ORISE
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

Independent Environmental
Assessment and Verification

January 27, 2006

Ms. Laurie Kauffman
U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

SUBJECT: REVISED REPORT FOR ANALYSIS OF SAMPLES FROM THE CONNECTICUT YANKEE HADDAM NECK PLANT, HADDAM NECK, CONNECTICUT [INSPECTION REPORT NO. DPR-61/2005003] [RFTA NO. 06-001]

Dear Ms. Kauffman:

The Oak Ridge Institute for Science and Education (ORISE) received a combination of 11 bedrock and concrete samples on November 21, 2005 and one water sample and two soil samples on November 23, 2005 from the Connecticut Yankee Haddam Neck Plant in Haddam Neck, Connecticut. The sample identifications and collection data are in Table 1. All samples were analyzed by gamma spectroscopy (GS) (Procedure CP1, Revision 15). The water and soil were analyzed for tritium (H-3) by liquid scintillation analysis (Procedure AP2, Revision 15; Procedure CP4, Revision 3). The bedrock and concrete were analyzed for tritium (H-3) by liquid scintillation analysis (Procedure AP6, Revision 15; Procedure CP4, Revision 3). The bedrock, concrete, and soil samples were also analyzed for strontium-90 (Sr-90) by gas-flow proportional counting (Procedure AP4, Revision 13; Procedure CP3, Revision 2). The GS results are presented in Table 2, the H-3 results are presented in Table 3, and the Sr-90 results are presented in Table 4.

ORISE's Quality Control (QC) requirements were met for these analyses. The QC files are available for your review upon request.

A case narrative is included to explain the need for the revised letter report containing updated H-3 results for the bedrock and concrete samples.

P. O. Box 117
Oak Ridge, TN 37831

My contact information is listed below or you may contact Wade Ivey at 865.576.9184 should you have any questions.

Sincerely,

Dale Condra

Dale Condra
Laboratory Manager

RDC:WPI:ar

Enclosures

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TRITIUM CASE NARRATIVE

The original tritium data submitted on December 22, 2005 was not properly characterized in the letter report. The letter report should have stated that "The data generated by the distillation method can only be related to tritium in the water soluble form. There may be matrix affects in the bedrock and concrete samples that bind the tritium in such a manner that distillation could not effectively recover all the contamination present". The instrument normally used to analyze solid samples was out of service for repair when this request was received; therefore, in order to meet the requested deadline, the distillation method was used to analyze the samples.

Upon the request to review the data, it was decided that reanalyzing the samples using the repaired instrument was the best course of action. This method oxidizes the sample at ~900° C, instead of distilling the sample at 100° C, which should liberate any tritium in the bedrock and concrete matrices. As anticipated, the results of this reanalysis produced concentrations of tritium that were higher than the concentrations by distillation.

TABLE 1

SAMPLE IDENTIFICATIONS
AND COLLECTION DATA
CONNECTICUT YANKEE HADDAM NECK PLANT
HADDAM NECK, CONNECTICUT

ORISE Sample ID	NRC Region I Sample ID	Collection Date	Collection Time
0857M0012	9801-0000-009-1C-RAEXV-01	10/6/2005	1136
0857M0013	9801-0000-009-1C-RAEXV-02	10/6/2005	1136
0857M0014	9801-0000-009-1C-RAEXV-03	10/6/2005	1136
0857M0015	9801-0000-009-1C-RAEXV-05	10/6/2005	1136
0857M0016	9801-0000-018-1C-RAEXV-01	11/8/2005	1334
0857M0017	9801-0000-018-1C-RAEXV-02	11/8/2005	1334
0857M0018	9801-0000-018-1C-RAEXV-03	11/8/2005	1334
0857M0019	9801-0000-018-1C-RAEXV-04	11/8/2005	1334
0857M0020	9801-0000-025-RA-EXV	10/24/2005	1535
0857M0021	9801-0000-026-RA-EXV	10/24/2005	1540
0857M0022	9801-0000-027-RA-EXV	10/24/2005	1545
0857S0104	9801-0000-028-RAE-XV	11/9/2005	945
0857S0105	9801-0000-029-RAE-XV	11/9/2005	957
0857W0001	GWTT Effluent	11/8/2005	1050

TABLE 2

CONCENTRATIONS OF SELECTED
GAMMA EMITTING RADIONUCLIDES
BY GAMMA SPECTROSCOPY CP1, REVISION 15
CONNECTICUT YANKEE HADDAM NECK PLANT
HADDAM NECK, CONNECTICUT

