YANKEE ATOMIC ELECTRIC COMPANY
49 Yankee Road, Rowe, Massachusetts 01367

April 25, 2007
BYR 2007-034

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-001

References:
(a) License No. DPR-3 (Docket No. 50-29)

(b) BYR 2006-107, Revision 2 to the Yankee Nuclear Power Station's License Termination Plan

(c) Yankee Nuclear Power Station – Issuance of Amendment 158 Re: License Termination Plan

(d) BYR 2006-074, Submittal of Groundwater Compliance Plan for License Termination at YNPS

(e) BYR 2006-108, Update of Status of Groundwater Activities

(f) BYR 2007-016, Final Groundwater Condition Report

Subject: Confirmation of Groundwater Compliance

On August 31, 2006, Yankee Atomic Electric Company (Yankee) submitted its plan to demonstrate license termination compliance for groundwater at the Yankee Nuclear Power Station (YNPS) site. The final version of the Plan incorporated comments made by the NRC on the draft version of the Plan, which were received by Yankee on July 31, 2006. An updated status of groundwater activities was provided on November 21, 2006. On February 15, 2007, the Final Groundwater Condition Report was submitted to demonstrate compliance with the various license termination requirements associated with groundwater.

The Final Groundwater Condition Report summarized the results of the groundwater sampling events, evaluated tritium trends in monitoring wells and described the three-dimensional flow and transport model developed for the site. This model was used to evaluate the attenuation of tritium in monitoring well MW-107C, which has been identified as the only monitoring well that exceeds EPA Maximum Contaminant Level (MCL) for tritium (H-3) of 20,000 pCi/L, and to demonstrate LTP compliance in the hypothetical "resident farmer's" well.

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As described in the Groundwater Compliance Plan, Yankee committed to submitting the results of the March sampling round including:

- Wells sampled in the previous quarterly monitoring event;
- Validated laboratory results; and
- Summary of any significant changes in concentration trends.

In addition, Yankee committed to submitting the following groundwater-related information in support of license termination:

- Summary of the groundwater tritium concentrations;
- Confirmation that no other radionuclides have been detected in groundwater on site exceeding License Amendment No. 158 action levels; and
- Confirmation that the tritium concentration in the resident farmer's well is less than the EPA MCL.

The first quarter 2007 groundwater sampling campaign commenced on March 5. All groundwater monitoring wells were sampled and analyzed for H-3. In addition, wells with H-3 concentrations greater than 5,000 pCi/L were analyzed for C-14, Sr-90, and Tc-99. A summary of the first quarter 2007 groundwater sampling results and tritium trend analyses is provided in Attachment 1. The monitoring well-specific tritium data are provided in Attachment 2. The tritium results for the first quarter 2007 confirm that:

- Tritium is the only plant-related radionuclide positively identified in groundwater;
- In general, wells continue to show a downward or stable trend. The one monitoring well (MW-110C) not exhibiting a downward trend has tritium concentrations significantly below the EPA MCL of 20,000 pCi/L. The H-3 concentration is approximately 10 percent of the EPA MCL.
- The first quarter 2007 result for tritium in MW-107C is 30,900 pCi/L, and the overall trend continues to be downward. As the "resident farmer" scenario was evaluated using the April 2006 concentration in MW-107C, the down trending result for MW-107C through 2006 and first quarter 2007 is consistent with the assumptions used in the evaluation of the resident farmer well (i.e., the current tritium concentration in MW-107C is less that the April 2006 value) and confirms that Yankee has satisfied the requirement for the "resident farmer's" well to be less than the 20,000 pCi/L limit for tritium.

With this letter, Yankee confirms the demonstration of compliance with the groundwater criteria in the LTP. This is the final remaining action required to satisfy the pending request to release a portion of the site from the NRC license. Please include this information in the NRC Staff review of this pending action.

If you should have any questions concerning the information provided above, please call Alice Carson at (301) 916-3995, or me at (860) 573-5523.

