



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.

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Mr. John House

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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

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| Distribution approval and concurrence: | Initials |
|--|-------------|
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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.