ORISE
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

August 9, 2011

Mr. John Nicholson
U. S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

ORISE CONTRACT NO. DE-AC05-06OR23100
SUBJECT: LETTER REPORT FOR ANALYTICAL RESULTS FOR TWENTY TWO SOIL SAMPLES FROM ABB, INC., WINDSOR, CONNECTICUT [TAC NO. U01836/U01837] (RFTA NO. 11-001) DCN: 2016-LR-09-0

Dear Mr. Nicholson:

The Oak Ridge Institute for Science and Education (ORISE) received 22 soil samples on July 21, 2011 from ABB, Inc. in Windsor, Connecticut. The samples were analyzed according to the NRC Form 303 supplied with the samples. The sample identification numbers are presented in Table 1 and the gamma spectroscopy results for the requested radionuclides are provided in Table 2. Six random samples were selected for gross alpha as directed by the NRC Form 303. The gross alpha results, along with gross beta results, for the six samples are presented in Table 3. The requested detection limit of 0.1 pCi/g for thorium-232 (Th-232) was not met for a majority of the samples. The average detection limit for the samples was 0.22 pCi/g. The Th-232 concentration was statistically positive above the requested detection limit for the samples, but it was determined that longer sample count times to further reduce the detection limit were not necessary. Total uranium was calculated in two ways depending if the sample was indicative of enrichment. The formulas used are shown as a footnote in Table 2. The pertinent procedure reference is included with the data 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 Dale Condra at 865.241.3242 with any questions or comments.

Sincerely,

Wade P. Ivey

Wade Ivey, Manager
Laboratory

WPI:RDC:bj

Enclosures

c: T. Carter, NRC/FSME/DWMEP T-8F5
S. Nesmith, NRC/FSME/PBPA/TWFN 8A23
L. Kauffman, NRC Region I
S. Hammann, NRC Region I

Electronic: S. Roberts, ORISE T. Vitkus, ORISE
File 2016, 9th Set

Distribution approval and concurrence:	Initials
Technical Review	
Quality Review	

Telephone: 865.241.576.9184 **Fax: 865.241.3248** **E-mail: wade.ivey@orau.org**

P.O. Box 117 | Oak Ridge, TN 37831 | www.orise.orau.gov

TABLE 1

SAMPLE IDENTIFICATIONS AND COLLECTION INFORMATION ABB, INC. WINDSOR, CONNECTICUT

ORISE Sample ID	NRC Region I Sample ID	Collection Date	Collection Time
2016S0203	ABB-11-11-1	6/28/11	10:35
2016S0204	ABB-11-11-2	6/28/11	10:45
2016S0205	ABB-11-12-1	6/30/11	14:35
2016S0206	ABB-11-12-2	6/30/11	14:50
2016S0207	ABB-11-12-3	6/30/11	14:55
2016S0208	ABB-11-12-4	6/30/11	15:10
2016S0209	ABB-11-13-1	7/8/11	13:50
2016S0210	ABB-11-13-2	7/8/11	14:05
2016S0211	ABB-11-13-3	7/8/11	14:20
2016S0212	ABB-11-13-4	7/8/11	14:55
2016S0213	ABB-11-13-5	7/8/11	15:20
2016S0214	ABB-11-13-6	7/8/11	15:45
2016S0215	ABB-11-14-1	7/14/11	12:55
2016S0216	ABB-11-14-2	7/14/11	13:15
2016S0217	ABB-11-14-3	7/14/11	13:20
2016S0218	ABB-11-14-4	7/14/11	13:30
2016S0219	ABB-11-14-5	7/14/11	13:35
2016S0220	ABB-11-14-6	7/14/11	15:00
2016S0221	ABB-11-14-7	7/14/11	15:15
2016S0222	ABB-11-14-8	7/14/11	15:25
2016S0223	ABB-11-14-9	7/14/11	15:35
2016S0224	ABB-11-14-10	7/14/11	15:50

TABLE 2

CONCENTRATIONS OF SELECTED GAMMA EMITTERS IN SOIL SAMPLES BY GAMMA SPECTROSCOPY CP1, REVISION 17 ABB, INC. WINDSOR, CONNECTICUT

