

November 12, 2008

Dr. Thomas McLaughlin
 U.S. Nuclear Regulatory Commission
 FSME/DWMEP/DURLD
 TWFN 8 F5
 Rockville, Maryland 20852

**SUBJECT: REPORT FOR ANALYSES AND DATA COMPARISON FOR
 12 WATER SAMPLES FROM JEFFERSON PROVING GROUNDS,
 MADISON, INDIANA
 [INSPECTION REPORT NUMBER 70/143-2007-006] [RFTA NO. 07-001]
 DCN 1774-LR-01-0**

Dear Dr. McLaughlin:

The Oak Ridge Institute for Science and Education (ORISE) received 12 water samples from Jefferson Proving Grounds in Madison, Indiana. The analyses were performed based on the contaminant of interest, depleted uranium. The analytical results from ORISE were to be compared with the analytical results from the laboratory contracted by the Army. A case narrative with graphs details the data comparison between the two laboratories. Sample identification and collection data for the samples addressed in this report are presented in Table 1. Alpha spectroscopy data for the ORISE results are provided in Table 2. The GPL and ORISE data used to produce the three graphs presented in the case narrative are provided in Table 3.

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, Manager
 Laboratory

RDC:WPI:bf

Enclosures

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 File 1774

E. Abelquist, ORISE
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Distribution approval and concurrence :	Initials
Technical Review	TW
Quality Review	ATP

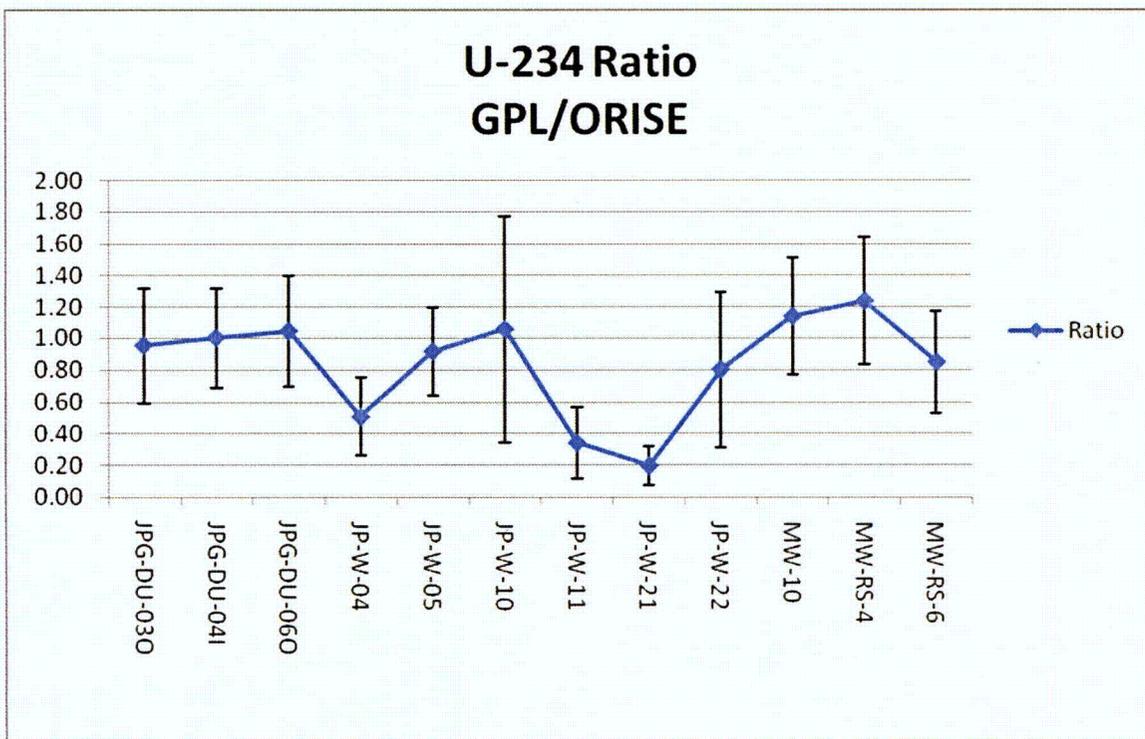
CASE NARRATIVE

As part of the Request for Technical Assistance, ORISE was requested to perform a comparison between the data from the laboratory contracted by the Army and the analytical results generated by ORISE for the 12 water samples from the Jefferson Proving Grounds located in Madison, Indiana.

