

February 15, 2007

actual date was 2008 SWS

Mr. Duane Schmidt
 U.S. Nuclear Regulatory Commission
 FSME/DWMEP/DURLD
 TWFN 8 F5
 Rockville, Maryland 20852

SUBJECT: REPORT FOR ANALYSES OF SOIL SAMPLES, BATCH TWO FROM NUCLEAR FUEL SERVICES, ERWIN, TENNESSEE [INSPECTION REPORT NUMBER 70/143-2007-006] [RFTA NO. 07-001] DCN: 0478-LR-03-0

Dear Mr. Schmidt:

The Oak Ridge Institute for Science and Education (ORISE) received 14 soil samples from Nuclear Fuel Services on four separate dates. Four samples for technetium-99 (Tc-99) analysis were received on October 31, 2007. One sample for Tc-99 analysis was received on November 9, 2007. Eight samples were received on January 16, 2008. One additional sample was received on January 25, 2008. The gamma and alpha spectroscopy analyses were performed based on a PDF of the 303 forms submitted by Jennifer Foster on December 5, 2007. Sample identification and collection data for the samples addressed in this report are presented in Table 1. Gamma spectroscopy data for ORISE sample numbers are provide in Table 2. The alpha spectroscopy data are provided in Tables 3. The Pu-241 data are presented in Table 4. The technetium-99 data are provided in Table 5. 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.

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:km

Enclosures

- | | | |
|----|-----------------------------------|---------------------|
| c: | T. Carter, NRC/FSME/DWMEP T-8F5 | E. Abelquist, ORISE |
| | E. Knox-Davin, NRC/FSME/TWFN 8A23 | S. Roberts, ORISE |
| | J. Foster, NRC Region II | File 0478 |

Distribution approval and concurrence	Initials
Technical Management Team Member	<i>STR</i>
Quality Manager	<i>ADP</i>

TABLE 1

SAMPLE IDENTIFICATIONS
AND COLLECTION DATA
NUCLEAR FUEL SERVICES
ERWIN, TENNESSEE

ORISE Sample ID	NRC Region II Sample ID	Collection Date	Collection Time
0478S0017	0725-AX-XE	10/26/2007	9:19
0478S0018	0732-BX-XE	10/25/2007	15:44
0478S0019	0744-BX-XE	10/25/2007	14:22
0478S0020	0746-DX-XE	10/25/2007	11:36
0478S0021	0324-CX-XE	11/7/2007	10:04
0478S0022	0719-BX-XA	10/23/2007	10:16
0478S0023	0723-CX-XA	10/23/2007	16:24
0478S0024	0725-AX-XA	10/26/2007	9:19
0478S0025	0732-BX-XA	10/25/2007	15:44
0478S0026	0733-CX-XA	10/26/2007	12:54
0478S0027	0744-BX-XA	10/25/2007	14:22
0478S0028	0746-DX-XA	10/25/2007	11:36
0478S0029	0300-DX-XA	11/7/2007	9:22
0478S0030	0324-CX-XA	11/7/2007	10:04

TABLE 2

**CONCENTRATIONS OF SELECTED
GAMMA EMITTING RADIONUCLIDES
IN SOIL SAMPLES
BY GAMMA SPECTROSCOPY CPI, REVISION 15
NUCLEAR FUEL SERVICES
ERWIN, TENNESSEE**

