

June 16, 2004

Mr. Richard M. Kacich, President
Yankee Atomic Electric Company
19 Midstate Drive, Suite 200
Auburn, MA 01501

SUBJECT: YANKEE (ROWE) NUCLEAR POWER STATION - REQUEST FOR
ADDITIONAL INFORMATION RE: LICENSE TERMINATION PLAN (TAC NO.
L52095)

Dear Mr. Kacich:

By letters dated November 24, 2003, December 10, 2003, December 16, 2003, January 19, 2004, January 20, 2004, February 2, 2004, February 10, 2004, and March 4, 2004, Yankee Atomic Electric Company submitted a License Termination Plan and an application to amend its license to incorporate a new license condition addressing the license termination plan (LTP) for the Yankee (Rowe) Nuclear Power Station. The new license condition would document the date of NRC approval of the LTP and provide criteria to determine the need for NRC approval of changes to the approved LTP. The Nuclear Regulatory Commission staff has reviewed the information provided and has determined that additional information is required as identified in the Enclosure.

We held a meeting on June 9, 2004, to discuss these questions with your staff. Please provide a response at the earliest practical date to support our continued review of the application. Please contact me at (301) 415-3017, if you have any other questions on these issues.

Sincerely,

/RA/

John B. Hickman, Project Manager
Decommissioning Directorate
Division of Waste Management
and Environmental Protection
Office of Nuclear Material Safety
and Safeguards

Docket No. 50-029

Enclosure: Request for Additional Information

cc w/encl: See next page

June 16, 2004

Mr. Richard M. Kacich, President
Yankee Atomic Electric Company
19 Midstate Drive, Suite 200
Auburn, MA 01501

SUBJECT: YANKEE (ROWE) NUCLEAR POWER STATION - REQUEST FOR
ADDITIONAL INFORMATION RE: LICENSE TERMINATION PLAN (TAC NO.
L52095)

Dear Mr. Kacich:

By letters dated November 24, 2003, December 10, 2003, December 16, 2003, January 19, 2004, January 20, 2004, February 2, 2004, February 10, 2004, and March 4, 2004, Yankee Atomic Electric Company submitted a License Termination Plan and an application to amend its license to incorporate a new license condition addressing the license termination plan (LTP) for the Yankee (Rowe) Nuclear Power Station. The new license condition would document the date of NRC approval of the LTP and provide criteria to determine the need for NRC approval of changes to the approved LTP. The Nuclear Regulatory Commission staff has reviewed the information provided and has determined that additional information is required as identified in the Enclosure.

We held a meeting on June 9, 2004, to discuss these questions with your staff. Please provide a response at the earliest practical date to support our continued review of the application. Please contact me at (301) 415-3017, if you have any other questions on these issues.

Sincerely,
/RA/

John B. Hickman, Project Manager
Decommissioning Directorate
Division of Waste Management
and Environmental Protection
Office of Nuclear Material Safety
and Safeguards

Docket No. 50-029
Enclosure: Request for Additional Information
cc w/encl: See next page

DISTRIBUTION

PUBLIC	Central File	DWM r/f	NMSS r/f
Docket File 50-29	ACRS/ACNW	OGC (Smith/Kannler)	
JGreeves	JHickman	RBellamy, RI	JWray, RI

ML

* See Previous Concurrence

OFFICE	DCD/PM	DCD/LA	DCD/SC	DCD/D
NAME	JHickman	CBurkhalter*	CCraig*	DGillen
DATE	06/09/2004	06/07/2004	06/07/2004	06/16/2004

OFFICIAL RECORD COPY

Yankee (Rowe) Nuclear Power Station

cc:

Mr. Richard M. Kacich, President
Yankee Atomic Electric Company
19 Midstate Drive, Suite 200
Auburn, MA 01501

Mr. Greg A. Maret, Vice President of
Decommissioning
Yankee Atomic Electric Company
19 Midstate Drive, Suite 200
Auburn, MA 01501

Gerry van Noordennen, Regulatory Affairs
Manager
Yankee Atomic Electric Company
49 Yankee Road
Rowe, MA 01367

James A. Kay, Principal Licensing Engineer
c/o Framatome ANP
400 Donald Lynch Boulevard
Marlborough, MA 01752