Sincerely,

Gerard van Noordennen

Gerard van Noordennen
Regulatory Affairs Manager

Attachments: 1. Tritium Trend Analysis and Summary of March 2007 Groundwater Results
2. Summary of 2006-2007 Tritium Groundwater Results

cc w/attachments:
S. Collins, NRC Region I Administrator
S. Hansell, Chief, Decommissioning Branch, NRC Region I
L. Kauffman, Region I
J. Hickman, NRC Project Manager
E. Waterman, US Environmental Protection Agency, Region 1
R. Walker, Director, MA DPH
L. Hanson, MA DEP
W. Perlman, Executive Committee Chair, FRCOG
T.W. Hutcheson, Chair, Franklin Regional Planning Board
L. Dunlavy, Executive Director, FRCOG
P. Sloan, Directory of Planning & Development, FRCOG
D. Howland, Regional Engineer, MA DEP
M. Whalen, MA DPH
D. Katz, CAN
CAN Business Office
Robert Ross, CAN Hydrogeologist

Attachment 1
Tritium Trend Analysis and Summary of March 2007 Groundwater Results

Tritium Trend Analysis and Summary of March 2007 Groundwater Results

To evaluate the long-term trend for tritium in groundwater, YNPS has completed a trend analysis for all monitoring wells included in the quarterly groundwater monitoring plan. The trend analysis included all sample results from January 2006 through March 2007, a total of five quarters of monthly sampling plus some supplemental monthly sampling results. The analysis was conducted in an identical fashion to the trend analysis completed in the Final Groundwater Condition Report (BYR 2007-016), and utilized Sens Slope Trend analysis. The results of the trend analysis through March 2007 are summarized in the attached **Table 1**. The trend analysis results for tritium through December 2006 are also included in **Table 1**. The trend analysis results are presented in terms of identifying either an upward trend, downward trend or no trend. The no trend result indicates that neither an upward nor downward trend is present, and is generally indicative of a stable concentration trend.

Of the 54 monitoring locations, seven monitoring wells (CB-6, MW-101A, MW-106A, MW-107C, MW-107D, MW-110A, and MW-111A) and Sherman Spring have a defined downward trend. A total of 42 monitoring wells have no/stable trends and one monitoring well (MW-110C) displays an upward trend. This is similar to the trend analysis results for 2006 where 43 of the monitoring wells had stable trends and eight monitoring wells had downward trends (Table 1). Three monitoring wells (CFW-5, MW-100A, and MW-106D) had upward trends identified, but the trends are an artifact of non-detect concentrations (**Table 1**).

The tritium concentration in MW-110C does have an upward trend, but the tritium concentration is relatively low ranging from 1,160 pCi/L in Q1 2006 to 2,590 pCi/L in Q4 2006. While the tritium concentration has clearly increased in MW-110C during 2006, the Q1 2007 result decreased to 2,040 pCi/L. The maximum concentration is still an order of magnitude below the tritium MCL of 20,000 pCi/L, and MW-110C is adjacent to and downgradient of the southern corner of the former spent fuel pool/ion exchange pit (SFP/IXP) area where significant soil remediation was conducted. All other monitoring wells in this portion of the site have stable or decreasing tritium trends. Based on both the significant remediation conducted in the SFP/IXP area and the consistent downward or stable trends observed in nearby monitoring wells, the reduction in tritium observed in Q1 2007 for MW-110C most likely indicates the beginning of decreasing tritium levels for the monitoring well.

The trend results for MW-107C through Q1 2007 continue to exhibit a downward trend. While a small increase in tritium was observed in Q1 2007 relative to Q4 2006 (29,100 pCi/L, Q4 2006 versus 30,900 pCi/L, Q1 2007), the long-term trend is still downward. The small increase in tritium is believed to be a function of normal perturbations through time, some or all of which may be seasonally driven. **Figure 1** shows a comparison between model-simulated tritium at MW-107C developed in the Final Groundwater Condition Report (transmitted with letter BYR 2007-016) going forward and the measured tritium at MW-107C from April 2006 through March 2007. This is an update of Figure 6-51 from the Final Groundwater Condition Report and includes a revised linear extrapolation of measured tritium concentrations at MW-107C. There is a relatively close comparison between the simulated and measured tritium concentrations, and the linear regression line through the measured data and the model results suggest that the MCL

concentration of 20,000 pCi/L in MW-107C will be achieved by early 2008 (**Figure 1**). Also shown in **Figure 1** is the tritium concentration with radioactive decay as the only fate and transport mechanism for tritium. Clearly, processes including advective dispersion and associated mixing and dilution are very important in the fate and transport of tritium at YNPS.

