

April 27, 2006

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

**SUBJECT: ANALYTICAL RESULTS FOR 41 WATER SAMPLES IN BATCH TWO FROM THE VICINITY OF THE BYRON GENERATING STATION, BYRON, ILLINOIS [INSPECTION REPORT NO. 05000454/2006-003] (RFTA NO. 06-001)**

Dear Mr. Snell:

The Oak Ridge Institute for Science and Education (ORISE) received 41 water samples in Batch Two on April 12, 2006 that were collected in the vicinity of the Byron Generating Station in Byron, Illinois. This water sample set was received at the same time as two water sample sets from the Braidwood facility. The laboratory has been instructed that samples from the Braidwood facility have higher priority and the samples from the Byron facility were analyzed after the Braidwood sample sets. The samples were analyzed for tritium using a liquid scintillation analyzer (Procedures AP2, Revision 15 and CP4, Revision 3). The chain of custody identified six 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  
BYRON GENERATING STATION  
BYRON, ILLINOIS**

<b>ORISE Sample ID</b>	<b>NRC Region III Sample ID</b>	<b>Collection Date</b>	<b>Collection Time</b>
1689W0022	BY-06-2-01	2/3/2006	9:40 AM
1689W0023	BY-06-2-02	2/3/2006	9:30 AM
1689W0024	BY-06-2-03	2/3/2006	9:52 AM
1689W0025	BY-06-2-04	2/3/2006	10:05 AM
1689W0026	BY-06-2-05	2/3/2006	8:50 AM
1689W0027	BY-06-2-06	2/3/2006	9:10 AM
1689W0028	BY-06-2-07	2/16/2006	na <sup>a</sup>
1689W0029	BY-06-2-08	2/16/2006	na
1689W0030	BY-06-2-09	2/28/2006	na
1689W0031	BY-06-2-10	2/28/2006	na
1689W0032	BY-06-2-11	2/28/2006	na
1689W0033	BY-06-2-12	2/28/2006	na
1689W0034	BY-06-2-13	2/28/2006	na
1689W0035	BY-06-2-14	2/28/2006	na
1689W0036	BY-06-2-15	2/28/2006	na
1689W0037	BY-06-2-16	2/28/2006	na
1689W0038	BY-06-2-17	2/28/2006	na
1689W0039	BY-06-2-18	2/28/2006	na
1689W0040	BY-06-2-19	3/8/2006	na
1689W0041	BY-06-2-20	3/8/2006	na
1689W0042	BY-06-2-21	3/8/2006	na
1689W0043	BY-06-2-22	3/7/2006	na
1689W0044	BY-06-2-23	3/23/2006	na
1689W0045	BY-06-2-24	3/24/2006	na
1689W0046	BY-06-2-25	3/24/2006	na
1689W0047	BY-06-2-26	3/24/2006	na

**TABLE 1 (cont.)**

**SAMPLE IDENTIFICATIONS  
AND COLLECTION DATA  
BYRON GENERATING STATION  
BYRON, ILLINOIS**

<b>ORISE Sample ID</b>	<b>NRC Region III Sample ID</b>	<b>Collection Date</b>	<b>Collection Time</b>
1689W0048	BY-06-2-27	3/24/2006	na
1689W0049	BY-06-2-28	3/24/2006	na
1689W0050	BY-06-2-29	3/24/2006	na
1689W0051	BY-06-2-30	3/23/2006	na
1689W0052	BY-06-2-31	3/23/2006	na
1689W0053	BY-06-2-32	3/29/2006	na
1689W0054	BY-06-2-33	3/29/2006	na
1689W0055	BY-06-2-34	3/27/2006	na
1689W0056	BY-06-2-35	3/29/2006	na
1689W0057	BY-06-2-36	3/29/2006	na
1689W0058	BY-06-2-37	3/28/2006	na
1689W0059	BY-06-2-38	3/29/2006	na
1689W0060	BY-06-2-39	3/29/2006	na
1689W0061	BY-06-2-40	3/29/2006	na
1689W0062	BY-06-2-41	3/29/2006	na

\*No data provided.

