

August 29, 2012

Mr. Gerald Schlapper  
 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 NINE WATER  
 SAMPLES ASSOCIATED WITH THE CIMARRON CORPORATION IN  
 CIMARRON, OKLAHOMA  
 [INSPECTION REPORT NO. 07000925/2012002;  
 NRC CONTROL NO. UIL-12-1] (RFTA NO. 12-001)  
 DCN: 5199-LR-01-0**

Dear Mr. Schlapper:

Oak Ridge Associated Universities (ORAU), under the Oak Ridge Institute for Science and Education (ORISE) contract, received nine water samples on August 2, 2012 from the Cimarron Corporation in Cimarron, Oklahoma. The samples were analyzed for gross alpha and beta activity, isotopic uranium, and technetium-99 (Tc-99) according to the chain of custody form supplied with the samples. The sample identification numbers are presented in Table 1 and the gross alpha and beta, isotopic uranium, and Tc-99 data are presented in Tables 2 through 4, respectively. The pertinent procedure references are included with the data tables.

The requested minimum detectable activity (MDA) was not met for samples T-77 and 1201. The amount of dissolved material in these two samples limited the amount of sample that could be analyzed, thus increasing the MDA. Sample 1346 was analyzed for gross alpha and beta and Tc-99 and the Tc-99 activity is about twice the gross beta activity. This could possibly be due to the volatilization of Tc-99 prior to the gross beta analysis as the sample is heated over a 500 °C flame prior to counting, thus reducing the gross beta measurement.

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

- c: T. Carter, NRC/FSME/DWMEP T-8F5
- S. Nesmith, NRC/FSME/PBPA/TWFN 8A23

Electronic: S. Roberts, ORAU T. Vitkus, ORAU File 5199

Distribution approval and concurrence:	Initials
Technical Review	WJ
Quality Review	WJ
Group Manager Review	WJ

**TABLE 1**

**SAMPLE IDENTIFICATIONS  
AND COLLECTION DATA  
CIMARRON CORPORATION  
CIMARRON, OKLAHOMA**

<b>ORISE Sample ID</b>	<b>NRC Region IV Sample ID</b>	<b>Collection Date</b>	<b>Collection Time</b>
5199W0001	TMW-13	7/31/12	9:08 AM
5199W0002	1312	8/1/12	7:05 AM
5199W0003	1346	8/1/12	8:40 AM
5199W0004	1352	7/31/12	1:57 PM
5199W0005	T-77	7/31/12	1:22 PM
5199W0006	1201	8/1/12	9:45 AM
5199W0007	1313	8/1/2012	7:15 AM
5199W0008	1336A	7/31/2012	10:32 AM
5199W0009	Seep 1208	8/1/2012	7:38 AM

**TABLE 2**

**CONCENTRATIONS OF GROSS ALPHA AND  
BETA RADIONUCLIDES IN WATER SAMPLES  
BY GROSS ALPHA AND BETA FOR VARIOUS MATRICES  
AP1, REVISION 18; CP3, REVISION 3  
CIMARRON CORPORATION  
CIMARRON, OKLAHOMA**

ORISE Sample ID	NRC Region IV Sample ID	Radionuclide Concentrations, TPU <sup>s</sup> <sup>a</sup> , and MDCs <sup>b</sup> (pCi/L)	
		Gross Alpha	Gross Beta
5199W0001	TMW-13	1104 ± 26 , 4	260 ± 10 , 5
5199W0002	1312	34.9 ± 5.8 , 4.7	425 ± 11 , 5
5199W0003	1346	9.6 ± 2.1 , 1.7	594.1 ± 7.7 , 1.8
5199W0004	1352	80.1 ± 4.9 , 1.8	42.1 ± 2.5 , 2.1
5199W0005	T-77	146 ± 17 , 12	39.0 ± 8.8 , 12.2
5199W0006	1201	-3 ± 19 , 36	26 ± 22 , 37

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

<sup>b</sup>The MDCs appear after the commas.

**TABLE 3**  
**CONCENTRATIONS OF URANIUM ISOTOPES**  
**IN WATER SAMPLES**  
**BY ALPHA SPECTROSCOPY AP11, REVISION 6; CP2, REVISION 16**  
**CIMARRON CORPORATION**  
**CIMARRON, OKLAHOMA**

ORISE Sample ID	NRC Region IV Sample ID	Radionuclide Concentrations, TPU <sup>a</sup> , and MDCs <sup>b</sup> (pCi/L)			
		U-234	U-235	U-238	Total U <sup>c</sup>
5199W0001	TMW-13	707 ± 93 , 0 <sup>d</sup>	36.3 ± 5.9 , 0.9	383 ± 51 , 1	1,100 ± 110
5199W0002	1312	23.8 ± 3.4 , 0.4	1.11 ± 0.37 , 0.35	7.7 ± 1.3 , 0.3	32.7 ± 3.6
5199W0003	1346	1.20 ± 0.34 , 0.26	0.04 ± 0.09 , 0.21	0.92 ± 0.28 , 0.05	2.16 ± 0.45
5199W0004	1352	50.1 ± 6.8 , 0.3	2.30 ± 0.56 , 0.29	36.3 ± 5.0 , 0.2	88.7 ± 8.4
5199W0005	T-77	202 ± 26 , 1	10.0 ± 1.6 , 0.1	32.7 ± 4.5 , 0.4	244.0 ± 27.0
5199W0006	1201	0.66 ± 0.25 , 0.28	0.00 ± 0.11 , 0.34	0.40 ± 0.18 , 0.06	1.06 ± 0.33

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

<sup>b</sup>The MDCs appear after the commas.

<sup>c</sup>Total U is calculated by U-234 + U-235 + U-238.

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

TABLE 4

CONCENTRATION OF TECHNETIUM-99  
IN WATER SAMPLES  
BY LIQUID SCINTILLATION COUNTING  
AP5, REVISION 19; CP4, REVISION 4  
CIMARRON CORPORATION  
CIMARRON, OKLAHOMA

ORISE Sample ID	NRC Region IV Sample ID	Radionuclide Concentrations, TPUs <sup>a</sup> , and MDCs <sup>b</sup> (pCi/L)
5199W0003	1346	1,148 ± 58 , 15
5199W0007	1313	864 ± 45 , 15
5199W0008	1336A	1,102 ± 56 , 15
5199W0009	Seep 1208	862 ± 45 , 15

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

<sup>b</sup>The MDCs appear after the commas.