



January 13, 2006

Mr. John House
U.S. Nuclear Regulatory Commission
Region III
2443 Warrenville Road
Lisle, IL 60532-4351

**SUBJECT: ANALYTICAL RESULTS FOR NON-RUSH WATER SAMPLES NEAR
THE BRAIDWOOD NUCLEAR GENERATING STATION IN
BRAIDWOOD, ILLINOIS
[INSPECTION REPORT 456/457/2005-010] (RFTA NO. 06-001)**

Dear Mr. House:

The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) received water samples from December 5, 2005 through December 12, 2005 that were collected near the Braidwood Nuclear Generating Station in Braidwood, Illinois. As directed, the residential and lake samples were first analyzed for tritium (H-3) to meet your request for rush processing. The tritium results of the residential and lake samples were reported to you in the letter report dated December 19, 2005. The 22 residential and lake samples were then gamma counted for activation/fission products to environmental levels based on a standard count time of 16 hours and the quantity available for each sample. The remaining samples were handled by the laboratory's routine process. We were instructed to analyze the samples that had a minimum of 500 mL by gamma spectroscopy (GS) (Procedure CPI, Revision 15). There were 12 water samples that met the GS criteria. All 37 of the routine water samples were analyzed for H-3. The analysis was performed by liquid scintillation (Procedure AP2, Revision 15; Procedure CP4, Revision 3). The sample identifications and collection data are presented in Table 1. The GS results are presented in Table 2. The H-3 results are presented in Table 3.

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

P. O. BOX 117, OAK RIDGE, TENNESSEE 37831-0117

Managed and operated by Oak Ridge Associated Universities for the U.S. Department of Energy

H-20
RECEIVED JAN 13 2006

Mr. John House

- 2 -

January 13, 2006

If you have any questions, please call me at (865) 241-3242 or Wade Ivey at (865) 576-9184.

Sincerely,

Dale Condra

Dale Condra
Laboratory Manager
Environmental Survey and
Site Assessment Program

RDC:WPI:ar

Enclosure

cc: T. McLaughlin, NRC/NMSS/T-7E18
E. Knox-Davin, NRC/NMSS/TWFN T8A23
J. Cameron, Region III
J. Cassidy, Region III
File-1682
E. Abelquist, ORISE/ESSAP
S. Kirk, ORISE/ESSAP
G. Bonano, Region III
S. Orth, Region III

Distribution approval and concurrence:	Initials
Technical Management Team Member	WCA for JSK
Quality Manager	TUB for ATP

ORISE TABLE 1

**SAMPLE IDENTIFICATIONS
AND COLLECTION DATA
BRAIDWOOD NUCLEAR GENERATING STATION
BRAIDWOOD, ILLINOIS**

ESSAP Sample ID	NRC Region III Sample ID	Collection Date	Collection Time
1682W0001	NRC-1-R3	12/1/2005	na ^a
1682W0002	NRC-2-R3	12/1/2005	na
1682W0003	NRC-3-R3	12/1/2005	na
1682W0004	NRC-4-R3	12/1/2005	na
1682W0005	NRC-5-R3	12/1/2005	na
1682W0006	NRC-6-R3	12/1/2005	na
1682W0007	NRC-7-R3	12/1/2005	15:45
1682W0008	NRC-8-R3	12/1/2005	16:40
1682W0009	NRC-9-R3	12/1/2005	na
1682W0010	NRC-10-R3	12/1/2005	na
1682W0011	NRC-11-R3	12/1/2005	na
1682W0012	NRC-12-R3	12/5/2005	na
1682W0013	NRC-13-R3	12/5/2005	na
1682W0014	NRC-14-R3	12/2/2005	14:35
1682W0015	NRC-15-R3	12/2/2005	14:00
1682W0016	NRC-16-R3	12/3/2005	13:28
1682W0017	NRC-17-R3	na	na
1682W0018	NRC-18-R3	na	na
1682W0019	NRC-19-R3	na	na
1682W0020	NRC-20-R3	12/2/2005	na
1682W0021	NRC-21-R3	12/2/2005	na
1682W0022	NRC-22-R3	12/2/2005	na
1682W0023	NRC-23-R3	12/2/2005	na
1682W0024	NRC-24-R3	11/30/2005	na
1682W0025	NRC-25-R3	11/30/2005	na
1682W0026	NRC-26-R3	11/30/2005	na
1682W0027	NRC-27-R3	12/6/2005	na
1682W0028	NRC-28-R3	11/30/2005	na
1682W0029	NRC-29-R3	11/30/2005	na
1682W0030	NRC-30-R3	na	na
1682W0031	NRC-31-R3	na	na
1682W0032	NRC-32-R3	na	na