Mr. Robert Capstick, Director of Government
Affairs
Yankee Atomic Electric Company
19 Midstate Drive, Suite 200
Auburn, MA 01501

Mr. Frank Helin, Decommissioning Director
Yankee Atomic Electric Company
49 Yankee Road
Rowe, MA 01367

Mr. Frederick Williams, ISFSI Operations
Manager
Yankee Atomic Electric Company
49 Yankee Road
Rowe, MA 01367

Mr. Greg Babineau, Site Closure
Implementation Manager
Yankee Atomic Electric Company
49 Yankee Road
Rowe, MA 01367

Kelley Smith
Communication Manager/Yankee Rowe
Community Advisory Board
19 Midstate Drive
Auburn, MA 01501

Alice Carson, RSCS, Inc.
12312 Milestone Manor Lane
Germantown, MD 20876

Gerald Garfield, Esq.
Day, Berry & Howard
City Place 1
Hartford, CT 06103

Ms. Leslie Greer
Assistant Attorney General
Commonwealth of Massachusetts
200 Portland Street
Boston, MA 02114

Robert Walker, Director
Radiation Control Program
Massachusetts Department of Public
Health
305 South Street
Boston, MA 02130

Mr. James B. Muckerheide
Massachusetts Emergency Management
Agency
400 Worcester Road
Framingham, MA 01702-5399

Edward Flynn, Secretary
Massachusetts Executive Office of Public
Safety
One Ashburton Place
Room 2133
Boston, MA 02108

Yankee (Rowe) Nuclear Power Station

cc:

Peggy Sloan, AICP
Franklin Regional Council of Governments
425 Main Street, Suite 20
Greenfield, MA 01301-3313

David O'Brien, Commissioner
Vermont Department of Public Service
120 State Street, Drawer 20
Montpelier, VT 05602

Amy Ignatius, Executive Director
New England Conference of Public Utility
Commissioners, Inc.
One Eagle Square, Suite 514
Concord, NH 03301

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

Diane Screnci, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. Marv Rosenstein
Chief, Chemicals Management Branch
Office of Ecosystem Protection
U.S. Environmental Protection Agency
One Congress Street, Suite 1100,
Mail Code CPT
Boston, MA 02114

Mr. Anthony Honnellio
U.S. Environmental Protection Agency
Region 1
One Congress Street, Suite 1100,
Boston, MA 02114-2023

Mr. Jeff Fowley
Office of Regional Counsel
U.S. Environmental Protection Agency
One Congress Street, Suite 1100,
Mail Code RAA
Boston, MA 02114

Ms. Bonnie Gitlin
Radiation Protection Division
Office of Radiation and Indoor Air
Office of Air and Radiation
U.S. Environmental Protection Agency
Ariel Rios Building, Mail Code 66081
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Mr. Phillip Newkirk
Radiation Protection Division
Office of Radiation and Indoor Air
Office of Air and Radiation
U.S. Environmental Protection Agency
Ariel Rios Building, Mail Code 66081
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Citizens Awareness Network
P.O. Box 83
Shelborne Falls, MA 01370

Jonathan M. Block
Attorney at Law
Main Street
P.O. Box 566
Putney, VT 05346-0566

REQUEST FOR ADDITIONAL INFORMATION
REGARDING THE LICENSE TERMINATION PLAN
YANKEE (ROWE) NUCLEAR POWER STATION
DOCKET NO. 50-029

1. (Page 5-1) Section 5.1, second paragraph, states that “advanced survey technologies may be used to conduct radiological surveys that can effectively scan 100% of the surface...”. On page 5-17, it is noted that less than 100% coverage of survey units may occur. Text in Section 5.1 should state that less than 100% coverage may occur for Class 2 and 3 survey units.

Basis: LTP sections should be consistent with each other.

2. (Page 5-1) Section 5.1, second paragraph, discusses advanced survey technologies. Technical evaluations will be developed. Confirm that NRC will be given the opportunity to review the technical evaluations and you will provide prior notification to the NRC before the use of alternate instruments or technologies.

Basis: This information is necessary to determine if the survey method is adequate to meet the decommissioning requirements in Subpart E of 10 CFR 20.

