Department of Public Health
150 Tremont Street, 7th Floor
Boston, Massachusetts 02111

Mr. George Sterzinger
Commissioner
Vermont Department of Public Service
120 State Street, 3rd Floor
Montpelier, Vermont 05602

Ms. Jane M. Grant
Senior Engineer - PLEX Licensing
Yankee Atomic Electric Company
580 Main Street
Bolton, Massachusetts 01740-1398

Enclosure

REQUEST FOR ADDITIONAL INFORMATION CONCERNING THE
YANKEE ATOMIC PILOT EVALUATION REPORT (YAEC-1710)
FOR PLANT LICENSE RENEWAL

1. The results of YAEC's review of safety injection system components tabulated in Attachment E to the report are not clear. The steps and logic applied in Attachment E are not consistent with the NUMARC NUPLEX methodology discussed in Attachment A of YAEC No. 1710. This discrepancy should be explained.
2. The rationale and the basis should be provided for eliminating components and structures from further considerations for license renewal and for which credit is taken because of ongoing programs and requirements. For those ongoing programs and requirements when considered as part of established effective program(s) for managing aging, the basis for presuming that the programs address all relevant aging mechanisms and degradation processes and that they are effective for timely mitigation of aging degradation should be provided. When credit is taken for eliminating parts and components from further consideration for license renewal on the basis that they are routinely replaced, then criteria for establishing replacement interval(s) should be described. The documentation should be an integral element of an established effective program for managing aging. The licensee should assure that those decisions are valid decisions for extended life considerations.
3. Because the Yankee screening process is based on the proposed NUMARC methodology, what modifications to the Yankee screening process for structures, systems and components and specifically to the components in the safety injection system have been made to account for the NUMARC resolution of comments on their proposed screening methodology?
4. The pilot application does not address cable wrap or barrier penetrations. The report should identify how these items will be handled by the renewal process.
5. A number of terms or phrases used in the report require definition or greater explanation. These terms include:
 - a) potentially significant age-related degradation (page iii)
 - b) properly managed (page iii)
 - c) as necessary (page iii)
 - d) effectively manages age-related degradation (page 2)
 - e) undesirable effect (page 8)
 - f) functional requirements are properly addressed (page 18)
 - g) breakdown (page 20)
 - h) potential aging degradation mechanism (page 27)

6. Did the study evaluate BOP SSC whose age-related failures may challenge the functions of the safety related SSC?
7. Will there be evaluation reports, similar to the SI System Report, on other YNPS systems? If yes, what is their schedule?
8. Does the Yankee program for the management of age-related degradation include, (i) detection of degradation, (ii) preventive maintenance, (iii) trending of parameters useful to monitor degradation, and (iv) recordkeeping? Describe how these elements have been incorporated into the lessons learned on the pilot system components.
9. The pilot application, when addressing age-related degradation of piping appears to focus on the capability to maintain integrity. It does not adequately address aging related effects on piping which result in increased pressure drops due to possible diameter reduction and piping corrosion. Describe what programs are in place to assure adequate NPSH will be available during the renewal term. Also, describe those programs currently in place that assure that aging effects for all fluid systems over the additional license renewal period will not result in flowrates below those assumed in the plant safety analysis.
10. Many of the electrical system components have been eliminated from further evaluation because they are stated to be under effective (EQ) programs or surveillance and maintenance procedures. No discussion of the nature of the EQ programs was provided. In particular, we noticed no discussion of how those components that were only qualified for the life of the plant would be addressed. Although the procedures are listed by name and title, none of the procedures were provided. Although the criteria to be applied in determining the effectiveness of the procedures in detecting age-related phenomena are discussed, no examples were given to illustrate how the procedures were applied in making the determination. Also, we note that although the components needing further evaluation have been identified, the actual evaluations are stated to be beyond the scope of the subject report. Describe how these concerns will be addressed in the two license renewal reports.
11. Section 3.3, the scope of systems and structures should also cover those structures and components included in ATWS, PTS or Station Blackout events and evaluations. Describe how these events were factored into the screening process described in this report.
12. In Section 3.3.2, the report identified the evaluation factors, but did not identify the specific acceptance criteria for these factors. State how the applicable acceptance criteria in FSAR, SRP, and SEP would be used in your evaluation.
13. The stressors identified in Section 3.3.2.7 and referred to on page 20 do not reflect dead and live design loads. Also on page 21, you stated that the detailed analysis and the simple examinations were beyond the scope of this report. Provide clarifications on these two issues.

