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REGION I

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

May 4, 2007

MAY -7 PM 1: 22

Mr. Jim Kottan  
U.S. Nuclear Regulatory Commission  
Region I  
475 Allendale Road  
King of Prussia, PA 19406

**SUBJECT: INTERIM REPORT FOR COMPLETED ANALYSES FOR SAMPLES FROM SET TWENTY-THREE, FROM THE INDIAN POINT POWER STATION, BUCHANAN, NEW YORK [INSPECTION REPORT NO. 050-247/2006-007] [RFTA NO. 06-001]**

Dear Mr. Kottan:

The Oak Ridge Institute for Science and Education (ORISE) received set 23, consisting of four water samples, associated with the Indian Point Power Station on March 9, 2007. Sample analysis was initiated based on your previous direction for handling samples from this licensee. Sample identification and collection data for the samples addressed in this report are presented in Table 1. Gamma spectroscopy, the hard-to-detect betas (iron-55, nickel-63, and tritium), technetium-99, total radiostrontium, alpha spectroscopy, plutonium-241, and carbon-14 data are provided in Tables 2 through 8, respectively. The pertinent procedure references are provided in each specific table.

ORISE's Quality Control (QC) requirements were met for these analyses. The QC files are available for your review upon request. Additional reports will follow after the completion of the requested analyses.

ORISE has removed the Ni-59 data due to problems with the calculation associated with the concentration of this radionuclide. ORISE is discontinuing the reporting of Ni-59 data until this problem can be resolved.

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

RDC:WPI:bf

Enclosures

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**TABLE 1****SAMPLE IDENTIFICATIONS  
AND COLLECTION DATA  
INDIAN POINT POWER STATION  
BUCHANAN, NEW YORK**

<b>ORISE Sample ID</b>	<b>NRC Region I Sample ID</b>	<b>Collection Date</b>	<b>Collection Time</b>
1697W0138 <sup>a</sup>	U1-CSS-(002)	2/27/2007	11:24
1697M0087 <sup>b</sup>	U1-CSS-(002)	2/27/2007	11:24
1697W0139	LAF-001-(005)	3/7/2007	13:03
1697M0088	LAF-001-(005)	3/7/2007	13:03
1697W0140	LAF-002-(005)	3/7/2007	14:45
1697M0089	LAF-002-(005)	3/7/2007	14:45
1697W0141	LAF-003-(005)	3/7/2007	10:55
1697M0090	LAF-003-(005)	3/7/2007	10:55

<sup>a</sup>The W in the ORISE sample identification represents a water matrix.

<sup>b</sup>The M in the ORISE sample identification represents a 100mL filtered fraction of the preceding water sample.

**TABLE 2**

**CONCENTRATIONS OF SELECTED  
GAMMA EMITTING RADIONUCLIDES  
IN WATER SAMPLES  
BY GAMMA SPECTROSCOPY CP1, REVISION 15  
INDIAN POINT POWER STATION  
BUCHANAN, NEW YORK**

ORISE Sample ID	NRC Region I Sample ID	Radionuclide Concentrations <sup>a</sup> (pCi/L)			
		Co-58	Co-60	Cs-134	Cs-137
1697W0138	U1-CSS-(002)	-3.1 ± 2.7 <sup>b</sup>	0.5 ± 2.1	-0.6 ± 2.9	1.9 ± 5.2
1697W0139	LAF-001-(005)	2.2 ± 2.5	-0.4 ± 2.3	1.2 ± 2.6	-0.7 ± 2.1
1697W0140	LAF-002-(005)	-0.6 ± 1.9	1.1 ± 1.6	1.2 ± 1.8	-0.7 ± 1.5
1697W0141	LAF-003-(005)	-0.9 ± 2.8	2.0 ± 2.6	-0.3 ± 3.0	-1.3 ± 2.3

<sup>a</sup>The range of MDCs for the selected radionuclide is 2.6 pCi/L to 4.7 pCi/L.

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

TABLE 3

**CONCENTRATIONS OF HARD-TO-DETECT  
BETA EMITTING RADIONUCLIDES  
IN WATER SAMPLES  
BY LIQUID SCINTILLATION ANALYSIS CP4, REVISION 3  
INDIAN POINT POWER STATION  
BUCHANAN, NEW YORK**

ORISE Sample ID	NRC Region I Sample ID	Radionuclide Concentrations <sup>a</sup> (pCi/L)		
		Fe-55 <sup>b</sup>	Ni-63 <sup>c</sup>	H-3 <sup>d</sup>
1697W0138	U1-CSS-(002)	66 ± 48 <sup>e</sup> , 79	11.1 ± 3.2 , 5.0	4,960 ± 470 , 390
1697W0139	LAF-001-(005)	52 ± 48 , 79	1.8 ± 3.0 , 5.0	110 ± 230 , 390
1697W0140	LAF-002-(005)	37 ± 47 , 79	2.8 ± 3.0 , 5.0	290 ± 240 , 390
1697W0141	LAF-003-(005)	74 ± 48 , 79	1.0 ± 3.0 , 5.0	30 ± 220 , 390

<sup>a</sup>The MDCs for each radionuclide are after the comma.

