

January 27, 2004

Mr. James Shepherd
U.S. Nuclear Regulatory Commission
NMSS/DWM/DCB
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**SUBJECT: ANALYTICAL RESULTS FOR WATER SAMPLES COLLECTED
DECEMBER 2, 2003 AT BIG ROCK POINT NUCLEAR PLANT,
CHARLEVOIX, MICHIGAN (INSPECTION REPORT NUMBER
050-00155/2003-07) [RFTA 04-001]**

Dear Mr. Shepherd:

The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) received six water samples on December 3, 2003 that were collected on December 2, 2003 at the Big Rock Point Nuclear Plant in Charlevoix, Michigan. The following analyses were performed on the samples per the sampling plan received by e-mail on November 18, 2003:

1. Gamma spectrometry (Procedure CP1, Revision 13)
2. Gross alpha and gross beta (Procedure AP1, Revision 14; Procedure CP3, Revision 2)
3. H-3 (Procedure AP2, Revision 14; Procedure CP4, Revision 2)
4. C-14 (Non-routine Procedure AP9, Revision 2; Procedure CP4, Revision 2)
5. Sr-90 as Total Radiostrontium by low background beta counting (Procedure AP4, Revision 11; Procedure CP3, Revision 2)
6. Pu-241 (Non-routine Procedure AP10, Revision 2; Procedure CP4, Revision 3)
7. Ni-63 (Non-routine Procedure AP12, Revision 3; Procedure CP4, Revision 3)
8. Fe-55 (Non-routine Procedure AP13, Revision 3; Procedure CP4, Revision 3)
9. Alpha isotopic (Procedure AP11, Revision 2; Procedure CP2, Revision 11)

The data for these analyses are presented in Tables 1 through 7, respectively.

Ni-59 was one of the requested radionuclides. ESSAP does not have the capability to analyze samples for Ni-59 due to the extremely low energies of the x-rays associated with this radionuclide. This fact should have been pointed out before beginning the analytical work and we apologize for this oversight.

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

Please contact me at (865) 241-3242 or Wade Ivey at (865) 576-9184 with any questions or comments.

Sincerely,



Dale Condra
Laboratory Manager
Environmental Survey and
Site Assessment Program

RDC:WPI:ar

Enclosure

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Distribution approval and concurrence:	Initials	Date
Technical Management Team Member	TQV	1/27/2004
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ORISE TABLE 1

CONCENTRATIONS OF SELECTED GAMMA EMITTING RADIONUCLIDES
IN WATER SAMPLES
BY GAMMA SPECTROMETRY CP1, REVISION 13
BIG ROCK POINT NUCLEAR PLANT
CHARLEVOIX, MICHIGAN

ESSAP Sample ID	NRC Region III Sample ID	Radionuclide Concentrations ^a (pCi/L)				
		Mn-54	Co-60	Zn-65	Ag-110m	I-129
895W001	MW-9	0.1 ± 1.6 ^b	0.1 ± 1.8	3.5 ± 4.2	0.9 ± 1.5	23 ± 24
895W002	PZ-3MB	0.3 ± 2.1	2.7 ± 2.3	0.7 ± 5.1	-3.0 ± 2.1	2 ± 25
895W003	PZ-5S	0.8 ± 2.0	-0.9 ± 2.1	-2.7 ± 4.7	0.4 ± 1.9	-11 ± 18
895W004	PZ-3D	0.3 ± 2.0	0.6 ± 2.2	1.8 ± 4.4	0.3 ± 2.0	12 ± 24
895W005	PZ-3MA	0.4 ± 2.0	0.9 ± 2.0	-2.0 ± 4.7	-0.2 ± 1.9	14 ± 18
895W006	MW-6	0.0 ^c ± 1.6	-0.7 ± 1.7	-6.4 ± 3.7	1.2 ± 1.5	-3 ± 24
ESSAP Sample ID	NRC Region III Sample ID	Radionuclide Concentrations ^a (pCi/L)				
		Cs-134	Cs-137	Eu-152	Eu-154	Eu-155
895W001	MW-9	0.2 ± 1.8	-0.7 ± 1.7	-1.6 ± 4.4	-3.8 ± 7.6	1.1 ± 3.6
895W002	PZ-3MB	-1.5 ± 2.5	-3.9 ± 4.2	-2.9 ± 5.5	-8 ± 10	-0.9 ± 4.9
895W003	PZ-5S	1.9 ± 2.2	0.5 ± 2.2	-3.0 ± 4.9	-5.8 ± 9.6	3.0 ± 4.8
895W004	PZ-3D	0.4 ± 2.2	0.0 ± 4.4	1.9 ± 5.5	-10.7 ± 9.7	0.1 ± 4.6
895W005	PZ-3MA	-0.9 ± 2.4	-0.8 ± 2.1	-2.0 ± 5.0	8.5 ± 9.3	-3.4 ± 4.6
895W006	MW-6	1.2 ± 1.9	-1.3 ± 1.7	2.2 ± 4.3	-6.0 ± 7.9	-1.7 ± 3.5