3. (Page 5-6) In the second paragraph under the bullet “Specify Tolerable Limits on Decision Errors”, change the last sentence to “The following statement *will* [rather than may] be used as the null hypothesis at YNPS unless otherwise approved by the NRC: “The survey unit exceeds the release criteria.” Change Section 1.6 to reflect NRC concurrence is needed to use other than this null hypothesis.

Basis: Other null hypotheses may be less robust. MARSSIM recommends using the null hypothesis as stated above. Statistical tests must ensure survey units meet the decommissioning requirements in Subpart E of 10 CFR 20.

4. (Page 5-6) A Type I error of 0.05 (5%) is set in section 5.4.1. If double sampling is performed as proposed in Section 5.5.3.5, a smaller Type I error (e.g., 0.025) may be necessary for the initial survey design. See additional discussion in comment on Section 5.5.3.5. Please justify your proposal or revise.

Basis: Double sampling changes the Type I error. This information is necessary to determine if the statistical analysis is adequate to meet the decommissioning requirements in Subpart E of 10 CFR 20.

5. (Page 5-7) The first paragraph of Section 5.4.2 states “The process described in LTP Section 1.6 will be used to evaluate the modifications to unit classifications to determine whether prior notification by the NRC is required.” As it reads currently, “...prior notification by the NRC...” isn’t really correct since notification is done by the licensee to the NRC. Please revise “by the NRC” to “to the NRC.”

6. (Page 5-8) Section 5.4.2, first paragraph following Table 5-1 must be consistent with Section 5.5.3.5, Re-survey. Changes are anticipated in Section 5.5.3.5 concerning subdividing survey units. Subdividing the survey units changes the statistical result. Please include a requirement for NRC notification prior to subdividing survey units.
7. (Page 5-8) Section 5.4.3 should provide the accuracy (and explanation as to the acceptability of that accuracy) of the GPS system.

Basis: Accurate survey equipment is necessary for the proper characterization and for meeting the remediation requirements in Subpart E of 10 CFR 20.

8. (Page 5-9) Section 5.4.4, third paragraph, discusses an alternative background determination method. This method may be used only with prior NRC approval. It is not clear if this is a conservative background determination method. This should not be the general or routine method for obtaining backgrounds. Provide further technical justification or remove.
9. (Page 5-12) Section 5.4.5.2, first paragraph after bullets, references two standard deviations above the FSS mean as a threshold to initiate an investigation. Explain the statistical basis for this threshold, and which data set the standard deviation comes from. It is not clear that the proposed threshold and associated survey(s) provide assurance equivalent to the FSS.
10. (Page 5-12) Section 5.4.5.2, last paragraph should reference, specify, or describe the "specific radiological contamination levels" that are used to trigger an investigation survey.
11. (Page 5-14) Section 5.4.6.1, last paragraph discusses insignificant radionuclides and gives a citation to 10 CFR 20. However, 10 CFR 20.1204(g)(3) pertains to calculation of internal dose for occupational exposure, and the dose is still calculated on the total activity of the mixture. NUREG-1757, Vol. 2, Section 3.3, page 3-4 has a discussion of the treatment of insignificant radionuclides concerning pathway analysis and dose for decommissioning. The treatment in the LTP should be similar to that in NUREG-1757 or a justification need to be provided.
12. (Page 5-14) Section 5.4.6.2: may need more detail concerning DQOs for surrogate ratios. How (and how well) will ratios be determined? Will the ratio be checked to ensure it is representative during the FSS?
13. (Page 5-15) Section 5.4.6.2, last two sentences: the contributions from all radionuclides, including insignificant contributors, must be accounted for in demonstrating compliance per NUREG-1757. Delete the last sentence or justify. See question 11.
14. (Page 5-16) Section 5.5, second bullet at bottom of page, gives ranges of scanning coverage for Class 2 survey units. Provide the methodology for deciding what the coverage will actually be for a Class 2 survey unit.