ORISE Sample ID	NRC Region I Sample ID	Radionuclide Concentrations[a,b] (pCi/g[c] and pCi/L)							
		Co-60	Ag-108m	Sb-125	Cs-134	Cs-137	Eu-152	Eu-154	Eu-155
0857M0012	9801-0000-009-1C-RAEXV-01	0.00[d] ± 0.05[e]	0.14 ± 0.15	-0.24 ± 0.45	0.29 ± 0.07	186.0 ± 6.8	0.21 ± 0.36	-0.06 ± 0.18	-0.16 ± 0.19
0857M0013	9801-0000-009-1C-RAEXV-02	0.00 ± 0.04	0.01 ± 0.02	-0.02 ± 0.07	0.04 ± 0.04	0.24 ± 0.07	-0.06 ± 0.08	-0.04 ± 0.16	0.08 ± 0.07
0857M0014	9801-0000-009-1C-RAEXV-03	0.00 ± 0.04	0.00 ± 0.02	-0.02 ± 0.08	0.04 ± 0.04	0.50 ± 0.07	-0.02 ± 0.08	-0.00 ± 0.16	0.03 ± 0.06
0857M0015	9801-0000-009-1C-RAEXV-05	-0.01 ± 0.04	0.01 ± 0.02	-0.02 ± 0.07	0.04 ± 0.05	0.05 ± 0.04	0.00 ± 0.08	0.24 ± 0.20	0.06 ± 0.06
0857M0016	9801-0000-018-1C-RAEXV-01	0.17 ± 0.05	0.08 ± 0.18	-0.03 ± 0.55	0.32 ± 0.08	325 ± 12	-0.04 ± 0.45	0.03 ± 0.17	0.03 ± 0.23
0857M0017	9801-0000-018-1C-RAEXV-02	0.03 ± 0.06	-0.02 ± 0.10	-0.03 ± 0.30	0.07 ± 0.05	51.6 ± 2.0	0.35 ± 0.29	-0.01 ± 0.20	0.08 ± 0.12
0857M0018	9801-0000-018-1C-RAEXV-03	0.01 ± 0.03	0.00 ± 0.04	0.01 ± 0.11	0.01 ± 0.03	10.91 ± 0.43	-0.02 ± 0.10	-0.03 ± 0.15	0.02 ± 0.07
0857M0019	9801-0000-018-1C-RAEXV-04	0.01 ± 0.04	-0.01 ± 0.03	0.13 ± 0.11	0.02 ± 0.04	1.78 ± 0.12	-0.04 ± 0.09	-0.01 ± 0.20	0.05 ± 0.05
0857M0020	9801-0000-025-RA-EXV	0.02 ± 0.02	0.00 ± 0.01	-0.02 ± 0.04	0.03 ± 0.02	0.33 ± 0.03	-0.03 ± 0.04	0.01 ± 0.08	0.01 ± 0.04
0857M0021	9801-0000-026-RA-EXV	0.00 ± 0.02	-0.01 ± 0.01	-0.02 ± 0.03	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.03	-0.05 ± 0.08	0.00 ± 0.04
0857M0022	9801-0000-027-RA-EXV	0.00 ± 0.02	0.01 ± 0.01	-0.01 ± 0.03	0.03 ± 0.02	0.02 ± 0.01	0.00 ± 0.04	-0.01 ± 0.08	0.06 ± 0.05
0857S0104	9801-0000-028-RAE-XV	0.03 ± 0.02	-0.01 ± 0.01	0.03 ± 0.04	0.02 ± 0.02	0.16 ± 0.04	-0.04 ± 0.04	-0.07 ± 0.08	0.09 ± 0.07
0857S0105	9801-0000-029-RAE-XV	0.01 ± 0.03	0.00 ± 0.02	-0.02 ± 0.04	0.03 ± 0.02	0.44 ± 0.04	0.01 ± 0.05	0.04 ± 0.11	0.06 ± 0.05
0857W0001	GWTT Effluent	1.40 ± 0.86	0.20 ± 0.66	-1.3 ± 3.9	1.22 ± 0.80	166.8 ± 5.5	-0.4 ± 1.8	-0.4 ± 2.9	1.1 ± 1.5

[a]The range of MDCs for the selected radionuclides is 0.06 pCi/g to 0.20 pCi/g.