^aThe average MDCs for a sixteen hour count of water in a 1.0 L Marinelli range from a low of 3.0 pCi/L for Ag-110m to a high of 37 pCi/L for I-129.

^bUncertainties represent the 95% confidence level, based on total propagated uncertainties.

^cZero values are due to rounding.

ORISE TABLE 2

**CONCENTRATIONS OF GROSS ALPHA AND BETA
IN WATER SAMPLES
BY LOW BACKGROUND ALPHA AND BETA COUNTING
AP1, REVISION 14; CP3 REVISION 2
BIG ROCK POINT NUCLEAR PLANT
CHARLEVOIX, MICHIGAN**

ESSAP ID	NRC Region III Sample ID	Concentrations (pCi/L)	
		Gross Alpha ^a	Gross Beta ^b
895W001	MW-9	0.5 ± 1.8^c	8.6 ± 2.8
895W002	PZ-3MB	2.4 ± 3.6	13.1 ± 3.1
895W003	PZ-5S	3.4 ± 4.3	17.1 ± 5.6
895W004	PZ-3D	3.8 ± 2.6	9.3 ± 2.9
895W005	PZ-3MA	3.3 ± 2.8	6.5 ± 2.7
895W006	MW-6	4 ± 20	39 ± 26

^aThe average MDC for gross alpha for a 200 minute count using sample quantities ranging from 0.01 L to 0.1 L is 10 pCi/L.

^bThe average MDC for gross beta for a 200 minute count using sample quantities ranging from 0.01 L to 0.1 L is 11 pCi/L.

^cUncertainties represent the 95% confidence level, based on total propagated uncertainties.

ORISE TABLE 3

**CONCENTRATIONS OF AMERCIUM-241 and CURIUM 243/244
IN WATER SAMPLES
BY ALPHA SPECTROSCOPY
AP11, REVISION 2; CP2 REVISION 11
BIG ROCK POINT NUCLEAR PLANT
CHARLEVOIX, MICHIGAN**

ESSAP Sample ID	NRC Region III Sample ID	Radionuclide Concentrations (pCi/L)	
		Am-241 ^a	Cm-243/244 ^b
895W001	MW-9	-0.06 ± 0.21 ^c	0.04 ± 0.22
895W002	PZ-3MB	-0.02 ± 0.23	-0.26 ± 0.23
895W003	PZ-5S	0.32 ± 0.32	-0.11 ± 0.23
895W004	PZ-3D	0.15 ± 0.17	0.04 ± 0.16
895W005	PZ-3MA	0.15 ± 0.21	-0.13 ± 0.18
895W006	MW-6	0.14 ± 0.21	-0.11 ± 0.21

^aThe average MDC for a sixteen hour count of a 0.1 L sample for Am-241 is 0.40 pCi/L.

^bThe average MDC for a sixteen hour count of a 0.1 L sample for Cm-243/244 is 0.42 pCi/L.

^cUncertainties represent the 95% confidence level, based on total propagated uncertainties.

ORISE TABLE 4

**CONCENTRATIONS OF PLUTONIUM RADIONUCLIDES
IN WATER SAMPLES
BY ALPHA SPECTROSCOPY AP11, REVISION 2; CP2, REVISION 11 AND
LIQUID SCINTILLATION ANALYSIS NON-ROUTINE AP10, REVISION 2; CP4, REVISION 3
BIG ROCK POINT NUCLEAR PLANT
CHARLEVOIX, MICHIGAN**