15. (Page 5-17) Section 5.5: the text on this page describes in a general way how advanced survey techniques will be used. When 100% of the area is covered (as in Class 1 units), and assuming an adequate MDC, the advanced survey technique provides more complete spatial coverage than discrete measurements or samples. However, when less than 100% is covered, there will be some unsampled area. MARSSIM traditional methodology provides coverage over 100% of the area by a random-start systematic pattern, with statistical inference. Even 100 % of Class 3 areas are sampled randomly. The proposed substitution of advanced survey techniques for both the scan and fixed measurements/sampling does not provide adequate spatial coverage for Class 2 and 3 areas. Please provide further clarification on how advanced survey techniques will be conducted on Class 2 and 3 areas to ensure that 100% of the area is subject to random sampling.
16. (Page 5-17) The last bullet discusses surveys that combine advanced techniques with traditional methods. Provide more detail as to how the number of traditional measurements/samples will be determined for the areas not assessed with the advanced technique, and how statistical tests will be performed.
17. (Page 5-18) Section 5.5.1.1 sets α at 0.05. Note that the double sampling proposed in Section 5.5.3.5 will increase α to greater than 0.05. If the licensee retains the provision for double sampling, α should be set to 0.025. See question # 4.
18. (Page 5-19) Section 5.5.1.2, sentence after the two bullets: as noted in the comment for page 5-9, Section 5.4.4, parameters for backgrounds should not be taken from the survey area. Add a sentence emphasizing that the reference areas will not be in the survey area unless NRC approval is obtained.
19. (Page 5-24) In the paragraph following Equation 5-15, it is stated that if a method of calculating MDC is different than MARSSIM, a technical evaluation will be available for NRC inspection. Notification to the NRC should be made prior to implementation.

Basis: Since the MDC is a key parameter for survey design, the method to calculate MDC should not be changed without NRC concurrence. Calculating MDC in an approved and defensible manner is necessary to ensure the survey design is adequate to meet the decommissioning requirements in Subpart E of 10 CFR 20.
20. (Page 5-26) Section 5.5.1, last paragraph: the accuracy and suitability of the GPS system should be provided somewhere. (Essentially the same comment as for Section 5.4.3, page 5-8.) See question # 7.
21. (Page 5-27) Section 5.5.2, first paragraph at top of page: Specify the number, percentage, or other DQO that quantifies how many samples will be taken to confirm the radionuclide mix.
22. Page 5-28) Section 5.5.3.3 discusses remediation. Provide examples of "other reasons" that cause removal of materials that would not be considered remediation.
23. (Page 5-28) Section 5.5.3.3 does not discuss the possibility that remediation may also be necessary to meet the requirement for the average concentration above background

to be less than the $DCGL_W$, not just those spots above the $DCGL_{EMC}$. Please address this issue.

24. (Page 5-29) Section 5.5.3.4 allows subdividing a survey unit and reclassifying the parts. While a whole unit could be re-classified from a less restrictive to more restrictive classification without prior NRC approval, subdividing a failed unit has a potential impact on the Type 1 decision error (as well as raising questions concerning the original classification methodology) and so should be done only with prior NRC notification.
25. (Page 5-29) Section 5.5.3.5 proposes a re-survey methodology that is essentially double sampling. Double sampling can double the Type I decision error. In some cases, double sampling may be acceptable if a smaller Type 1 error was used for the initial survey design. If the original survey uses a Type 1 error of 0.05, the proposed additional sampling of the subdivided "cleaner" area would result in an increase of the Type I error to greater than 0.05 and would require NRC approval. See also questions 4 and 17.
26. (Page 5-29) Section 5.5.3.5, last paragraph: This case (remediation of a small area of a Class 1 survey area and subsequent limited survey) could only be performed if the survey unit passed the Wilcoxon or Sign test.
27. (Page 5-32) Section 5.6.1.3, last paragraph: NRC notification should be made prior to using advanced survey technologies. See also question #2.
28. (Page 5-32) Section 5.6.1.4: NRC notification should made prior to using advanced survey technologies. See also question #2.
29. (Page 5-32) Section 5.6.1.4, last paragraph: While a calibration using one geometry may be extended to others by modeling, the requirement that the measured configuration matches the assumed (modeled) configuration exists. Often, much more data is needed concerning the materials close to the source (such as shield densities, thicknesses, and composition). A source distribution is also assumed. These factors and associated quality assurance will need to be addressed in a technical support document submitted to the NRC prior to implementation.
30. (Page 5-32) Section 5.6.1.5: A nominal or minimum sample size (mass) and depth should be specified, as well as procedural details such as removal of extraneous material and handling.
31. (Page 5-35) Section 5.6.2.3: "adjusted" data must be documented and noted as such in the FSS Report. The technical basis and rationale for the adjustment must be provided for review.
32. (Page 5-35) Section 5.6.2.4: The statement "Instruments and methods used for field measurements will be capable of meeting the investigation level in Table 5-2" is less limiting than the third paragraph on page 5-17 (10-50% of the $DCGL$). Please resolve the discrepancy.