14. Section 3.4, the information used to judge the increase in radiological health and safety risk to the public would be useful to the staff in evaluating the screening process. Provide the specific criteria used.
15. Section 3.4, this Section states "age-related degradation of a system or structure is considered potentially significant to plant safety if the failure of the system or structure contributes to increased radiological health and safety risk to the public." However, the licensee must consider the potential interaction of one component with another as a result of its failure. Attachment D asserts that degradation of the turbine generator system is not significant for plant safety and need not be considered for license renewal. Because the turbine generator consists of large rotating components whose failure could damage equipment needed to protect the radiological health and safety of the public, age-related degradation of the turbine generator system and its effects must be considered. Are there other systems or structures that have large amounts of stored energy and could, upon failure, interact with other components to increase the risk to the radiological health and safety risk of the public? It is not clear how the aging effects on turbine missile probability were taken into account and what the basis for elimination is. Describe how these issues are addressed in the subject reports.
16. Attachment D asserts that the leak monitoring system is not significant to plant safety. The staff does not agree with this conclusion because leak monitoring is intended to detect the potential loss of the pressure boundary integrity of components. If the leak monitoring system becomes unreliable because of age-related degradation, the pressure boundary integrity could be lost without any advance warning. Are there other systems or components that monitor the plants condition that are considered not significant to plant safety?
17. In Section 3.4.3, the licensee asserts that the Heating Steam/Condensate System and Non-Return Valve (NRV) Enclosure Ventilation System, are excluded from evaluation because their failure would be detected in a time frame that would allow the plant to be shut down, before the need for a manual or automatic plant trip. Are the materials in these systems susceptible to age-related degradation that could lead to sudden catastrophic failure?
18. Section 3.5, an established effective program must have, as appropriate, the elements of trending, recordkeeping and maintenance in addition to those listed in the bottom bullet (c) of page 15 of the report. An acceptable alternative for short-lived components would be a replacement that is based on demonstrated conservative life assessment.
19. In the first paragraph of page 16, you stated that component-specific evaluations are beyond the scope of this report. State if component-specific evaluations have been or are being performed and how you are handling the results of these evaluations.

20. Section 3.5.2, the criteria used for established effective replacement, or inspection program appears to be missing such key elements, as trending, recordkeeping and maintenance. In addition, examples of specific criteria for determining the need for corrective action should be provided. Please discuss how the above concerns are factored into the screening process at Yankee.
21. The paragraph on structural components on page 20, states that they will be evaluated for generic degradation. However, this report seems to focus only on concrete components (Attachment K). State how you plan to address the steel components.
22. Section 3.5.3, in addition to the focused walkdown of structural components, are there any plans for insitu measurements and testing of possible degradation sites? If yes, discuss the current plans, if no, state the bases for the conclusion that they need not be done.
23. Section 4.1, aging-degradation assessments should be supplemented with plant procedures for SSC evaluation. I&C equipment and some electrical components and fluid system components may be evaluated as groups, or as sub-systems. Also, all applicable plant procedures, established programs, ongoing regulatory requirements, and applicable codes and standards should be identified in the report and their effectiveness in managing age-related degradation described.
24. Section 4.2, when will the staff receive the results of the screening process on the remaining plant fluid systems requiring component level review? In addition, how will the staff be informed of the types of plant changes made to correct deficiencies in managing age-degradation for those components which are identified at the end of the screening process? The staff has a similar concern regarding fatigue evaluations discussed in the report.
25. In Section 4.2.4, YAEC suggests that only six components are potentially subject to age-related degradation. The licensee has used a rule-based computer expert system, CODAT, to determine whether components are subject to age-related degradation. In Appendix G, the licensee has described 14 mechanisms that were considered in the evaluation. Four mechanisms identified in EPRI NP-5461 were excluded. Why were they excluded?
26. The system, material, and environmental characteristics for each component that were used as input into CODAT should be available for audit by the staff.
27. The licensee indicates CODAT does not evaluate fatigue or degradation associated with component operations (i.e., general wear and mechanical degradation of pumps and valves). How were these mechanisms evaluated for the pilot system?