ORISE TABLE 1 (Continued)

**SAMPLE IDENTIFICATIONS
AND COLLECTION DATA
BRAIDWOOD NUCLEAR GENERATING STATION
BRAIDWOOD, ILLINOIS**

ESSAP Sample ID	NRC Region III Sample ID	Collection Date	Collection Time
1682W0033	NRC-33-R3	na	na
1682W0034	NRC-34-R3	na	na
1682W0035	NRC-35-R3	na	na
1682W0036	NRC-36-R3	na	na
1682W0037	NRC-37-R3	na	na
1682W0038	NRC-38-R3	na	na
1682W0039	NRC-39-R3	na	na
1682W0040	NRC-40-R3	na	na
1682W0041	NRC-41-R3	na	na
1682W0042	NRC-42-R3	na	na
1682W0043	NRC-43-R3	12/6/2005	10:25
1682W0044	NRC-44-R3	12/5/2005	13:25
1682W0045	NRC-45-R3	12/6/2005	8:25
1682W0046	NRC-46-R3	12/6/2005	9:00
1682W0047	NRC-47-R3	12/5/2005	15:00
1682W0048	NRC-48-R3	12/5/2005	14:25
1682W0049	NRC-49-R3	12/5/2005	15:57
1682W0050	NRC-50-R3	11/30/2005	15:00
1682W0051	NRC-51-R3	12/2/2005	na
1682W0052	NRC-52-R3	12/7/2005	16:10
1682W0053	NRC-53-R3	12/8/2005	8:30
1682W0054	NRC-54-R3	12/8/2005	8:40
1682W0055	NRC-55-R3	12/7/2005	na
1682W0056	NRC-56-R3	12/7/2005	na
1682W0057	NRC-57-R3	12/7/2005	na
1682W0058	NRC-58-R3	12/7/2005	na
1682W0059	NRC-59-R3	12/7/2005	na

*No data provided.

ORISE TABLE 2

CONCENTRATIONS OF SELECTED
GAMMA EMITTING RADIONUCLIDES
IN WATER SAMPLES
BY GAMMA SPECTROSCOPY CP1, REVISION 15
BRAIDWOOD NUCLEAR GENERATING STATION
BRAIDWOOD, ILLINOIS