33. (Page 5-38) Section 5.6.2.4.4, first paragraph, second sentence: If larger NaI detectors...are used, then the scan MDC will be computed using the methods of ...MARSSIM. Please commit to documenting the computation of the scan MDC.
34. (Page 5-38) Section 5.6.2.4.4, second paragraph, last sentence: Demonstrate the alternate method of determining the scan MDC is conservative.
35. (Page 5-44) Section 5.6.3.2.2 states that 25 locations in the industrial area will be sampled initially for subsurface contamination. Please provide the rationale for this number.
36. (Page 5-44) Section 5.6.3.2.2 states a minimum of 5% of the routine subsurface samples will be analyzed for hard-to-detect radionuclides. For other samples (e.g., surfaces soils), what fraction will be analyzed for hard-to-detect radionuclides? Is there additional information to support this percentage?
37. (Page 5-44) Section 5.6.3.2.2 indicates that 3-meter subsurface samples will be homogenized over the entire depth of the core. Homogenizing over 1-meter lengths or less provides more information on the vertical distribution of radionuclides. Please justify 3 meter homogenization.
38. (Page 5-46ff) Section 5.7 addresses only the traditional type of surveys. It is not clear how data from traditional methods combined with advanced methods, or data from advanced methods alone, will be evaluated.
39. (Page 5-50) Section 5.7.2, second paragraph from top: elaborate on which "actual values" will be assigned to "less than MDC" data for the Sign Test.
40. (Page 5-51) Section 5.7.5, second paragraph references MARSSIM Sections I.9 and I.10 concerning retrospective power analyses. Section I.10 presents spreadsheet formulas and does not deal with power analyses.
41. (Page 5-51) Section 5.7.5, last sentence: Depending on the survey design, a new survey may also increase the Type 1 error and would, therefore, also require concurrence by the regulator. Please revise the statement accordingly or justify why not.
42. (Page 4-2) Section 4.2.1: Please commit to NRC notification prior to backfill of excavations or justify why not.
43. (Page 4-3) Section 4.2.3: Is "no remediation" of groundwater" still true given more data on the tritium plume?
44. (Page 4-4) Section 4.3.2: last paragraph: provide justification for (or the source of) the statement "The ALARA criterion is met by performing the action and not necessarily by achieving results below the specified action level", and also the next sentence.
45. (Page 4A-3) Table 4A-1 change parameter "R" to "r".

- 46. (Page 4A-5) last paragraph: Additional discussion is needed concerning meeting ALARA criteria by performing a cleanup action as opposed to achieving cleanup goals.
- 47. HSA Section 8 references: provide Ref. 15 (YRC-1178)
- 48. HSA Vol. 1 (page 7-4) Section 7.3 references Section 7.2.2; should this be 7.3.2?
- 49. HSA Vol. 1 (page 7-6) paragraph preceding Section 7.3.1:

“In examining the SOF values on Table 7-4, it is evident that the use of the interim DCGLs would not result in any reclassifications for all class 2 and 3 survey areas given the reasonably close agreement between these DCGLs and the low SOF values shown for the survey areas. Therefore, modification of the comparison basis to the final proposed DCGLs is not needed since this data provides ample substantiation of the classification performed only by historical basis.”