The samples analyzed by the two laboratories were collected as split samples. While these samples were collected at approximately the same time, the samples sent to each laboratory should not be considered duplicates and as such, a comparison of the data should not be used as a quality indicator.

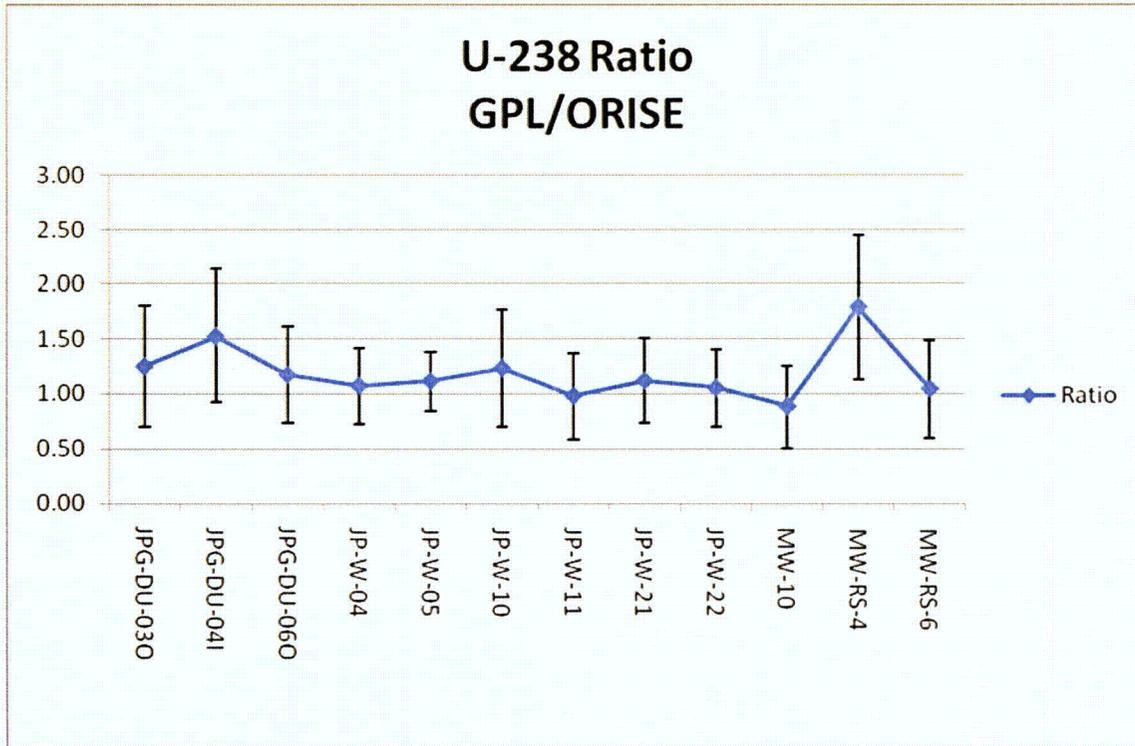
ORISE generated three graphs displaying the ratio of the Army's laboratory data to the ORISE data. The graphs show the ratio of the concentrations provided by GPL divided by the concentrations provided by ORISE. The error bars are the result of propagating the 2-sigma uncertainties of the concentrations from each laboratory following the standard equation for propagating the uncertainty of division of two values. Since it is very difficult to split samples, even water samples, in the field, the data show that the analytical results from the two laboratories are in general agreement. The first graph displays the ratio and uncertainty for U-234, the second graph displays the same information for U-238, and the last graph presents the total U data. Due to the very low concentrations of U-235, those data were not plotted.