**TABLE 2**

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

ORISE Sample ID	NRC Region III Sample ID	Radionuclide Concentrations <sup>a</sup> (pCi/L)			
		Co-58	Co-60	Cs-134	Cs-137
1689W0026	BY-06-2-05	-2.3 ± 3.9 <sup>b</sup>	1.7 ± 2.3	3.0 ± 2.2	8.0 ± 4.9
1689W0037	BY-06-2-16	2.6 ± 4.7	2.1 ± 3.9	1.5 ± 3.5	1.2 ± 3.1
1689W0044	BY-06-2-23	3.1 ± 4.3	0.1 ± 3.3	0.5 ± 3.3	3.3 ± 3.0
1689W0049	BY-06-2-28	1.4 ± 3.5	2.5 ± 3.1	-0.8 ± 3.2	7.4 ± 3.6
1689W0054	BY-06-2-33	-1.3 ± 3.1	1.7 ± 3.0	-0.8 ± 3.0	-0.8 ± 5.6
1689W0059	BY-06-2-38	-1.6 ± 3.4	-2.4 ± 3.2	2.7 ± 3.3	3.2 ± 4.0

<sup>a</sup>The range of MDCs for the selected radionuclides is 3.3 pCi/L to 8.1 pCi/L.

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

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

ORISE Sample ID	NRC Region III Sample ID	Tritium Concentrations, TPU's, and MDCs <sup>a</sup> (pCi/L)
1689W0022	BY-06-2-01	40,900 ± 1,500 <sup>b</sup> (400)
1689W0023	BY-06-2-02	36,200 ± 1,300 (400)
1689W0024	BY-06-2-03	81,500 ± 2,500 (400)
1689W0025	BY-06-2-04	1,650 ± 310 (400)
1689W0026	BY-06-2-05	29,400 ± 1,200 (400)
1689W0027	BY-06-2-06	30 ± 230 (400)
1689W0028	BY-06-2-07	-50 ± 110 (200)
1689W0029	BY-06-2-08	-100 ± 110 (200)
1689W0030	BY-06-2-09	-150 ± 110 (200)
1689W0031	BY-06-2-10	-50 ± 110 (200)
1689W0032	BY-06-2-11	-170 ± 110 (200)
1689W0033	BY-06-2-12	-90 ± 110 (200)
1689W0034	BY-06-2-13	-160 ± 110 (200)
1689W0035	BY-06-2-14	-110 ± 110 (200)
1689W0036	BY-06-2-15	-30 ± 110 (200)
1689W0037	BY-06-2-16	-200 ± 110 (200)
1689W0038	BY-06-2-17	-170 ± 110 (200)
1689W0039	BY-06-2-18	-160 ± 110 (200)
1689W0040	BY-06-2-19	-40 ± 220 (400)
1689W0041	BY-06-2-20	-110 ± 220 (400)
1689W0042	BY-06-2-21	-20 ± 230 (400)
1689W0043	BY-06-2-22	-30 ± 230 (400)
1689W0044	BY-06-2-23	-150 ± 220 (400)
1689W0045	BY-06-2-24	-170 ± 220 (400)
1689W0046	BY-06-2-25	170 ± 240 (400)
1689W0047	BY-06-2-26	-10 ± 230 (400)
1689W0048	BY-06-2-27	-70 ± 220 (400)
1689W0049	BY-06-2-28	-110 ± 220 (400)
1689W0050	BY-06-2-29	-170 ± 220 (400)
1689W0051	BY-06-2-30	-40 ± 220 (400)
1689W0052	BY-06-2-31	30 ± 230 (400)
1689W0053	BY-06-2-32	-220 ± 240 (440)

TABLE 3 (cont.)

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

ORISE Sample ID	NRC Region III Sample ID	Tritium Concentrations, TPUs, and MDCs <sup>a</sup> (pCi/L)			
1689W0054	BY-06-2-33	300	±	270	(440)
1689W0055	BY-06-2-34	50	±	250	(440)
1689W0056	BY-06-2-35	-20	±	250	(440)
1689W0057	BY-06-2-36	-230	±	240	(440)
1689W0058	BY-06-2-37	3,270	±	400	(440)
1689W0059	BY-06-2-38	-180	±	240	(440)
1689W0060	BY-06-2-39	-190	±	240	(440)
1689W0061	BY-06-2-40	-130	±	240	(440)
1689W0062	BY-06-2-41	3,350	±	400	(440)

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

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