ESSAP Sample ID	NRC Region III Sample ID	Radionuclide Concentrations (pCi/L)		
		Pu-238 ^a	Pu-239/240 ^a	Pu-241 ^b
895W001	MW-9	0.04 ± 0.15 ^c	0.06 ± 0.09	7 ± 20
895W002	PZ-3MB	0.00 ^d ± 0.17	0.07 ± 0.10	5 ± 18
895W003	PZ-5S	-0.18 ± 0.14	0.02 ± 0.09	-1 ± 19
895W004	PZ-3D	-0.08 ± 0.14	0.06 ± 0.07	-2 ± 18
895W005	PZ-3MA	-0.23 ± 0.15	0.02 ± 0.07	11 ± 19
895W006	MW-6	-0.02 ± 0.15	-0.06 ± 0.09	1 ± 17

^aThe average MDC for Pu-238 and Pu-239/240 for a sixteen hour count using a 0.1 L sample is 0.25 pCi/L.

^bThe average MDC for Pu-241 for a one hour count using a 0.1 L sample is 31 pCi/L.

^cUncertainties represent the 95% confidence level, based on total propagated uncertainties.

^dZero values are due to rounding.

ORISE TABLE 5

CONCENTRATIONS OF TRITIUM AND CARBON-14
IN WATER SAMPLES
BY LIQUID SCINTILLATION ANALYSIS
AP2, REVISION 14; NON-ROUTINE AP9, REVISION 2; CP4, REVISION 3
BIG ROCK POINT NUCLEAR PLANT
CHARLEVOIX, MICHIGAN

ESSAP Sample ID	NRC Region III Sample ID	Tritium Concentrations ^a (pCi/L)	C-14 Concentrations ^b (pCi/L)
895W001	MW-9	190 ± 230 ^c	13 ± 22
895W002	PZ-3MB	290 ± 230	37 ± 22
895W003	PZ-5S	310 ± 240	41 ± 22
895W004	PZ-3D	770 ± 250	15 ± 22
895W005	PZ-3MA	2900 ± 310	28 ± 22
895W006	MW-6	2050 ± 290	32 ± 22

^aThe average MDC for a one hour count of a 0.01 L sample for tritium is 390 pCi/L.

^bThe average MDC for a six hour count of a 0.05 L sample for C-14 is 37 pCi/L.

^cUncertainties represent the 95% confidence level, based on total propagated uncertainties.

ORISE TABLE 6

CONCENTRATIONS OF IRON-55 AND NICKEL-63
IN WATER SAMPLES
BY LIQUID SCINTILLATION ANALYSIS
NON-ROUTINE AP12, REVISION 3; NON-ROUTINE AP13, REVISION 3; CP4, REVISION 3
BIG ROCK POINT NUCLEAR PLANT
CHARLEVOIX, MICHIGAN

ESSAP Sample ID	NRC Region III Sample ID	Fe-55 Concentrations ^a (pCi/L)	Ni-63 Concentrations ^b (pCi/L)
895W001	MW-9	52 ± 28 ^c	24 ± 13
895W002	PZ-3MB	46 ± 27	23 ± 13
895W003	PZ-5S	31 ± 26	20 ± 13
895W004	PZ-3D	25 ± 26	21 ± 13
895W005	PZ-3MA	41 ± 27	-14 ± 12
895W006	MW-6	35 ± 26	11 ± 13

^aThe average MDC for a one hour count of a 0.1 L sample for Fe-55 is 42 pCi/L.

^bThe average MDC for a one hour count of a 0.1 L sample for Ni-63 is 21 pCi/L.

^cUncertainties represent the 95% confidence level, based on total propagated uncertainties.

ORISE TABLE 7

**CONCENTRATIONS OF STRONTIUM-90 AS TOTAL STRONTIUM
IN WATER SAMPLES
BY LOW BACKGROUND BETA COUNTING
AP4, REVISION 12; CP3, REVISION 2
BIG ROCK POINT NUCLEAR PLANT
CHARLEVOIX, MICHIGAN**

ESSAP Sample ID	NRC Region III Sample ID	Sr-90 Concentrations^a (pCi/L)
895W001	MW-9	0.9 ± 1.7^b
895W002	PZ-3MB	1.5 ± 1.7
895W003	PZ-5S	$0.0^c \pm 1.7$
895W004	PZ-3D	0.2 ± 1.4
895W005	PZ-3MA	1.1 ± 2.2
895W006	MW-6	0.5 ± 1.7

^aThe average MDC for a one hour count of a 0.25 L sample for Sr-90 is 2.9 pCi/L.

^bUncertainties represent the 95% confidence level, based on total propagated uncertainties.

^cZero values are due to rounding.