ORISE Sample ID	NRC Region I Sample ID	Radionuclide Concentrations, TPUs[a], and MDCs[b] (pCi/g)					
		Th-232 by Ac-228	Ra-226 by Pb-214	Co-60	U-238 by Th-234	U-235	Total U[c]
2016S0203	ABB-11-11-1	0.71 ± 0.15 , 0.34	0.45 ± 0.05 , 0.06	0.02 ± 0.04 , 0.08	0.57 ± 0.24 , 0.67	0.03 ± 0.12 , 0.23	1.17 ± 0.49
2016S0204	ABB-11-11-2	0.68 ± 0.12 , 0.12	0.48 ± 0.06 , 0.07	0.00[d] ± 0.05 , 0.08	0.63 ± 0.30 , 0.90	0.06 ± 0.19 , 0.31	1.32 ± 0.63
2016S0205	ABB-11-12-1	2.54 ± 0.36 , 0.60	1.84 ± 0.13 , 0.10	0.00 ± 0.06 , 0.09	2.18 ± 0.41 , 1.10	-0.07 ± 0.18 , 0.34	4.29 ± 0.84
2016S0206	ABB-11-12-2	0.97 ± 0.14 , 0.14	0.70 ± 0.07 , 0.08	0.01 ± 0.05 , 0.08	0.79 ± 0.29 , 0.91	0.09 ± 0.18 , 0.29	1.67 ± 0.61
2016S0207	ABB-11-12-3	1.49 ± 0.19 , 0.11	1.06 ± 0.08 , 0.06	0.01 ± 0.04 , 0.07	1.34 ± 0.29 , 0.74	0.26 ± 0.18 , 0.31	7.2 ± 3.9
2016S0208	ABB-11-12-4	1.52 ± 0.20 , 0.15	1.11 ± 0.09 , 0.07	-0.01 ± 0.04 , 0.07	0.96 ± 0.29 , 1.00	0.08 ± 0.15 , 0.28	2.00 ± 0.60
2016S0209	ABB-11-13-1	0.66 ± 0.10 , 0.10	0.45 ± 0.04 , 0.05	0.01 ± 0.04 , 0.06	0.52 ± 0.18 , 0.56	-0.01 ± 0.12 , 0.20	1.03 ± 0.38
2016S0210	ABB-11-13-2	0.55 ± 0.09 , 0.13	0.47 ± 0.05 , 0.06	0.08 ± 0.02 , 0.04	1.04 ± 0.24 , 0.65	0.51 ± 0.07 , 0.14	12.6 ± 1.5
2016S0211	ABB-11-13-3	0.63 ± 0.19 , 0.39	0.47 ± 0.06 , 0.08	0.32 ± 0.07 , 0.16	4.50 ± 0.52 , 0.89	3.04 ± 0.26 , 0.24	73.5 ± 5.7
2016S0212	ABB-11-13-4	0.38 ± 0.11 , 0.18	0.36 ± 0.06 , 0.09	0.08 ± 0.03 , 0.07	4.90 ± 0.63 , 1.20	0.29 ± 0.11 , 0.29	10.1 ± 1.3
2016S0213	ABB-11-13-5	0.48 ± 0.10 , 0.15	0.31 ± 0.05 , 0.08	0.17 ± 0.03 , 0.05	8.64 ± 0.77 , 0.82	0.34 ± 0.09 , 0.21	17.6 ± 1.5
2016S0214	ABB-11-13-6	0.49 ± 0.09 , 0.13	0.32 ± 0.04 , 0.06	0.04 ± 0.03 , 0.07	0.86 ± 0.23 , 0.61	0.10 ± 0.04 , 0.11	1.82 ± 0.46
2016S0215	ABB-11-14-1	1.25 ± 0.22 , 0.47	0.69 ± 0.07 , 0.08	0.05 ± 0.05 , 0.09	1.15 ± 0.35 , 0.92	0.02 ± 0.16 , 0.30	2.32 ± 0.72
2016S0216	ABB-11-14-2	0.67 ± 0.13 , 0.17	0.54 ± 0.06 , 0.08	-0.01 ± 0.05 , 0.09	1.23 ± 0.45 , 1.40	5.60 ± 0.39 , 0.42	128.4 ± 8.5
2016S0217	ABB-11-14-3	0.68 ± 0.11 , 0.14	0.53 ± 0.05 , 0.06	-0.04 ± 0.04 , 0.07	0.74 ± 0.23 , 0.62	0.13 ± 0.06 , 0.17	3.7 ± 1.3
2016S0218	ABB-11-14-4	0.79 ± 0.13 , 0.16	0.66 ± 0.07 , 0.06	0.01 ± 0.04 , 0.07	0.83 ± 0.27 , 0.78	-0.03 ± 0.13 , 0.23	1.63 ± 0.56
2016S0219	ABB-11-14-5	1.50 ± 0.21 , 0.18	0.74 ± 0.08 , 0.10	-0.05 ± 0.07 , 0.10	0.91 ± 0.46 , 1.40	7.17 ± 0.50 , 0.43	164 ± 11
2016S0220	ABB-11-14-6	0.79 ± 0.11 , 0.10	0.63 ± 0.05 , 0.05	0.00 ± 0.04 , 0.06	1.03 ± 0.22 , 0.52	0.11 ± 0.05 , 0.15	2.17 ± 0.44
2016S0221	ABB-11-14-7	1.05 ± 0.21 , 0.52	0.61 ± 0.08 , 0.10	0.02 ± 0.06 , 0.10	1.13 ± 0.40 , 1.10	0.18 ± 0.09 , 0.24	5.2 ± 2.0
2016S0222	ABB-11-14-8	0.87 ± 0.16 , 0.18	0.76 ± 0.09 , 0.11	0.00 ± 0.07 , 0.11	1.10 ± 0.43 , 1.20	0.40 ± 0.25 , 0.43	10.2 ± 5.4
2016S0223	ABB-11-14-9	1.08 ± 0.16 , 0.13	0.85 ± 0.08 , 0.07	0.05 ± 0.04 , 0.09	1.38 ± 0.36 , 0.95	2.55 ± 0.21 , 0.25	59.3 ± 4.6
2016S0224	ABB-11-14-10	1.20 ± 0.19 , 0.19	0.84 ± 0.08 , 0.08	0.04 ± 0.04 , 0.09	0.97 ± 0.37 , 1.20	0.14 ± 0.06 , 0.20	4.1 ± 1.4