ESSAP Sample ID	NRC Region III Sample ID	Radionuclide Concentrations ^a (pCi/L)			
		Co-58	Co-60	Cs-134	Cs-137
1682W0001	NRC-1-R3	-2.3 ± 2.7 ^b	5.2 ± 4.5	-0.7 ± 3.0	2.7 ± 5.6
1682W0003	NRC-3-R3	0.9 ± 3.2	-0.2 ± 3.0	2.2 ± 3.3	2.7 ± 2.9
1682W0005	NRC-5-R3	-0.4 ± 2.3	2.6 ± 2.5	0.6 ± 2.4	2.1 ± 2.2
1682W0009	NRC-9-R3	-1.4 ± 3.5	2.7 ± 3.1	-1.0 ± 3.1	0.8 ± 2.9
1682W0010	NRC-10-R3	-1.9 ± 2.3	2.6 ± 2.4	2.1 ± 2.4	0.8 ± 2.3
1682W0011	NRC-11-R3	-0.6 ± 3.1	0.2 ± 3.5	0.1 ± 3.3	0.1 ± 3.0
1682W0012	NRC-12-R3	-1.2 ± 2.6	1.3 ± 3.0	1.3 ± 5.0	-3.4 ± 5.4
1682W0013	NRC-13-R3	1.4 ± 4.6	0.7 ± 5.4	4.7 ± 5.4	0.7 ± 5.0
1682W0014	NRC-14-R3	0.4 ± 2.2	1.6 ± 2.9	-0.2 ± 2.5	1.3 ± 2.2
1682W0015	NRC-15-R3	1.2 ± 5.3	0.6 ± 5.8	2.6 ± 6.5	1.4 ± 6.1
1682W0016	NRC-16-R3	-0.1 ± 4.8	3.5 ± 4.8	2.1 ± 5.7	0.0 ^c ± 4.5
1682W0017	NRC-17-R3	-2.1 ± 2.8	1.1 ± 2.9	0.0 ± 3.0	-1.2 ± 5.4
1682W0019	NRC-19-R3	2.0 ± 2.8	1.2 ± 3.0	3.8 ± 2.9	4.3 ± 3.2
1682W0021	NRC-21-R3	-2.8 ± 2.7	2.7 ± 2.9	1.4 ± 2.7	-0.1 ± 4.4
1682W0024	NRC-24-R3	-6.7 ± 8.2	4.1 ± 7.2	-0.5 ± 7.2	-3 ± 13
1682W0025	NRC-25-R3	-0.7 ± 8.8	-0.5 ± 7.4	4.5 ± 8.1	3.8 ± 6.9
1682W0026	NRC-26-R3	0.1 ± 8.0	5.5 ± 6.7	1.2 ± 6.9	5.9 ± 5.7
1682W0027	NRC-27-R3	1.8 ± 9.0	-2.0 ± 6.7	6 ± 13	1.7 ± 6.2
1682W0028	NRC-28-R3	-0.1 ± 7.3	1.6 ± 7.4	-2.0 ± 7.1	1.9 ± 6.8
1682W0029	NRC-29-R3	-4.9 ± 5.9	-7.4 ± 6.7	-0.5 ± 6.1	-0.7 ± 5.0
1682W0030	NRC-30-R3	-1.3 ± 2.9	-0.7 ± 3.1	0.8 ± 3.1	0.8 ± 2.9
1682W0031	NRC-31-R3	-1.5 ± 2.6	-0.9 ± 2.5	-1.3 ± 2.9	-0.4 ± 2.3
1682W0032	NRC-32-R3	0.2 ± 3.2	3.3 ± 3.1	0.6 ± 3.7	-0.9 ± 2.9
1682W0043	NRC-43-R3	-1.4 ± 2.9	1.3 ± 3.1	-1.8 ± 3.1	0.8 ± 2.9
1682W0050	NRC-50-R3	-0.9 ± 2.7	4.2 ± 3.7	0.3 ± 3.2	1.1 ± 4.8
1682W0051	NRC-51-R3	-0.5 ± 2.4	-1.5 ± 2.5	1.9 ± 2.5	0.6 ± 2.4
1682W0052	NRC-52-R3	-2.8 ± 4.8	3.9 ± 5.9	0.9 ± 5.3	1.0 ± 8.0
1682W0053	NRC-53-R3	-3.4 ± 5.3	5.4 ± 5.7	-1.5 ± 6.2	6.4 ± 5.0
1682W0054	NRC-54-R3	-2.6 ± 6.4	1.4 ± 6.9	5.2 ± 6.9	2.8 ± 6.2
1682W0055	NRC-55-R3	-3.9 ± 7.6	2.0 ± 7.9	0.9 ± 8.2	-1.9 ± 7.1
1682W0056	NRC-56-R3	2.1 ± 8.9	11.0 ± 7.1	-1.1 ± 9.1	-4 ± 18
1682W0057	NRC-57-R3	4.5 ± 7.3	0.4 ± 6.9	5.0 ± 7.8	-4.8 ± 6.6
1682W0058	NRC-58-R3	-4.2 ± 5.7	-1.0 ± 5.9	6.1 ± 6.4	3.4 ± 5.1
1682W0059	NRC-59-R3	-4.1 ± 7.7	-2.9 ± 9.5	2.2 ± 7.9	4.9 ± 7.0