28. The licensee has not discussed the use of maintenance, failure and inspection records to determine whether mechanical or fluid components and systems are experiencing age-related degradation. Has the licensee evaluated its maintenance, failure and inspection records to determine whether any components or systems have been experiencing age-related degradation and how was this factored into the pilot system report?
29. Table 4.2 doesn't clearly identify cable trays as an item for evaluation. Address this staff concern.
30. Section 4.3.3 "Effective Program Review" provides examples of I&C components subject to an effective program other than EQ. The licensee has stated that one effective program is contained in procedure OP-4634 which functionally checks and, if necessary, adjusts the trip and reset points of certain SI actuation switches. Unless the results of OP-4634 are adequately trended and specific action taken if certain criteria are not met, the stated program may not be effective. Programs or procedures such as these may have to be revised to incorporate trending and corrective action measures.
31. In the various tables throughout the report, there are columns entitled "not subject to effective program" or some other similar title beginning with "not". The "yes" and "no" responses associated with these are sometimes difficult to interpret because of the negative title.
32. Also, in many of the tables, a dash (-) replaces a yes or no response. It is not made clear why a yes or no response is not applicable, and in some cases, a component may have a yes or no response while an identical or similar component has a dash. Clarification is necessary, especially in Attachments D through G.
33. In the Attachment C Table, structures such as the heating boiler vent stack are eliminated (Step 1a) because they do not contribute to plant safety. The staff assumes that a review to assure its failure will not affect any safety-related equipment has been completed as part of the elimination process. Describe the process used by the licensee to reach the specific conclusion for the above component.
34. In Attachment D, the circulating water system and equipment floor drainage system (EFDS) are eliminated (Step 1b) based on their degradation not being significant to plant safety. From a flooding standpoint, it is not clear why they should be eliminated. This is especially true for the EFDS. Many flooding analyses may be based on the ability of the EFDS to handle a specific minimum flow rate and to prevent backflow into certain areas. Aging effects on the EFDS piping may cause flow reductions which could affect flooding analyses (removal rate and backflow), and the operability of certain check valves could also affect flooding analyses. Further justification for elimination should be provided to address the stated staff's concern.

35. Section 4.3.3 lists a number of general attributes of an effective program to assure continued instrumentation and control component operability. Among those listed attributes are, checking for worn parts, observation and visual inspection. It is not clear that there is a distinction between these three attributes and whether specific guidance and criteria are given for each. Please clarify how each of these attributes specifically contributes to an effective program.
36. Also in Section 4.3.3, it is indicated that certain instrumentation and control components are already covered by an effective program. Further discussion is then provided indicating that enhancements to existing programs are being considered to increase emphasis on the following:
 1. Assessment of component general condition and signs of abnormal operation.
 2. Data collection for trending.

It appears that the programs as they exist today, may not be sufficiently effective in controlling or detecting age related degradation of instrumentation and control components. Provide more details regarding these enhancements and how such enhancements will be made rather than just considered.

37. Section 4.4.1, caution should be exercised in evaluating components such as cables, penetrations, relays, etc. on a generic basis. Because designs, applications, stressors, and environment in which they operate may dictate what aging mechanisms are operative and importantly, what will be the rate of their degradation, if any?
38. Section 4.4.3 describe how the "erosion" of the MOV bodies (an aging mechanism) is addressed in the periodic functional testing procedures. How are aging mechanisms at various degradation sites within the MOV boundary addressed in the YNPS procedure?
39. Table 4.1, the cable group has been categorized as conductors. Will cables be evaluated generically? If so, will they include insulating materials or just the conducting portion (current carrying conductors) of the cable systems?
40. In Section 4.4.3, YAEK states that the acceptability of a request for renewal of a plant license will depend, in part, on the degree of confidence existing in the capability of plant components performing their safety functions. With respect to motor-operated valves (MOVs), the report states that a program will be implemented in accordance of Generic Letter 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance." One aspect of the program that will be considered is its scope. The report states that "critical plant MOVs" will be included in a diagnostic testing program. This stated scope of the program appears to be more restrictive than that recommended by the staff in Generic Letter 89-10.

