



Docket 040-08027
License 54B-1010

December 7, 2015

Mr. Robert Evans
U.S. Nuclear Regulatory Commission
Region IV
1600 East Lamar Boulevard
Arlington, TX 76011

**SUBJECT: ORISE CONTRACT NO. DE-AC05-06OR23100
LETTER REPORT FOR ANALYTICAL RESULTS FOR SIX SOIL SAMPLES
ASSOCIATED WITH THE SEQUOYAH FUELS CORPORATION IN GORE,
OKLAHOMA
[TAC NO. 040-08027/15-003] [DOCKET NO. 040-08027](RFTA NO. 16-001)
DCN: 5206-LR-06-0**

Dear Mr. Evans:

Oak Ridge Associated Universities (ORAU), under the Oak Ridge Institute for Science and Education (ORISE) contract, received six soil samples on November 16, 2015 from the Sequoyah Fuels Corporation in Gore, Oklahoma. The samples were received in good condition. Per the NRC Form 303 that was sent with the samples, the samples were analyzed for total uranium by gamma spectrometry. The analytical data, along with the procedure reference, are presented in the attached reports. A case narrative is included to provide information regarding the analytical data.

ORAU'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 Forrest Smith at 865.574.9802 with any questions or comments.

Sincerely,

Wade Ivey, Manager
Laboratory
WPI:WFS:km

Enclosures

Electronic: T. Carter, NRC S. Roberts, ORAU File 10957
E. Bailey, ORAU T. Vitkus, ORAU

Distribution approval and concurrence:	Initials
Quality Review	WFS
Technical Review	JJR



CASE NARRATIVE

5206-LR-06-0

Gamma Spectrometry:

The samples were analyzed using ORAU/REAL standard operating procedure (SOP) CP1, revision 19. The requested radionuclide of concern (ROC) from NRC Form 303 was total uranium (U-Total) by gamma spectrometry. At low uranium concentrations, gamma spectrometry can only provide data for uranium-235 (U-235) and uranium-238 (U-238). Gamma spectrometry cannot provide useful data for uranium-234 (U-234) at low concentrations.

For U-Total, the laboratory had to determine whether or not the samples were natural or enriched with uranium. This was performed by an in-house determination by comparison of the results versus the minimum detectable concentrations (MDC) and the U-238/U-235 activity ratios. All samples were determined to be natural. The total uranium was calculated based upon the following equation:

$$\text{Natural U: } U\text{-Total} = U\text{-235} + (2 * U\text{-238})$$

This equation assumes the U-234 is in equilibrium with U-238.

The identifying isotopes and peak energies used to quantify the ROCs are listed in the table below.

Radionuclide of Concern	Identifying Radionuclide	Peak Energy (keV)
U-235	U-235	143.8
U-238	Th-234	63.3

There were no deviations from the SOP and there were no unusual circumstances with the sample analysis.

Summary Results by Analyte



Analyte: U-Total SOP (Rev. #): CP1 (19) Report Date: 12/7/2015
Project Name: Sequoyah Fuels
Project #: 201210957 SDG #: 201210957-1

Client Sample ID	Lab Sample ID	Result*	TPU(2s)	Units	Batch #
NRC-1A	10957S0001	8.8	2.2	pCi/g	GS0160
NRC-2	10957S0002	34.5	7.2	pCi/g	GS0160
NRC-4	10957S0003	35.8	7.6	pCi/g	GS0160
NRC-5	10957S0004	3.23	0.92	pCi/g	GS0160
NRC-6	10957S0005	6.2	1.9	pCi/g	GS0160
NRC-7	10957S0006	23.2	5.0	pCi/g	GS0160

*Total U calculated by: $U\text{-total} = U\text{-235} + (2 * U\text{-238})$

Ivey,
Wade

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ou=Standard Accounts,
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Date: 2015.12.02 09:40:36 -05'00'

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F. Smith

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ou=department of energy, ou=Energy
IT Services, ou=Oak Ridge Institute for
Science and Education, ou=People,
cn=William F. Smith
Date: 2015.12.07 10:32:34 -05'00'

Gamma Spectrometry Summary Results By Analyte



Report Date: December 01, 2015

Analyte:	U-235	SOP (Rev. #)	CP1 (19)
Project Name:	Sequoyah Fuels 11-2015	Energy Signature:	143.76 (KeV)
Project # :	201210957	SDG # :	201210957-1

Client Sample ID:	Lab Sample ID:	Result	TPU (2s)	MDC	Units	Qualifier Flag	Batch #
NRC-1A	10957S0001	0.185	0.085	0.187	pCi/g	U	GS0160
NRC-2	10957S0002	0.721	0.087	0.159	pCi/g		GS0160
NRC-4	10957S0003	0.95	0.15	0.25	pCi/g		GS0160
NRC-5	10957S0004	0.169	0.076	0.165	pCi/g		GS0160
NRC-6	10957S0005	0.13	0.10	0.24	pCi/g	U	GS0160
NRC-7	10957S0006	0.443	0.070	0.197	pCi/g		GS0160

Electronically Validated By:
Wade Ivey- 12/1/2015 13:52

Electronically Approved By:

Wade Ivey 12/1/2015 13:52

William F. Smith
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 DN: cn=William F. Smith, o=ORISE, ou=Energy IT Services, ou=Oak Ridge Institute for Science and Education, ou=People, cn=William F. Smith
 Date: 2015.12.01 10:33:29 -0500

Qualifier Flags:
U = Analyte not detected (< MDC)

TPU = Total Propagated Uncertainty
MDC = Minimum Detectable Concentration

Gamma Spectrometry Summary Results By Analyte



Report Date: December 01, 2015

Analyte: U-238 by Th-234	SOP (Rev. #): CP1 (19)
Project Name: Sequoyah Fuels 11-2015	Energy Signature: 63.29 (KeV)
Project #: 201210957	SDG #: 201210957-1

Client Sample ID:	Lab Sample ID:	Result	TPU (2s)	MDC	Units	Qualifier Flag	Batch #
NRC-1A	10957S0001	4.3	1.1	0.9	pCi/g		GS0160
NRC-2	10957S0002	16.9	3.6	0.8	pCi/g		GS0160
NRC-4	10957S0003	17.4	3.8	1.1	pCi/g		GS0160
NRC-5	10957S0004	1.53	0.46	0.65	pCi/g		GS0160
NRC-6	10957S0005	3.05	0.93	1.33	pCi/g		GS0160
NRC-7	10957S0006	11.4	2.5	0.7	pCi/g		GS0160

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 Education, ou=People, cn=William
 F. Smith
 Date: 2015.12.07 10:33:04 -0500

Qualifier Flags:
U = Analyte not detected (< MDC)

TPU = Total Propagated Uncertainty
MDC = Minimum Detectable Concentration