[a]Uncertainties represent the 95% confidence level, based on total propagated uncertainties.

[b]MDCs are after the commas.

[c]Total uranium is calculated using either U-238*2 + U-235 for natural uranium or U-238 + U-235 + U235*(21.7) for enriched uranium.

[d]Zero values are due to rounding or sample and background having equal counts.

TABLE 3

CONCENTRATIONS OF GROSS ALPHA AND GROSS BETA IN SOIL SAMPLES BY GAS FLOW PROPORTIONAL COUNTING AP1, REVISION 17; CP3, REVISION 2 ABB, INC. WINDSOR, CONNECTICUT

ORISE Sample ID	NRC Region I Sample ID	Radionuclide Concentrations, TPUs[a], and MDCs[b] (pCi/g)	
		Gross Alpha	Gross Beta
2016S0203	ABB-11-11-1	4.9 ± 2.4 , 3.0	17.9 ± 3.0 , 4.1
2016S0206	ABB-11-12-2	12.7 ± 3.4 , 3.0	21.4 ± 3.2 , 4.3
2016S0210	ABB-11-13-2	15.7 ± 3.8 , 3.1	20.1 ± 3.5 , 4.7
2016S0212	ABB-11-13-4	10.9 ± 3.1 , 2.9	18.5 ± 3.2 , 4.4
2016S0216	ABB-11-14-2	132.8 ± 9.9 , 3.0	18.6 ± 3.3 , 4.3
2016S0223	ABB-11-14-9	34.5 ± 5.2 , 3.0	16.4 ± 3.1 , 4.3

[a]Uncertainties represent the 95% confidence level, based on total propagated uncertainties.

[b]The MDCs are after the comma.