ORISE Sample ID	NRC Region II Sample ID	Radionuclide Concentrations ^a (pCi/g)						
		Am-241	Th-228 by Pb-212	Th-232 by Ac-228	Total Th ^b	U-238 by Th-234	U-235	Total U ^c
0478S0022	0719-BX-XA	0.03 ± 0.03 ^d , 0.05	1.09 ± 0.07, 0.03	1.26 ± 0.17, 0.09	2.35 ± 0.18	0.58 ± 0.34, 0.47	0.00 ^e ± 0.08, 0.13	0.6 ± 1.8
0478S0023	0723-CX-XA	0.08 ± 0.08, 0.12	2.39 ± 0.15, 0.06	2.24 ± 0.28, 0.13	4.63 ± 0.32	15.1 ± 1.4, 1.1	4.10 ± 0.34, 0.28	108.2 ± 7.5
0478S0024	0725-AX-XA	0.02 ± 0.05, 0.08	2.23 ± 0.14, 0.05	2.31 ± 0.27, 0.12	4.54 ± 0.30	2.88 ± 0.97, 0.75	0.14 ± 0.15, 0.20	6.1 ± 3.4
0478S0025	0732-BX-XA	0.02 ± 0.05, 0.07	1.02 ± 0.09, 0.05	1.08 ± 0.20, 0.14	2.10 ± 0.22	1.40 ± 0.65, 0.69	0.21 ± 0.18, 0.19	6.2 ± 4.0
0478S0026	0733-CX-XA	0.07 ± 0.05, 0.08	1.46 ± 0.10, 0.05	1.52 ± 0.22, 0.13	2.98 ± 0.24	0.70 ± 0.53, 0.69	0.13 ± 0.14, 0.18	3.7 ± 3.1
0478S0027	0744-BX-XA	0.01 ± 0.04, 0.06	1.68 ± 0.11, 0.04	1.63 ± 0.20, 0.10	3.31 ± 0.23	4.82 ± 0.69, 0.56	1.17 ± 0.16, 0.15	31.4 ± 3.5
0478S0028	0746-DX-XA	0.01 ± 0.07, 0.08	1.68 ± 0.12, 0.05	1.72 ± 0.23, 0.13	3.40 ± 0.26	1.13 ± 0.72, 0.73	0.24 ± 0.16, 0.19	6.6 ± 3.5
0478S0029	0300-DX-XA	0.03 ± 0.04, 0.06	1.09 ± 0.08, 0.04	1.14 ± 0.15, 0.10	2.23 ± 0.17	0.80 ± 0.49, 0.52	0.03 ± 0.09, 0.14	1.5 ± 2.0
0478S0030	0324-CX-XA	0.02 ± 0.04, 0.06	1.26 ± 0.08, 0.03	1.36 ± 0.16, 0.08	2.62 ± 0.18	7.38 ± 0.72, 0.54	0.53 ± 0.13, 0.14	19.4 ± 2.9

^aThe MDCs are after the comma.

^bTotal Th is the sum of the concentrations of Th-228 + Th-232.

^cThe equation for Total U is U-238 + U-235 + (21.7*U-235).

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

^eZero value is due to rounding.

TABLE 3

CONCENTRATIONS OF SELECTED
ALPHA EMITTING RADIONUCLIDES
IN SOIL SAMPLES
AP11, REVISION 4; CP2, REVISION 13
NUCLEAR FUEL SERVICES
ERWIN, TENNESSEE

ORISE Sample ID	NRC Region II Sample ID	Radionuclide Concentrations ^a (pCi/g dry weight)		
		Am-241	Pu-238	Pu-239/240
0478S0024	0725-AX-XA	0.01 ± 0.01 ^b , 0.02	0.002 ± 0.004 ^c , 0.005	0.02 ± 0.01, 0.01
0478S0025	0732-BX-XA	0.00 ^d ± 0.02, 0.06	0.01 ± 0.02, 0.04	0.01 ± 0.01, 0.02
0478S0027	0744-BX-XA	0.02 ± 0.02, 0.03	0.00 ± 0.01, 0.02	0.01 ± 0.01, 0.01
0478S0028	0746-DX-XA	0.01 ± 0.03, 0.06	-0.01 ± 0.02, 0.05	0.01 ± 0.01, 0.00
0478S0030	0324-CX-XA	0.02 ± 0.03, 0.06	-0.01 ± 0.02, 0.05	0.02 ± 0.01, 0.02

TABLE 3 (Continued)

CONCENTRATIONS OF SELECTED
ALPHA EMITTING RADIONUCLIDES
IN SOIL SAMPLES
AP11, REVISION 4; CP2, REVISION 13
NUCLEAR FUEL SERVICES
ERWIN, TENNESSEE