[b]The range of MDCs for the selected radionuclides is 0.95 pCi/L to 4.8 pCi/L.

[c]The units of pCi/g apply to miscellaneous (M) and soil (S) samples.

[d]Zero values are due to rounding.

[e]Uncertainties represent the 95% confidence level, based on total propagated uncertainties.

REVISED TABLE 3

CONCENTRATIONS OF TRITIUM BY LIQUID SCINTILLATION ANALYSIS CONNECTICUT YANKEE HADDAM NECK PLANT HADDAM NECK, CONNECTICUT

ORISE Sample ID	NRC Region I Sample ID	Radionuclide Concentrations, TPUs, and MDCs[a] (pCi/g[b],as received, and pCi/L)
0857M0012[c]	9801-0000-009-1C-RAEXV-01	128 ± 13[d] (3)
0857M0013	9801-0000-009-1C-RAEXV-02	223 ± 22 (3)
0857M0014	9801-0000-009-1C-RAEXV-03	174 ± 17 (3)
0857M0015	9801-0000-009-1C-RAEXV-05	35.4 ± 4.2 (3.0)
0857M0016	9801-0000-018-1C-RAEXV-01	44.1 ± 5.0 (3.0)
0857M0017	9801-0000-018-1C-RAEXV-02	163 ± 16 (3)
0857M0018	9801-0000-018-1C-RAEXV-03	371 ± 36 (3)
0857M0019	9801-0000-018-1C-RAEXV-04	401 ± 39 (3)
0857M0020	9801-0000-025-RA-EXV	2.2 ± 1.8 (2.9)
0857M0021	9801-0000-026-RA-EXV	0.2 ± 1.7 (2.9)
0857M0022	9801-0000-027-RA-EXV	2.9 ± 1.8 (2.9)
0857S0104[e]	9801-0000-028-RAE-XV	0.3 ± 1.8 (3.1)
0857S0105	9801-0000-029-RAE-XV	0.26 ± 0.85 (1.5)
0857W0001[e]	GWTT Effluent	48,090 ± 590 (190)

[a]MDCs are in parenthesis.

[b]The units of pCi/g applies to miscellaneous (M) and soil (S) samples.

[c]The bedrock and concrete samples were analyzed by Procedures AP6, Revision 15 and CP4, Revision 3.

[d]Uncertainties represent the 95% confidence level, based on total propagated uncertainties.

[e]The soil samples and the water sample were analyzed by Procedures AP2, Revision 15 and CP4, Revision 3.

TABLE 4

CONCENTRATIONS OF STRONTIUM-90 BY GAS-FLOW PROPORTIONAL COUNTING AP4, REVISION 13; CP3, REVISION 2 CONNECTICUT YANKEE HADDAM NECK PLANT HADDAM NECK, CONNECTICUT

ORISE Sample ID	NRC Region I Sample ID	Radionuclide Concentrations, TPUs, and MDCs[a] (pCi/g)
0857M0012	9801-0000-009-1C-RAEXV-01	1.22 ± 0.18[b] (0.19)
0857M0013	9801-0000-009-1C-RAEXV-02	0.06 ± 0.12 (0.20)
0857M0014	9801-0000-009-1C-RAEXV-03	0.04 ± 0.12 (0.21)
0857M0015	9801-0000-009-1C-RAEXV-05	0.06 ± 0.12 (0.20)
0857M0016	9801-0000-018-1C-RAEXV-01	5.07 ± 0.36 (0.21)
0857M0017	9801-0000-018-1C-RAEXV-02	1.11 ± 0.18 (0.19)
0857M0018	9801-0000-018-1C-RAEXV-03	0.33 ± 0.13 (0.20)
0857M0019	9801-0000-018-1C-RAEXV-04	0.19 ± 0.11 (0.18)
0857M0020	9801-0000-025-RA-EXV	-0.01 ± 0.11 (0.21)
0857M0021	9801-0000-026-RA-EXV	0.23 ± 0.12 (0.19)
0857M0022	9801-0000-027-RA-EXV	-0.06 ± 0.09 (0.18)
0857S0104	9801-0000-028-RAE-XV	0.02 ± 0.12 (0.22)
0857S0105	9801-0000-029-RAE-XV	-0.04 ± 0.12 (0.23)

[a]MDCs are in parenthesis and based on one hour count times.

[b]Uncertainties represent the 95% confidence level, based on total propagated uncertainties.