The extent of coverage of this program and the degree of credit assumed by the licensee for mitigation of aging concerns will be reviewed as part of the renewal application.

41. Section 4.5.3 discusses established effective replacement, refurbishment, or inspection programs. The licensee indicates that the programs for the screenwell house and seal pit may need enhancement. The enhancements for these structural components will need additional review.
42. Identify the criteria to be used in the Masonry Walls Survey Program discussed in the last paragraph of page 38.
43. On page 39, you identified support components as part of the aging-degradation review. Provide a specific listing of the support components considered in this effort.
44. On page 40, you addressed the plant walkdown. Clarify if this plant walkdown applied to the entire plant or just to the safety-injection system.
45. Section 4.5.5 and Attachment L provide some results of the plant walkdown. However, you do not identify action items to be taken for the various findings. Provide the action recommended by your final evaluation.
46. Attachment C does not specifically identify the control room and the intake structure. State if these structures will belong to part of your evaluation scope and if yes, indicate where they are identified.
47. Attachment D identifies 70 out of 96 systems and structures as potentially significant to plant safety. It lists the systems and structures in which failure is not detectable. YNPS reasoning in addressing why failure cannot be detected should be provided.
48. Based on the analysis described in the Attachment D, can it be presumed that YNPS will include, as part of the established effective program, all systems and structures identified as "Y" in the last column?
49. In Attachment E, five out of 392 components with potential age-related degradation mechanisms have been identified. Staff comments and concerns that involve step 2B of the NUMARC-NUPLEX methodology are clearly reflected in the Attachment E table. Most of the components of the SI system are not subject to a refurbishment, replacement, or inspection (PRI) program, yet many of them are considered important to system safety functions and part of the RCS pressure boundary. A description of the process for identifying the potential aging-degradation mechanisms for the five components should be provided.

50. In Attachment G, the listing of degradation mechanism excludes "fatigue," "wear," and "creep". It is understood that "fatigue" will be evaluated separately. When and where evaluation for "wear" and "creep" will be made?
51. On page G-1, how were the 28 specific degradation mechanisms established? Were materials, stressors, and environmental interactions considered in establishing the degradation mechanisms? A listing of these mechanisms should be included in the report.
52. In Attachment H, provide the bases for the elimination from review of the 43 out of 168 I&C components susceptible to age-related degradation for which there are no established effective programs for managing aging?
53. In Attachment I, provide the basis for the elimination from review, the 25 out of 99 EEPs components susceptible to age-related degradation for which there are no "established effective programs" for managing aging?
54. In Attachment K, you indicated that further evaluations will be performed for the NST, RSS and SFP. State when these evaluations will be completed and if you plan to provide the evaluation results for staff review. The same information should be provided for the boric acid evaluation identified in pages 11 and 12 of this attachment.
55. Degradation due to contact with groundwater that may contain corrosive elements, warrants identification of methods of monitoring and evaluating such effects.
56. In Attachment K, description is needed of what ISI programs and NDE activities were used to derive the conclusions presented.
57. In Attachment K, reports on neutron and gamma heating and irradiation effects on concrete, and on boric acid leakage erosion of concrete are promised. When will these reports be available?
58. Alkali-silica reaction is not limited to early in the life of the structure. A rather limited look at structures was taken by looking only at two readily accessible fully or partially submerged structures. Since degradation from such chemical reactions of aggregates can be distributed through the entire structure, it is not clear what NDE technique was employed to reach this conclusion. Are the foundation mats free of this problem, and how was this determined?
59. Chapter 5, Inspection, is an important section of the report, yet it is significantly abbreviated. Detailed results of the inspection program is necessary for the staff to complete its review.

ATTACHMENT L: SAMPLE STRUCTURAL WALKDOWN DATA SHEETS

- a) Attachment Nos. A and B appear to conflict with Attachments A and B of the main part of the report.