ORISE Sample ID	NRC Region II Sample ID	Radionuclide Concentrations ^a (pCi/g dry weight)		
		Th-228	Th-230	Th-232
0478S0024	0725-AX-XA	2.39 ± 0.17 , 0.05	1.73 ± 0.13 , 0.02	2.37 ± 0.17 , 0.02
0478S0025	0732-BX-XA	1.17 ± 0.10 , 0.05	2.03 ± 0.15 , 0.01	0.95 ± 0.09 , 0.02
0478S0027	0744-BX-XA	1.97 ± 0.15 , 0.05	1.16 ± 0.10 , 0.02	1.58 ± 0.13 , 0.02
0478S0028	0746-DX-XA	1.60 ± 0.12 , 0.04	0.96 ± 0.09 , 0.02	1.03 ± 0.09 , 0.00
0478S0030	0324-CX-XA	1.58 ± 0.13 , 0.04	0.88 ± 0.09 , 0.01	1.69 ± 0.14 , 0.01

TABLE 3 (Continued)

CONCENTRATIONS OF SELECTED
ALPHA EMITTING RADIONUCLIDES
IN SOIL SAMPLES
AP11, REVISION 4; CP2, REVISION 13
NUCLEAR FUEL SERVICES
ERWIN, TENNESSEE

ORISE Sample ID	NRC Region II Sample ID	Radionuclide Concentrations ^a (pCi/g dry weight)		
		U-233/234	U-235	U-238
0478S0024	0725-AX-XA	4.72 ± 0.27 , 0.02	0.22 ± 0.05 , 0.04	1.84 ± 0.14 , 0.02
0478S0025	0732-BX-XA	7.67 ± 0.39 , 0.02	0.23 ± 0.05 , 0.02	1.80 ± 0.13 , 0.01
0478S0027	0744-BX-XA	30.2 ± 2.6 , 0.1	1.27 ± 0.25 , 0.03	5.18 ± 0.59 , 0.02
0478S0028	0746-DX-XA	2.25 ± 0.15 , 0.03	0.09 ± 0.03 , 0.03	0.93 ± 0.09 , 0.04
0478S0030	0324-CX-XA	13.98 ± 0.73 , 0.02	0.59 ± 0.09 , 0.01	10.58 ± 0.57 , 0.04

^aThe MDCs are after the comma.

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

^cSignificant figures were expanded to avoid reporting a TPU of zero at the request of the inspector.

^dZero values are due to rounding.

TABLE 4
CONCENTRATIONS OF PLUTONIUM-241
IN SOIL SAMPLES
BY LIQUID SCINTILLATION ANALYSIS
AP10, REVISION 3; CP4, REVISION 3
NUCLEAR FUEL SERVICES
ERWIN, TENNESSEE

ORISE Sample ID	NRC Region II Sample ID	Radionuclide Concentrations, TPUs, and MDCs ^a (pCi/g)	
0478S0024	0725-AX-XA	-2.2 ± 3.3 ^b	, 5.8
0478S0025	0732-BX-XA	0.4 ± 3.0	, 5.1
0478S0027	0744-BX-XA	-0.2 ± 3.7	, 6.3
0478S0028	0746-DX-XA	0.4 ± 3.0	, 5.1
0478S0030	0324-CX-XA	1.5 ± 3.0	, 5.1

^aThe MDCs are after the comma.

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

TABLE 5

CONCENTRATIONS OF TECHNETIUM-99
 IN SOIL SAMPLES
 BY LIQUID SCINTILLATION ANALYSIS
 AP5, REVISION 17; CP4, REVISION 3
 NUCLEAR FUEL SERVICES
 ERWIN, TENNESSEE

ORISE Sample ID	NRC Region II Sample ID	Radionuclide Concentrations, TPUs, and MDCs ^a (pCi/g)
0478S0017	0725-AX-XE	0.15 ± 0.16 ^b , 0.26
0478S0018	0732-BX-XE	0.21 ± 0.15, 0.25
0478S0019	0744-BX-XE	4.49 ± 0.53, 0.27
0478S0020	0746-DX-XE	0.67 ± 0.17, 0.23
0478S0021	0324-CX-XE	0.04 ± 0.12, 0.21

^aThe MDCs are after the comma.

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