^aThe range of MDCs for the selected radionuclides is 3.6 pCi/L to 17 pCi/L.

^bUncertainties represent the 95% confidence level, based on total propagated uncertainties.

^cZero values are due to rounding.

ORISE TABLE 3

CONCENTRATIONS OF TRITIUM
IN WATER SAMPLES
BY LIQUID SCINTILLATION ANALYSIS
AP2, REVISION 15; CP4, REVISION 3
BRAIDWOOD NUCLEAR GENERATING STATION
BRAIDWOOD, ILLINOIS

ESSAP Sample ID	NRC Region III Sample ID	Tritium Concentrations, TPUs, and MDCs ^a (pCi/L)
1682W0001	NRC-1-R3	2,930 ± 330 ^b (450)
1682W0002	NRC-2-R3	33,630 ± 810 (450)
1682W0003	NRC-3-R3	6,820 ± 410 (450)
1682W0004	NRC-4-R3	190 ± 270 (450)
1682W0005	NRC-5-R3	1,200 ± 290 (450)
1682W0006	NRC-6-R3	2,720 ± 330 (450)
1682W0007	NRC-7-R3	2,650 ± 330 (450)
1682W0008	NRC-8-R3	34,760 ± 820 (450)
1682W0017	NRC-17-R3	-60 ± 270 (470)
1682W0018	NRC-18-R3	140 ± 280 (470)
1682W0019	NRC-19-R3	420 ± 270 (450)
1682W0020	NRC-20-R3	2,750 ± 340 (470)
1682W0021	NRC-21-R3	2,470 ± 320 (450)
1682W0022	NRC-22-R3	-90 ± 270 (470)
1682W0023	NRC-23-R3	110 ± 280 (470)
1682W0030	NRC-30-R3	290 ± 270 (450)
1682W0031	NRC-31-R3	230 ± 270 (450)
1682W0032	NRC-32-R3	140 ± 270 (450)
1682W0033	NRC-33-R3	-40 ± 270 (470)
1682W0034	NRC-34-R3	2,120 ± 330 (470)
1682W0035	NRC-35-R3	1,770 ± 320 (470)
1682W0036	NRC-36-R3	1,400 ± 310 (470)
1682W0037	NRC-37-R3	-70 ± 270 (470)
1682W0038	NRC-38-R3	110 ± 280 (470)
1682W0039	NRC-39-R3	140 ± 280 (470)
1682W0040	NRC-40-R3	1,230 ± 300 (470)
1682W0041	NRC-41-R3	2,190 ± 330 (470)
1682W0042	NRC-42-R3	490 ± 290 (470)
1682W0043	NRC-43-R3	-30 ± 260 (450)
1682W0044	NRC-44-R3	-40 ± 270 (460)
1682W0045	NRC-45-R3	30,020 ± 770 (480)
1682W0046	NRC-46-R3	2,500 ± 340 (480)
1682W0047	NRC-47-R3	1,640 ± 320 (480)
1682W0048	NRC-48-R3	42,580 ± 920 (480)
1682W0049	NRC-49-R3	3,840 ± 370 (480)
1682W0050	NRC-50-R3	39,400 ± 880 (450)
1682W0051	NRC-51-R3	280 ± 270 (450)

^aMDCs are in parenthesis.

^bUncertainties represent the 95% confidence level, based on total propagated uncertainties.