While a number of monitoring wells had small increases in tritium concentration that are believed to represent normal fluctuations through time, there was a significant increase in tritium observed in CFW-6. CFW-6 is located upgradient of the industrial area, adjacent to the drainage for Wheeler Brook, and had a significant increase in tritium during 2006. The tritium observed in CFW-6 (up to 2,650 pCi/L) was attributed to concrete rubble from the reactor support structure that was temporarily stored east of the industrial area, and upgradient of CFW-6 (Final Groundwater Condition Report for Yankee Nuclear Power Station, February, 2007, transmitted with BYR 2007-016). The concrete rubble had up to 100 pCi/g of tritium and was located in that area from fall 2005 through early 2006. Following removal of the concrete rubble, final status survey results identified up to 40 pCi/g of tritium in surface soils within the area of concrete rubble storage. Tritium is readily leachable into the subsurface and would quickly migrate via infiltration to the shallow groundwater, creating the slug of tritium-contaminated groundwater observed in CFW-6. The increase in tritium observed in Q1 2007 (4,000 pCi/L) is also consistent with the soil concentrations determined during final status survey and is believed to be related to the flushing and infiltration of tritium associated with the concrete rubble. Based on the groundwater flow determined for this portion of the site, the slug of elevated tritium would flow from the CFW-6 area to the north and discharge to the Sherman Reservoir.

Table 1
H-3 Trend Analysis
Yankee Nuclear Power Station, Rowe, Massachusetts

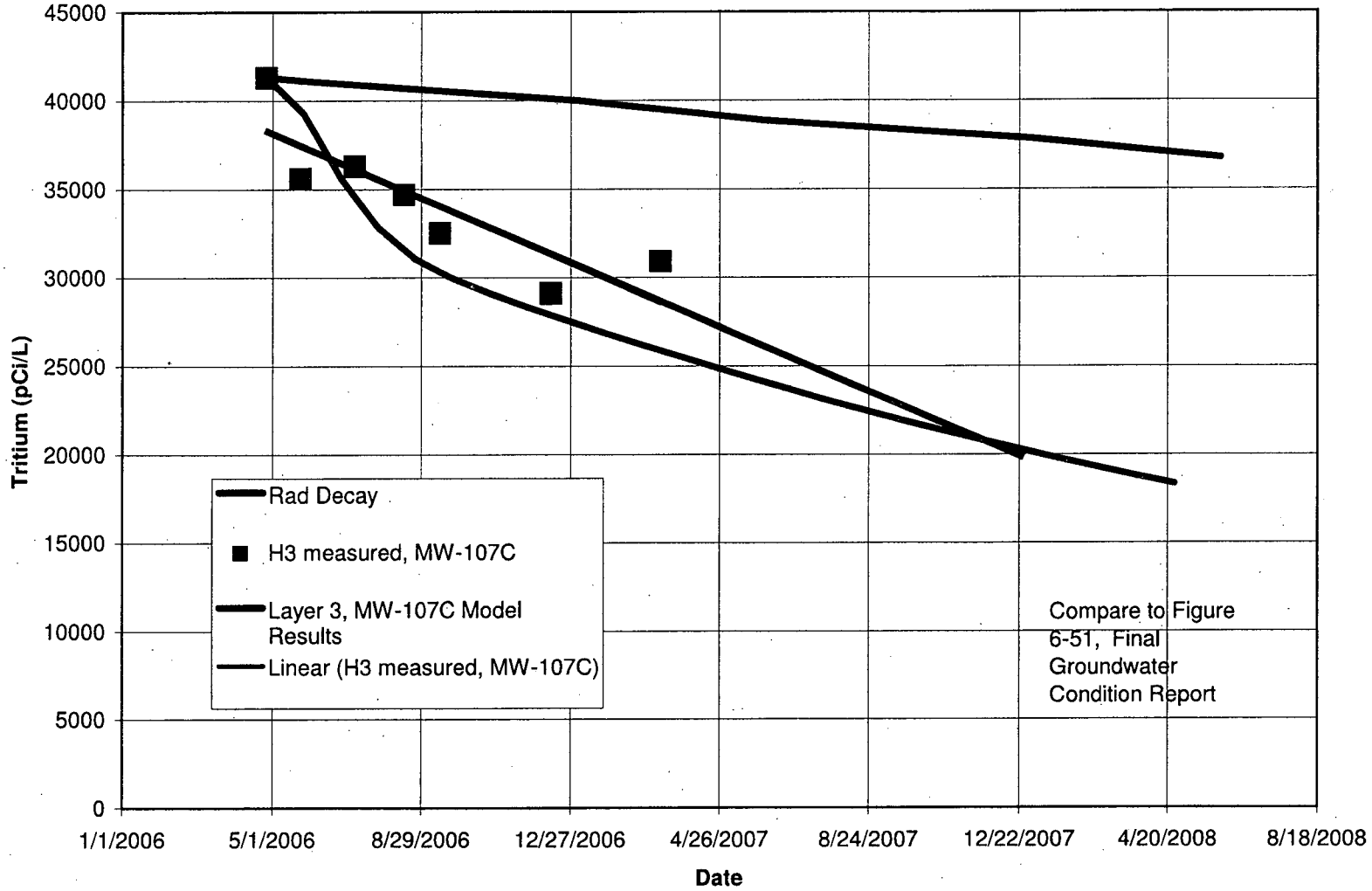
Well ID	Tritium Trend Q1-Q4 2006	Tritium Trend Q1 2006-Q1 2007
CB-3	NT	NT
CB-4	NT	NT
CB-6	DT	DT
CB-8	NT	NT
CW-10	NT	NT
CFW-1	NT	NT
CFW-5	NT	
CFW-6	NT	NT
MW-100A	NT	
MW-100B	NT	NT
MW-101A	DT	DT
MW-101B	NT	NT
MW-101C	NT	NT
MW-102A	NT	NT
MW-102B	NT	NT
MW-102C	NT	NT
MW-102D	NT	NT
MW-103A	NT	NT
MW-103B	NT	NT
MW-103C	NT	NT
MW-104A	NT	NT
MW-104B	NT	NT
MW-104C	NT	NT
MW-104D	NT	NT
MW-105A	NT	NT
MW-105B	DT	NT
MW-105C	NT	NT
MW-106A	DT	DT
MW-106B	NT	NT
MW-106C	NT	NT
MW-106D	NT	
MW-107A	NT	NT
MW-107B	NT	NT
MW-107C	DT	DT
MW-107D	DT	DT
MW-107E	DT	NT
MW-107F	NT	NT
MW-108A	NT	NT

