

**ORISE**  
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

June 30, 2006

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

**SUBJECT: INTERIM REPORT OF ANALYTICAL RESULTS FOR EIGHTEEN  
WATER SAMPLES, BATCH TWO, FROM THE VICINITY OF THE ZION  
GENERATING STATION, ZION, ILLINOIS  
[INSPECTION REPORT NO. 050-00295/2006-001] (RFTA NO. 06-001)**

Dear Mr. Snell:

The Oak Ridge Institute for Science and Education (ORISE) received Batch Two, consisting of 18 water samples, on June 23, 2006. These samples were collected in the vicinity of the Zion Generating Station in Zion, Illinois. The 18 water samples were analyzed for tritium to an average minimum detection concentration of 180 pCi/L using a liquid scintillation analyzer. The chain of custody identified three water samples to be analyzed by gamma spectroscopy (GS). One water sample was identified to be analyzed for total radiostrontium, iron-55, nickel-63, americium-241, and plutonium alpha isotopic analysis. 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. The pertinent procedure references are provided in the specific tables.

ORISE's Quality Control (QC) requirements were met for these analyses. The QC files are available for your review upon request. As more analytical data becomes available, additional interim letter reports or a final report will be issued as requested analyses are completed.

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

Sincerely,

*Dale Condra*

Dale Condra, Manager  
Laboratory

RDC:WPI:ar

Enclosure

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TABLE 1

SAMPLE IDENTIFICATIONS  
AND COLLECTION DATA  
ZION GENERATING STATION  
ZION, ILLINOIS

ORISE Sample ID	NRC Region III Sample ID	Collection Time	Collection Date
1701W0007	Z-06-2-01	5/26/2006	11:02 AM
1701W0008	Z-06-2-02	5/26/2006	1:40 PM
1701W0009	Z-06-2-03	5/26/2006	9:53 AM
1701W0010	Z-06-2-04	5/26/2006	12:30 PM
1701W0011	Z-06-2-05	5/25/2006	10:58 AM
1701W0012	Z-06-2-06	5/25/2006	2:22 PM
1701W0013	Z-06-2-07	5/24/2006	12:55 PM
1701W0014	Z-06-2-08	5/24/2006	2:00 PM
1701W0015	Z-06-2-09	5/26/2006	4:00 PM
1701W0016	Z-06-2-10	5/26/2006	1:15 PM
1701W0017	Z-06-2-11	5/26/2006	8:45 AM
1701W0018	Z-06-2-12	5/25/2006	11:23 AM
1701W0019	Z-06-2-13	5/24/2006	2:35 PM
1701W0020	Z-06-2-14	5/25/2006	9:15 AM
1701W0021	Z-06-2-15	5/24/2006	11:35 AM
1701W0022	Z-06-2-16	5/24/2006	10:14 AM
1701W0023	Z-06-2-17	5/26/2006	2:48 PM
1701W0024	Z-06-2-18	5/26/2006	11:00 AM

TABLE 2

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

ORISE Sample ID	NRC Region III Sample ID	Radionuclide Concentrations <sup>a</sup> (pCi/L)			
		Co-58	Co-60	Cs-134	Cs-137
1701W0008	Z-06-2-02	1.4 ± 3.5 <sup>b</sup>	4.6 ± 2.8	3.0 ± 2.9	4.5 ± 7.1
1701W0016	Z-06-2-10	-1.5 ± 5.5	1.4 ± 4.3	1.4 ± 4.7	-1.4 ± 4.0
1701W0024	Z-06-2-18	-0.9 ± 3.7	1.6 ± 3.2	1.5 ± 3.2	0.6 ± 2.9

<sup>a</sup>The range of MDCs for the selected radionuclides is 4.4 pCi/L to 9.3 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  
ZION GENERATING STATION  
ZION, ILLINOIS

ORISE Sample ID	NRC Region III Sample ID	Tritium Concentrations, TPUs, and MDCs <sup>a</sup> (pCi/L)			
1701W0007	Z-06-2-01	240 <sup>b</sup>	±	110	(190)
1701W0008	Z-06-2-02	260	±	120	(190)
1701W0009	Z-06-2-03	40	±	110	(190)
1701W0010	Z-06-2-04	60	±	110	(190)
1701W0011	Z-06-2-05	130	±	110	(190)
1701W0012	Z-06-2-06	170	±	110	(190)
1701W0013	Z-06-2-07	100	±	110	(190)
1701W0014	Z-06-2-08	80	±	110	(190)
1701W0015	Z-06-2-09	70	±	110	(190)
1701W0016	Z-06-2-10	30	±	110	(190)
1701W0017	Z-06-2-11	20	±	110	(190)
1701W0018	Z-06-2-12	40	±	110	(190)
1701W0019	Z-06-2-13	-70	±	100	(190)
1701W0020	Z-06-2-14	60	±	110	(190)
1701W0021	Z-06-2-15	30	±	100	(180)
1701W0022	Z-06-2-16	80	±	110	(180)
1701W0023	Z-06-2-17	120	±	110	(180)
1701W0024	Z-06-2-18	60	±	100	(180)

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

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