**GRAPH 1
U-234 DATA COMPARISON**



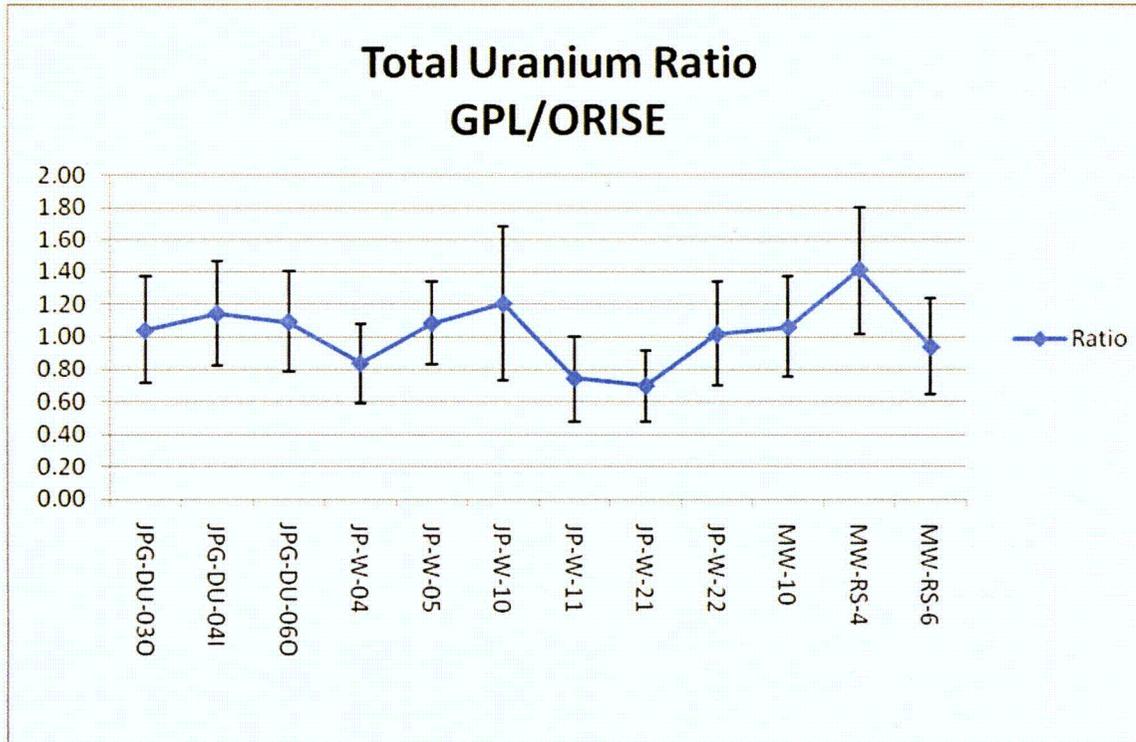
Of the three U-234 data points that are not in statistical agreement, points 7 and 8 from GPL were reported with a "J" qualifier. The J indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample. The detection limits for these samples were not available in the data supplied to ORISE.

GRAPH 2
U-238 DATA COMPARISON



The U-238 concentrations reported by GPL tend to be higher than those reported by ORISE. Eleven of the data points were in statistical agreement and the other point differed by less than a factor of 2. For non quality control samples, this indicates reasonable agreement.

GRAPH 3
TOTAL U DATA COMPARISON



The total U data which combines the analytical results from all the isotopes also shows that the data from the two laboratories are in agreement for non quality control samples.

There was good agreement for most of the analytical data from the two laboratories. Good agreement is defined as the overlapping of the analytical data at the 95% confidence level. For those samples which were not in statistical agreement, the concentrations in pCi/L for the analytes of interest were very low and/or less than the detection limit at which point statistical agreement is very difficult to obtain.

TABLE 1

**SAMPLE IDENTIFICATIONS
AND COLLECTION DATA
JEFFERSON PROVING GROUNDS
MADISON, INDIANA**

ORISE Sample ID	NRC HQ Sample ID	Collection Date	Collection Time
1774W0001	JPG-08-1-01	7/15/2008	10:29AM
1774W0002	JPG-08-1-02	7/15/2008	1:00PM
1774W0003	JPG-08-1-03	7/15/2008	2:37PM
1774W0004	JPG-08-1-04	7/16/2008	9:27AM
1774W0005	JPG-08-1-05	7/16/2008	1:50PM
1774W0006	JPG-08-1-06	7/16/2008	2:05PM
1774W0007	JPG-08-1-07	7/17/2008	8:11AM
1774W0008	JPG-08-1-08	7/17/2008	9:05AM
1774W0009	JPG-08-1-09	7/17/2008	10:40AM
1774W0010	JPG-08-1-10	7/17/2008	10:58AM
1774W0011	JPG-08-1-11	7/17/2008	2:45AM
1774W0012	JPG-08-1-12	7/18/2008	8:00AM

TABLE 2

**CONCENTRATIONS OF URANIUM ISOTOPES
IN WATER SAMPLES
BY ALPHA SPECTROSCOPY
AP11, REVISION 4; INTERIM CP2, REVISION 13
JEFFERSON PROVING GROUNDS
MADISON, INDIANA**