Comment: More discussion is needed on possible reclassification due to smaller DCGLs. The criteria for classification are not presented quantitatively, so it is not evident that the smaller final DCGLs do not cause some previously Class 3 areas to be Class 2. In addition contributions from tritium and Sr-90 must be added if present. An additional concern is that the dose contribution from insignificant radionuclides may not have been factored in (see comment for page 5-14, Section 5.4.6.1). Some areas that are classified as Class 3 (for example, OOL-01, OOL-03, and OOL-08) will have a maximum SOF that is close to or greater than 0.5. Table 7.4 should be augmented (or a new table created) with SOFs based on the final DCGLs and accounting for dose from insignificant radionuclides, tritium and Sr-900. (Conversely, subtraction of environmental background for Cs-137 will lower the SOF.)

- 50. HSA OOL-02, p.4, current status ff, discusses OOL-08... need OOL-02 discussion.
- 51. The licensee should provide groundwater potentiometric maps of the water-bearing units that have been or potentially may be impacted by site-generated radionuclides. The licensee should indicate groundwater flow directions on these maps and provide information on the hydraulic gradient. Additional potentiometric maps may need to be developed to represent seasonal or climatic changes in the water levels if these changes are significant.
- 52. The extent of the H-3 groundwater plume and of other potential site-generated radionuclide plumes should be adequately characterized, including horizontal and vertical dimensions and magnitude of radionuclide concentrations. The characterization of the plume(s) should also cover the development of hydraulic conductivity and storage values for the different water-bearing units.
- 53. The licensee should discuss whether site-generated radionuclides have moved offsite (i.e., reached Sherman Pond, Deerfield River, or other locations) or discuss the potential for site-generated radionuclides to move offsite. The fate and transport of the radionuclides in the groundwater should be evaluated and discussed. The licensee should also provide the rates of groundwater transport and an estimate of the time for radionuclides in the groundwater to travel offsite.

54. The relationship between groundwater and surface water should be examined and discussed.
55. The only groundwater sample results for site-generated radionuclides in the LTP are for H-3, gross alpha, and gross beta (Table 2-7). The concentrations and dates of sample collection for all site-generated radionuclides in the groundwater and surface water should be provided.

Basis (51-55): The extent of site-generated radionuclides in the groundwater and surface water needs to be adequately characterized to understand the potential dose that these radionuclides may produce. The existing H-3 groundwater plume and other potential site-generated radionuclide groundwater plumes should be defined with respect to length, width, depth, and magnitude of concentration. The hydrogeologic features at the site that impact the ability of radionuclides in the groundwater and surface water to migrate should also be characterized. These data are needed to understand the impact, the potential dose, of site-generated radionuclides on humans.

56. The dose contribution of the H-3 plume should be evaluated. Based on the results of the analysis, either a derived concentration guideline level (DCGL) can be created or, if the dose is less than 0.025 mSv/y (2.5 mrem/y), the H-3 dose contribution can be treated as insignificant as described in Section 3.3 of NUREG-1757, Volume 2. The dose contribution, as described in the guidance, would still count as part of meeting the dose limit.

Basis: The license termination rule is based on an all-pathways dose analysis. Data from the site shows elevated concentrations of H-3 in portions of the groundwater.

57. The LTP should be revised in Chapter 6 to include a common table displaying the DCGLs for soil, surfaces, and below-grade concrete. Additionally, the DCGLs for elevated measurements should be included in the revised Chapter 6.

Basis: Currently, the site-wide average DCGLs and the elevated measurements DCGLs are contained in a number of separate documents that were provided as support to the LTP between December 2003 and March 2004. Consolidation of the derived limits would facilitate review and future inspection against the derived limits.

Please provide copies of the following documents:

1. Copies of Franklin County Council of Governments comments on the LTP (and YAEC responses). Please submit these as soon as possible, as we would like to review them before the public meeting.
2. One copy of the November 2003 Public Archeology Laboratory report, "Archeological Reconnaissance Survey, Archeological Resources Management Plan, Yankee Nuclear Power Station."

3. Copies of communications to/from Massachusetts Historical Commission, including: July 11, 2003 letter to MHC from ERM and August 18, 2003 response from MHC to ERM.
4. Copies of communications to/from the Division of Fisheries and Wildlife or the Fish and Wildlife Service concerning endangered species.
5. Site Characterization Status Report when available.
6. Copy of MEPA certificate when available.
7. Unredacted copy of the information submitted to FERC in reference 7-2.