<sup>b</sup>Fe-55 analyzed using procedure AP13, Revision 4.

<sup>c</sup>Ni-63 analyzed using procedure AP12, Revision 5.

<sup>d</sup>H-3 analyzed using procedure AP2, Revision 15.

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

<sup>f</sup>Zero value is due to rounding.

**TABLE 4**

**CONCENTRATIONS OF TECHNETIUM-99 (Tc-99)  
IN WATER SAMPLES  
BY LIQUID SCINTILLATION ANALYSIS  
AP5, REVISION 16; CP4, REVISION 3  
INDIAN POINT POWER STATION  
BUCHANAN, NEW YORK**

<b>ORISE Sample ID</b>	<b>NRC Region I Sample ID</b>	<b>Tc-99 Concentrations<sup>a</sup> (pCi/L)</b>
1697W0138	U1-CSS-(002)	8.6 ± 7.8 <sup>b</sup> , 13.0
1697W0139	LAF-001-(005)	8.8 ± 7.8 , 13.0
1697W0140	LAF-002-(005)	3.5 ± 7.7 , 13.0
1697W0141	LAF-003-(005)	3.5 ± 7.7 , 13.0

<sup>a</sup>The MDCs are after the comma.

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

**TABLE 5**

**CONCENTRATIONS OF TOTAL RADIOSTRONTIUM  
IN WATER SAMPLES  
BY LOW BACKGROUND BETA COUNTING  
AP4, REVISION 13; CP3, REVISION 2  
INDIAN POINT POWER STATION  
BUCHANAN, NEW YORK**

<b>ORISE Sample ID</b>	<b>NRC Region I Sample ID</b>	<b>Radionuclide Concentrations, TPUs, and MDCs<sup>a</sup> (pCi/L)</b>
1697W0138	U1-CSS-(002)	16.8 ± 1.2 <sup>b</sup> , 0.8
1697W0139	LAF-001-(005)	0.45 ± 0.43 , 0.72
1697W0140	LAF-002-(005)	0.69 ± 0.48 , 0.77
1697W0141	LAF-003-(005)	0.25 ± 0.45 , 0.77

<sup>a</sup>The MDCs are after the comma.

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

TABLE 6

**CONCENTRATIONS OF SELECTED  
ALPHA EMITTING RADIONUCLIDES  
IN SUSPENDED AND DISSOLVED FRACTIONS OF WATER SAMPLES  
AP11, REVISION 3; CP2, REVISION 12  
INDIAN POINT POWER STATION  
BUCHANAN, NEW YORK**

ORISE Sample ID	NRC Region I Sample ID	Radionuclide Concentrations <sup>a</sup> (pCi/g of sediment in 100 mL or pCi/L for water)			
		Am-241	Cm-242	Cm-243/244	Np-237
1697W0138 <sup>b</sup>	U1-CSS-(002)	0.11 ± 0.19 <sup>c</sup> , 0.34	0.07 ± 0.10 , 0.17	0.09 ± 0.18 , 0.32	-0.13 ± 0.15 , 0.36
1697M0087 <sup>d</sup>	U1-CSS-(002)	0.00 <sup>c</sup> ± 0.02 , 0.04	0.02 ± 0.02 , 0.02	-0.01 ± 0.02 , 0.04	0.00 ± 0.01 , 0.02
1697W0139	LAF-001-(005)	0.22 ± 0.17 , 0.24	0.02 ± 0.06 , 0.14	0.07 ± 0.07 , 0.06	0.05 ± 0.11 , 0.20
1697M0088	LAF-001-(005)	-0.01 ± 0.02 , 0.04	0.01 ± 0.02 , 0.03	-0.01 ± 0.01 , 0.03	0.01 ± 0.01 , 0.02
1697W0140	LAF-002-(005)	0.15 ± 0.19 , 0.31	0.04 ± 0.09 , 0.18	-0.26 ± 0.18 , 0.43	-0.02 ± 0.17 , 0.34
1697M0089	LAF-002-(005)	0.00 ± 0.02 , 0.04	0.01 ± 0.02 , 0.02	-0.01 ± 0.02 , 0.04	0.00 ± 0.01 , 0.02
1697W0141	LAF-003-(005)	0.25 ± 0.17 , 0.23	-0.02 ± 0.09 , 0.22	-0.11 ± 0.13 , 0.31	0.03 ± 0.06 , 0.12
1697M0090	LAF-003-(005)	0.00 ± 0.02 , 0.03	0.01 ± 0.02 , 0.02	0.00 ± 0.01 , 0.03	-0.01 ± 0.01 , 0.03

TABLE 6 (Continued)

