

March 27, 2006

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

**SUBJECT: ANALYTICAL RESULTS FOR 80 WATER SAMPLES FROM THE VICINITY OF THE BRAIDWOOD GENERATING STATION, BRAIDWOOD, ILLINOIS [INSPECTION REPORT NO. 050-456/06-008] (RFTA NO. 06-001)**

Dear Mr. Snell:

The Oak Ridge Institute for Science and Education (ORISE) received 15 water samples on March 9, 2006 and 65 water samples on March 13, 2006 that were collected in the vicinity of the Braidwood Generating Station in Braidwood, Illinois. The 80 water samples were analyzed for tritium using a liquid scintillation analyzer (Procedures AP2, Revision 15 and CP4, Revision 3). The chain of custody for each sample shipment identified the water samples to be analyzed by gamma spectroscopy (GS) (Procedure CP1, Revision 15). The sample identifications and collection data are presented in Table 1. The GS data are presented in Table 2. The tritium data are presented in Table 3.

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

My contact information is listed below. You may also contact Wade Ivey at 865.576.9184 with any questions or comments.

Sincerely,



Dale Condra, Manager  
Laboratory

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TABLE 1

SAMPLE IDENTIFICATIONS  
AND COLLECTION DATA  
BRAIDWOOD GENERATING STATION  
BRAIDWOOD, ILLINOIS

ORISE Sample ID	NRC Region III Sample ID	Collection Date
1691W0001	BD-06-1-01	na <sup>a</sup>
1691W0002	BD-06-1-02	na
1691W0003	BD-06-1-03	na
1691W0004	BD-06-1-04	na
1691W0005	BD-06-1-05	na
1691W0006	BD-06-1-06	na
1691W0007	BD-06-1-07	na
1691W0008	BD-06-1-08	na
1691W0009	BD-06-1-09	na
1691W0010	BD-06-1-10	1/19/2006
1691W0011	BD-06-1-11	na
1691W0012	BD-06-1-12	na
1691W0013	BD-06-1-13	na
1691W0014	BD-06-1-14	na
1691W0015	BD-06-1-15	na
1691W0016	BD-06-1-16	na
1691W0017	BD-06-1-17	na
1691W0018	BD-06-1-18	na
1691W0019	BD-06-1-19	na
1691W0020	BD-06-1-20	na
1691W0021	BD-06-1-21	na
1691W0022	BD-06-1-22	na
1691W0023	BD-06-1-23	na
1691W0024	BD-06-1-24	na
1691W0025	BD-06-1-25	na
1691W0026	BD-06-1-26	na
1691W0027	BD-06-1-27	na
1691W0028	BD-06-1-28	na
1691W0029	BD-06-1-29	na
1691W0030	BD-06-1-30	na
1691W0031	BD-06-1-31	na
1691W0032	BD-06-1-32	na

TABLE 1 (Continued)

SAMPLE IDENTIFICATIONS  
AND COLLECTION DATA  
BRAIDWOOD GENERATING STATION  
BRAIDWOOD, ILLINOIS

ORISE Sample ID	NRC Region III Sample ID	Collection Date
1691W0033	BD-06-1-33	na
1691W0034	BD-06-1-34	na
1691W0035	BD-06-1-35	na
1691W0036	BD-06-1-36	na
1691W0037	BD-06-1-37	na
1691W0038	BD-06-1-38	na
1691W0039	BD-06-1-39	na
1691W0040	BD-06-1-40	na
1691W0041	BD-06-1-41	na
1691W0042	BD-06-1-42	na
1691W0043	BD-06-1-43	na
1691W0044	BD-06-1-44	na
1691W0045	BD-06-1-45	na
1691W0046	BD-06-1-46	na
1691W0047	BD-06-1-47	na
1691W0048	BD-06-1-48	na
1691W0049	BD-06-1-49	na
1691W0050	BD-06-1-50	na
1691W0051	BD-06-1-51	na
1691W0052	BD-06-1-52	na
1691W0053	BD-06-1-53	na
1691W0054	BD-06-1-54	na
1691W0055	BD-06-1-55	na
1691W0056	BD-06-1-56	na
1691W0057	BD-06-1-57	na
1691W0058	BD-06-1-58	na
1691W0059	BD-06-1-59	na

TABLE 1 (Continued)