Table 1
H-3 Trend Analysis
Yankee Nuclear Power Station, Rowe, Massachusetts

Well ID	Tritium Trend Q1-Q4 2006	Tritium Trend Q1 2006-Q1 2007
MW-108B	NT	NT
MW-108C	NT	NT
MW-109A	NT	NT
MW-109B	NT	NT
MW-109C	NT	NT
MW-109D	NT	NT
MW-110A	DT	DT
MW-110B	NT	NT
MW-110C	UT	UT
MW-110D	NT	NT
MW-111A	DT	DT
MW-111B	NT	NT
MW-111C	NT	NT
MW-113A	NT	NT
MW-113C	NT	NT
SP-001	DT	DT

Notes
NT - No Trend
DT - Down Trend
UT - Up Trend
[redacted] up trend artifact of non-detect concentrations

Figure 1
Concentration ofTritium in MW-107C 2006-2008



Attachment 2
Summary of 2006-2007 Tritium Groundwater Results

Summary of Tritium Results for Groundwater (in pCi/L)

Monitoring Well	Jan-06	Feb-06	Apr-06	May-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Mar-07
CB-3			ND		ND						
CB-3R								ND		ND	ND
CB-4	ND	ND	ND	ND	ND		4.03E+02			ND	ND
CB-6	1.47E+04	1.21E+04	7.68E+03	4.30E+03	1.91E+03	1.16E+03	9.59E+02			8.69E+02	1.28E+03
CB-8				ND	ND		ND			ND	ND
CFW-1			3.32E+02		ND		ND			ND	ND
CFW-5			ND				ND			ND	3.92E+02
CFW-6			3.00E+02		1.18E+03		2.65E+03		ND	5.81E+02	4.00E+03
CW-2			ND								
CW-5R								ND			
CW-10			ND		ND		ND		ND	ND	ND
DW001			ND		ND		ND			ND	ND
DW002			ND		ND						
MW-6R								4.51E+02		ND	ND
MW-100A			ND		ND		ND			ND	ND
MW-100B			ND		ND		ND			ND	ND
MW-101A			1.69E+04		8.52E+03	7.72E+03	1.01E+04		4.74E+03	3.88E+03	3.35E+03
MW-101B			ND	ND	ND		ND			ND	ND
MW-101C							ND			ND	ND
MW-102A			4.49E+03	4.63E+03	4.26E+03		4.47E+03			4.24E+03	4.64E+03
MW-102B			ND		ND		ND			ND	ND
MW-102C			4.61E+03	3.92E+03	4.98E+03		4.21E+03			3.52E+03	3.61E+03
MW-102D			1.61E+04	6.89E+03	1.11E+04	8.60E+03	6.97E+03			6.53E+03	8.58E+03
MW-103A			ND		4.16E+02		ND			ND	ND
MW-103B			ND		ND		ND			ND	ND
MW-103C			ND		ND		2.49E+02			ND	ND
MW-104A		3.32E+03	4.58E+03	2.96E+03	9.33E+02	6.36E+02	1.43E+03			2.85E+03	3.10E+03
MW-104B			ND		ND		ND			ND	ND
MW-104C			ND		ND		ND			ND	ND
MW-104D								ND	ND	ND	ND
MW-105A			ND		ND		ND			ND	ND
MW-105B			3.97E+03	4.78E+03	3.86E+03		3.29E+03			2.90E+03	3.44E+03

Summary of Tritium Results for Groundwater (in pCi/L)

Monitoring Well	Jan-06	Feb-06	Apr-06	May-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Mar-07
MW-105C			1.99E+03		1.03E+03		1.65E+03			2.75E+03	2.62E+03
MW-106A	1.13E+04	1.31E+04	ND	9.81E+03	7.17E+03	6.74E+03	5.28E+03			3.01E+03	ND
MW-106B			ND		ND		5.28E+02		ND	ND	ND
MW-106C			ND		ND		ND			ND	ND
MW-106D			ND		ND		ND			ND	ND
MW-107A			4.91E+03	5.05E+03	5.91E+03	5.60E+03	5.41E+03			4.04E+03	4.17E+03
MW-107B			ND	ND	ND		ND			ND	ND
MW-107C			4.13E+04	3.72E+04	3.60E+04	3.47E+04	3.25E+04			2.91E+04	3.09E+04
MW-107D			1.19E+04	1.20E+04	1.18E+04	1.16E+04	1.10E+04			9.31E+03	9.44E+03
MW-107E				8.13E+03	7.90E+03		5.50E+03			5.70E+03	6.42E+03
MW-107F					1.09E+04		9.58E+03	1.10E+04		9.21E+03	9.22E+03
MW-108A			ND		ND		ND			ND	ND
MW-108B			ND		ND		ND			ND	ND
MW-108C			ND		ND		ND			ND	ND
MW-109A			ND		ND		ND			ND	ND
MW-109B			ND		ND		ND			ND	ND
MW-109C			ND		ND		ND			ND	ND
MW-109D			ND		ND		ND			ND	ND
MW-110A	7.72E+03		2.93E+03	2.77E+03	2.99E+03		1.68E+03			1.66E+03	1.35E+03
MW-110B	2.00E+03		ND		ND		ND			ND	ND
MW-110C			1.16E+03		1.98E+03		1.87E+03			2.59E+03	2.04E+03
MW-110D			ND		ND		ND			ND	ND
MW-111A			4.44E+03	3.94E+03	3.05E+03		2.65E+03			1.68E+03	1.63E+03
MW-111B			ND		ND		ND			ND	ND
MW-111C			ND		5.16E+03		4.25E+03			ND	2.28E+03
MW-112A								ND		ND	ND
MW-113A				ND	ND		ND			ND	ND
MW-113C					6.01E+02		7.66E+02			7.98E+02	8.70E+02
SP-1	4.34E+03	4.61E+03	4.67E+03	2.65E+03	1.42E+03	1.51E+03	1.39E+03			1.10E+03	4.52E+02