**CONCENTRATIONS OF SELECTED  
ALPHA EMITTING RADIONUCLIDES  
IN SUSPENDED AND DISSOLVED FRACTIONS OF WATER SAMPLES  
AP11, REVISION 3; CP2, REVISION 12  
INDIAN POINT POWER STATION  
BUCHANAN, NEW YORK**

ORISE Sample ID	NRC Region I Sample ID	Radionuclide Concentrations <sup>a</sup> (pCi/g of sediment in 100 mL or pCi/L for water)			
		Pu-238	Pu-239/240	U-234	U-238
1697W0138	U1-CSS-(002)	0.17 ± 0.15 , 0.20	0.08 ± 0.10 , 0.16	1.50 ± 0.34 , 0.05	1.25 ± 0.31 , 0.16
1697M0087	U1-CSS-(002)	0.00 ± 0.02 , 0.04	0.00 ± 0.01 , 0.01	0.01 ± 0.01 , 0.02	0.00 ± 0.01 , 0.02
1697W0139	LAF-001-(005)	0.13 ± 0.16 , 0.27	0.09 ± 0.08 , 0.05	4.00 ± 0.60 , 0.13	3.68 ± 0.57 , 0.05
1697M0088	LAF-001-(005)	0.03 ± 0.02 , 0.03	0.01 ± 0.01 , 0.01	0.00 ± 0.01 , 0.02	0.00 ± 0.01 , 0.02
1697W0140	LAF-002-(005)	0.12 ± 0.14 , 0.24	0.08 ± 0.11 , 0.18	26.5 ± 2.4 , 0.1	16.5 ± 1.6 , 0.1
1697M0089	LAF-002-(005)	0.03 ± 0.02 , 0.03	0.02 ± 0.01 , 0.01	0.03 ± 0.02 , 0.01	0.02 ± 0.01 , 0.01
1697W0141	LAF-003-(005)	0.06 ± 0.10 , 0.18	0.02 ± 0.06 , 0.12	-0.02 ± 0.12 , 0.26	0.02 ± 0.08 , 0.17
1697M0090	LAF-003-(005)	0.01 ± 0.02 , 0.03	0.00 ± 0.01 , 0.02	0.01 ± 0.01 , 0.01	0.01 ± 0.01 , 0.01

<sup>a</sup>The MDCs are after the comma.

<sup>b</sup>The W in the ORISE sample identification represents a water matrix.

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

<sup>d</sup>The M in the ORISE sample identification represents a 100 mL filtered fraction of the preceding water sample.

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



TABLE 7

**CONCENTRATIONS OF PLUTONIUM-241  
IN SUSPENDED AND DISSOLVED FRACTIONS OF WATER SAMPLES  
BY LIQUID SCINTILLATION ANALYSIS  
AP10, REVISION 2; CP4, REVISION 3  
INDIAN POINT POWER STATION  
BUCHANAN, NEW YORK**

ORISE Sample ID	NRC Region I Sample ID	Radionuclide Concentrations <sup>a</sup> (pCi/g of sediment in 100 mL or pCi/L for water)
1697W0138 <sup>b</sup>	U1-CSS-(002)	-10 ± 29 <sup>c</sup> , 49
1697M0087 <sup>d</sup>	U1-CSS-(002)	-1.2 ± 2.9 , 5.1
1697W0139	LAF-001-(005)	6 ± 28 , 47
1697M0088	LAF-001-(005)	-1.4 ± 2.8 , 4.9
1697W0140	LAF-002-(005)	-4 ± 29 , 51
1697M0089	LAF-002-(005)	-0.5 ± 2.9 , 4.9
1697W0141	LAF-003-(005)	-9 ± 28 , 49
1697M0090	LAF-003-(005)	0.9 ± 3.0 , 5.0

<sup>a</sup>The MDCs are after the comma.

<sup>b</sup>The W in the ORISE sample identification represents a water matrix.

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

<sup>d</sup>The M in the ORISE sample identification represents a 100mL filtered fraction of the preceding water sample.

TABLE 8

CONCENTRATIONS OF CARBON-14  
 IN WATER SAMPLES  
 BY LIQUID SCINTILLATION ANALYSIS  
 AP9, REVISION 3; CP4, REVISION 3  
 INDIAN POINT POWER STATION  
 BUCHANAN, NEW YORK

ORISE Sample ID	NRC Region I Sample ID	Radionuclide Concentrations, TPUs, and MDCs <sup>a</sup> (pCi/L)			
1697W0138	U1-CSS-(002)	0.7	±	9.1 <sup>b</sup>	, 15.5
1697W0139	LAF-001-(005)	1.3	±	9.1	, 15.5
1697W0140	LAF-002-(005)	3.7	±	9.2	, 15.5
1697W0141	LAF-003-(005)	5.6	±	9.2	, 15.5

<sup>a</sup>The MDCs are after the comma.

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