SAMPLE IDENTIFICATIONS  
AND COLLECTION DATA  
BRAIDWOOD GENERATING STATION  
BRAIDWOOD, ILLINOIS

ORISE Sample ID	NRC Region III Sample ID	Collection Date
1691W0060	BD-06-1-60	na
1691W0061	BD-06-1-61	na
1691W0062	BD-06-1-62	na
1691W0063	BD-06-1-63	na
1691W0064	BD-06-1-64	na
1691W0065	BD-06-1-65	na
1691W0066	BD-06-1-66	na
1691W0067	BD-06-1-67	na
1691W0068	BD-06-1-68	na
1691W0069	BD-06-1-69	na
1691W0070	BD-06-1-70	na
1691W0071	BD-06-1-71	na
1691W0072	BD-06-1-72	na
1691W0073	BD-06-1-73	na
1691W0074	BD-06-1-74	na
1691W0075	BD-06-1-75	na
1691W0076	BD-06-1-76	na
1691W0077	BD-06-1-77	na
1691W0078	BD-06-1-78	na
1691W0079	BD-06-1-79	na
1691W0080	BD-06-1-80	na

\*No data provided.

TABLE 2

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

ORISE Sample ID	NRC Region III Sample ID	Radionuclide Concentrations <sup>a</sup> (pCi/L)			
		Co-58	Co-60	Cs-134	Cs-137
1691W0005	BD-06-1-05	2.9 ± 4.5 <sup>b</sup>	4.3 ± 5.3	3.5 ± 5.4	-0.8 ± 8.2
1691W0011	BD-06-1-11	0.9 ± 3.3	0.2 ± 3.1	-0.9 ± 3.2	-0.4 ± 2.9
1691W0020	BD-06-1-20	-4.8 ± 4.5	-1.5 ± 5.4	-3.4 ± 5.0	-2.1 ± 9.0
1691W0025	BD-06-1-25	1.0 ± 4.8	4.6 ± 5.2	1.5 ± 5.4	-2.0 ± 4.7
1691W0030	BD-06-1-30	-2.0 ± 5.2	6.5 ± 8.0	0.6 ± 5.8	-8.6 ± 8.8
1691W0035	BD-06-1-35	4.0 ± 4.7	1.2 ± 5.8	3.8 ± 5.3	3.1 ± 4.9
1691W0040	BD-06-1-40	-0.4 ± 4.0	-1.4 ± 5.0	6.1 ± 4.7	-5.4 ± 4.7
1691W0045	BD-06-1-45	3.0 ± 5.6	0.6 ± 5.6	5.6 ± 5.7	5.9 ± 5.2
1691W0050	BD-06-1-50	2.1 ± 4.7	-3.8 ± 4.6	3.5 ± 5.4	-2.1 ± 5.1
1691W0055	BD-06-1-55	-2.6 ± 5.4	2.6 ± 5.7	0.5 ± 6.8	3.5 ± 7.0
1691W0060	BD-06-1-60	-1.0 ± 4.2	3.4 ± 4.6	0.7 ± 5.1	-1.1 ± 4.4
1691W0065	BD-06-1-65	3.3 ± 4.5	1.9 ± 5.4	-2.9 ± 5.2	-3.9 ± 9.0
1691W0070	BD-06-1-70	3.4 ± 4.9	-1.1 ± 5.7	0.6 ± 5.4	0.3 ± 5.0
1691W0075	BD-06-1-75	2.9 ± 7.0	0.6 ± 6.4	1.2 ± 6.1	4.1 ± 5.3
1691W0080	BD-06-1-80	0.0 <sup>c</sup> ± 4.9	1.2 ± 5.3	0.5 ± 5.5	-5.3 ± 9.5

<sup>a</sup>The range of MDCs for the selected radionuclides is 4.8 pCi/L to 10 pCi/L.

<sup>b</sup>Uncertainties represent the 95% confidence level, based on total propagated uncertainties.

<sup>c</sup>Zero values are due to rounding.