ORISE Sample ID	NRC HQ Sample ID	Radionuclide Concentrations, TPUs and MDCs ^a (pCi/L)		
		U-233/234	U-235	U-238
1774W0001	JPG-08-1-01	1.04 ± 0.20 ^b , 0.02	0.07 ± 0.06, 0.10	0.57 ± 0.14, 0.02
1774W0002	JPG-08-1-02	2.08 ± 0.32, 0.09	0.03 ± 0.05, 0.11	0.72 ± 0.17, 0.11
1774W0003	JPG-08-1-03	1.14 ± 0.22, 0.09	-0.01 ± 0.02, 0.11	0.72 ± 0.18, 0.11
1774W0004	JPG-08-1-04	1.58 ± 0.25, 0.10	0.06 ± 0.05, 0.03	0.94 ± 0.19, 0.10
1774W0005	JPG-08-1-05	2.59 ± 0.35, 0.08	0.17 ± 0.09, 0.12	16.0 ± 1.4, 0.1
1774W0006	JPG-08-1-06	0.30 ± 0.13, 0.22	-0.01 ± 0.07, 0.20	0.68 ± 0.18, 0.16
1774W0007	JPG-08-1-07	1.58 ± 0.26, 0.03	0.03 ± 0.05, 0.10	0.76 ± 0.17, 0.03
1774W0008	JPG-08-1-08	0.84 ± 0.18, 0.10	0.14 ± 0.07, 0.03	1.69 ± 0.26, 0.10
1774W0009	JPG-08-1-09	0.55 ± 0.15, 0.09	0.01 ± 0.04, 0.11	0.90 ± 0.20, 0.11
1774W0010	JPG-08-1-10	1.53 ± 0.25, 0.10	0.11 ± 0.07, 0.03	0.83 ± 0.17, 0.10
1774W0011	JPG-08-1-11	1.24 ± 0.23, 0.09	0.08 ± 0.07, 0.13	1.55 ± 0.26, 0.11
1774W0012	JPG-08-1-12	0.41 ± 0.16, 0.23	-0.01 ± 0.07, 0.21	1.71 ± 0.29, 0.17

^aThe MDCs are after the comma.

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

TABLE 3

**CONCENTRATIONS OF URANIUM ISOTOPES
FOR DATA COMPARISON GRAPHS
JEFFERSON PROVING GROUNDS
MADISON, INDIANA**

ORISE Sample ID	NRC HQ Sample ID	JPG Sample ID	Radionuclide Concentrations and TPU's (pCi/L)		
			ISOTOPE	GPL DATA ^a	ORISE DATA
1774W0001	JPG-08-1-01	JPG-DU-03O	U-234	0.993 ± 0.322	1.04 ± 0.20
1774W0001	JPG-08-1-01	JPG-DU-03O	U-235	0.034 ± 0.05	0.07 ± 0.06
1774W0001	JPG-08-1-01	JPG-DU-03O	U-238	0.704 ± 0.253	0.57 ± 0.14
1774W0001	JPG-08-1-01	JPG-DU-03O	Total U ^b	1.73 ± 0.479	1.68 ± 0.25
1774W0002	JPG-08-1-02	JPG-DU-04I	U-234	2.09 ± 0.578	2.08 ± 0.32
1774W0002	JPG-08-1-02	JPG-DU-04I	U-235	0.055 ± 0.066	0.03 ± 0.05
1774W0002	JPG-08-1-02	JPG-DU-04I	U-238	1.1 ± 0.351	0.72 ± 0.17
1774W0002	JPG-08-1-02	JPG-DU-04I	Total U	3.24 ± 0.81	2.84 ± 0.36
1774W0003	JPG-08-1-03	MW-RS-6	U-234	0.963 ± 0.316	1.14 ± 0.22
1774W0003	JPG-08-1-03	MW-RS-6	U-235	0.018 ± 0.0359	-0.01 ± 0.02
1774W0003	JPG-08-1-03	MW-RS-6	U-238	0.752 ± 0.265	0.72 ± 0.18
1774W0003	JPG-08-1-03	MW-RS-6	Total U	1.73 ± 0.482	1.85 ± 0.29
1774W0004	JPG-08-1-04	JPG-DU-06O	U-234	1.67 ± 0.491	1.58 ± 0.25
1774W0004	JPG-08-1-04	JPG-DU-06O	U-235	0.057 ± 0.068	0.06 ± 0.05
1774W0004	JPG-08-1-04	JPG-DU-06O	U-238	1.12 ± 0.36	0.94 ± 0.19
1774W0004	JPG-08-1-04	JPG-DU-06O	Total U	2.85 ± 0.733	2.58 ± 0.32
1774W0005	JPG-08-1-05	JP-W-05	U-234	2.41 ± 0.656	2.59 ± 0.35
1774W0005	JPG-08-1-05	JP-W-05	U-235	0.111 ± 0.0969	0.17 ± 0.09
1774W0005	JPG-08-1-05	JP-W-05	U-238	17.7 ± 4.08	16.0 ± 1.4
1774W0005	JPG-08-1-05	JP-W-05	Total U	20.3 ± 4.55	18.8 ± 1.4
1774W0006	JPG-08-1-06	JP-W-10	U-234	0.312 ± 0.156	0.30 ± 0.13
1774W0006	JPG-08-1-06	JP-W-10	U-235	0.012 ± 0.042	-0.01 ± 0.07
1774W0006	JPG-08-1-06	JP-W-10	U-238	0.838 ± 0.294	0.68 ± 0.18
1774W0006	JPG-08-1-06	JP-W-10	Total U	1.16 ± 0.366	0.96 ± 0.23
1774W0007	JPG-08-1-07	MW-10	U-234	1.8 ± 0.509	1.58 ± 0.26
1774W0007	JPG-08-1-07	MW-10	U-235	0.035 ± 0.05	0.03 ± 0.05
1774W0007	JPG-08-1-07	MW-10	U-238	0.67 ± 0.243	0.76 ± 0.17
1774W0007	JPG-08-1-07	MW-10	Total U	2.51 ± 0.652	2.37 ± 0.31