TABLE 3

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

ORISE Sample ID	NRC Region III Sample ID	Tritium Concentrations, TPU's, and MDCs <sup>a</sup> (pCi/L)			
1691W0001	BD-06-1-01	-90	±	110 <sup>b</sup>	(200)
1691W0002	BD-06-1-02	20	±	120	(200)
1691W0003	BD-06-1-03	2,650	±	180	(200)
1691W0004	BD-06-1-04	40	±	120	(200)
1691W0005	BD-06-1-05	0 <sup>c</sup>	±	120	(200)
1691W0006	BD-06-1-06	50	±	120	(200)
1691W0007	BD-06-1-07	-50	±	110	(200)
1691W0008	BD-06-1-08	10	±	120	(200)
1691W0009	BD-06-1-09	-40	±	120	(200)
1691W0010	BD-06-1-10	30	±	120	(200)
1691W0011	BD-06-1-11	30	±	120	(200)
1691W0012	BD-06-1-12	-140	±	110	(200)
1691W0013	BD-06-1-13	-40	±	120	(200)
1691W0014	BD-06-1-14	-70	±	110	(200)
1691W0015	BD-06-1-15	-60	±	110	(200)
1691W0016	BD-06-1-16	570	±	270	(420)
1691W0017	BD-06-1-17	70	±	240	(420)
1691W0018	BD-06-1-18	-90	±	230	(420)
1691W0019	BD-06-1-19	-90	±	230	(420)
1691W0020	BD-06-1-20	33,900	±	1,100	(420)
1691W0021	BD-06-1-21	10	±	240	(420)
1691W0022	BD-06-1-22	-10	±	240	(420)
1691W0023	BD-06-1-23	-210	±	230	(420)
1691W0024	BD-06-1-24	-60	±	230	(420)
1691W0025	BD-06-1-25	-80	±	230	(420)
1691W0026	BD-06-1-26	-240	±	220	(420)
1691W0027	BD-06-1-27	-190	±	230	(420)
1691W0028	BD-06-1-28	-330	±	220	(420)
1691W0029	BD-06-1-29	-140	±	230	(420)
1691W0030	BD-06-1-30	-10	±	240	(420)
1691W0031	BD-06-1-31	-260	±	220	(420)
1691W0032	BD-06-1-32	-190	±	230	(420)
1691W0033	BD-06-1-33	-90	±	230	(420)
1691W0034	BD-06-1-34	-320	±	220	(420)
1691W0035	BD-06-1-35	-110	±	230	(420)
1691W0036	BD-06-1-36	-70	±	230	(410)

TABLE 3 (Continued)

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

ORISE Sample ID	NRC Region III Sample ID	Tritium Concentrations, TPU's, and MDCs <sup>a</sup> (pCi/L)			
1691W0037	BD-06-1-37	-80	±	230	(410)
1691W0038	BD-06-1-38	-160	±	220	(410)
1691W0039	BD-06-1-39	-50	±	230	(410)
1691W0040	BD-06-1-40	-100	±	220	(410)
1691W0041	BD-06-1-41	-60	±	230	(410)
1691W0042	BD-06-1-42	10	±	230	(410)
1691W0043	BD-06-1-43	-130	±	220	(410)
1691W0044	BD-06-1-44	-240	±	220	(410)
1691W0045	BD-06-1-45	-110	±	220	(410)
1691W0046	BD-06-1-46	-50	±	230	(410)
1691W0047	BD-06-1-47	-90	±	230	(410)
1691W0048	BD-06-1-48	-10	±	230	(410)
1691W0049	BD-06-1-49	10	±	230	(410)
1691W0050	BD-06-1-50	0	±	230	(410)
1691W0051	BD-06-1-51	-110	±	220	(410)
1691W0052	BD-06-1-52	-90	±	230	(410)
1691W0053	BD-06-1-53	10	±	230	(410)
1691W0054	BD-06-1-54	-60	±	230	(410)
1691W0055	BD-06-1-55	-180	±	230	(420)
1691W0056	BD-06-1-56	-160	±	230	(420)
1691W0057	BD-06-1-57	-230	±	230	(420)
1691W0058	BD-06-1-58	2,010	±	330	(420)
1691W0059	BD-06-1-59	-160	±	230	(420)
1691W0060	BD-06-1-60	-170	±	230	(420)
1691W0061	BD-06-1-61	-160	±	230	(420)
1691W0062	BD-06-1-62	-100	±	230	(420)
1691W0063	BD-06-1-63	-210	±	230	(420)
1691W0064	BD-06-1-64	370	±	260	(420)
1691W0065	BD-06-1-65	10	±	240	(420)
1691W0066	BD-06-1-66	-150	±	230	(420)
1691W0067	BD-06-1-67	-160	±	230	(420)
1691W0068	BD-06-1-68	-80	±	230	(420)
1691W0069	BD-06-1-69	-100	±	230	(420)
1691W0070	BD-06-1-70	-120	±	230	(420)
1691W0071	BD-06-1-71	-230	±	230	(420)
1691W0072	BD-06-1-72	-90	±	230	(420)
1691W0073	BD-06-1-73	-190	±	230	(420)
1691W0074	BD-06-1-74	-100	±	230	(420)
1691W0075	BD-06-1-75	10	±	230	(410)
1691W0076	BD-06-1-76	-50	±	230	(410)
1691W0077	BD-06-1-77	-80	±	230	(410)

TABLE 3 (Continued)

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

ORISE Sample ID	NRC Region III Sample ID	Tritium Concentrations, TPUs, and MDCs <sup>a</sup> (pCi/L)			
1691W0078	BD-06-1-78	30	±	230	(410)
1691W0079	BD-06-1-79	-80	±	230	(410)
1691W0080	BD-06-1-80	80	±	230	(410)

<sup>a</sup>MDCs are in parenthesis.

<sup>b</sup>Uncertainties represent the 95% confidence level, based on total propagated uncertainties.