TABLE 3 (Cont.)

**CONCENTRATIONS OF URANIUM ISOTOPES
FOR DATA COMPARISON GRAPHS
JEFFERSON PROVING GROUNDS
MARION, INDIANA**

ORISE Sample ID	NRC HQ Sample ID	JPG Sample ID	Radionuclide Concentrations and TPUs (pCi/L)		
			ISOTOPE	GPL DATA ^a	ORISE DATA
1774W0008	JPG-08-1-08	JP-W-04	U-234	0.427 ± 0.187	0.84 ± 0.18
1774W0008	JPG-08-1-08	JP-W-04	U-235	0 ± 0.135	0.14 ± 0.07
1774W0008	JPG-08-1-08	JP-W-04	U-238	1.81 ± 0.52	1.69 ± 0.26
1774W0008	JPG-08-1-08	JP-W-04	Total U ^b	2.23 ± 0.605	2.67 ± 0.33
1774W0009	JPG-08-1-09	JP-W-11	U-234	0.188 ± 0.112	0.55 ± 0.15
1774W0009	JPG-08-1-09	JP-W-11	U-235	0.018 ± 0.0359	0.01 ± 0.04
1774W0009	JPG-08-1-09	JP-W-11	U-238	0.876 ± 0.296	0.90 ± 0.20
1774W0009	JPG-08-1-09	JP-W-11	Total U	1.08 ± 0.341	1.46 ± 0.25
1774W0010	JPG-08-1-10	MW-RS-4	U-234	1.89 ± 0.54	1.53 ± 0.25
1774W0010	JPG-08-1-10	MW-RS-4	U-235	0.095 ± 0.09	0.11 ± 0.07
1774W0010	JPG-08-1-10	MW-RS-4	U-238	1.48 ± 0.446	0.83 ± 0.17
1774W0010	JPG-08-1-10	MW-RS-4	Total U	3.47 ± 0.865	2.46 ± 0.31
1774W0011	JPG-08-1-11	JP-W-21	U-234	0.243 ± 0.14	1.24 ± 0.23
1774W0011	JPG-08-1-11	JP-W-21	U-235	0.021 ± 0.0429	0.08 ± 0.07
1774W0011	JPG-08-1-11	JP-W-21	U-238	1.73 ± 0.522	1.55 ± 0.26
1774W0011	JPG-08-1-11	JP-W-21	Total U	1.99 ± 0.575	2.86 ± 0.36
1774W0012	JPG-08-1-12	JP-W-22	U-234	0.332 ± 0.16	0.41 ± 0.16
1774W0012	JPG-08-1-12	JP-W-22	U-235	0.019 ± 0.0379	-0.01 ± 0.07
1774W0012	JPG-08-1-12	JP-W-22	U-238	1.8 ± 0.517	1.71 ± 0.29
1774W0012	JPG-08-1-12	JP-W-22	Total U	2.15 ± 0.587	2.12 ± 0.34

^aGPL data presented as submitted to the Army.

^bTotal is the sum of U-234+U-235+U-238.