

July 22, 2011

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

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 REGION I

**SUBJECT: ORISE CONTRACT NO. DE-AC05-06OR23100
 LETTER REPORT FOR ANALYTICAL RESULTS FOR FORTY SIX SOIL
 SAMPLES FROM ABB, INC., WINDSOR, CONNECTICUT
 [TAC NO. U01836/U01837] (RFTA NO. 11-001)
 DCN: 2016-LR-08-0**

Dear Mr. Nicholson:

The Oak Ridge Institute for Science and Education (ORISE) received 46 soil samples on June 15, 2011 from ABB, Inc. in Windsor, Connecticut. The samples were analyzed according to 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. Although the NRC Form 303 requested only gross alpha activity on six random samples, ORISE analyzed the six random samples for both gross alpha and gross beta activity. The gross alpha/beta results 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 0.14 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. The pertinent procedure references are included with the data tables.

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:bf

Enclosures

c: T. Carter, NRC/FSME/DWMEP T-8F5 L. Kauffman, NRC Region I
 S. Nesmith, NRC/FSME/PBPA/TWFn 8A23 S. Hammann, NRC Region I
 File 2016, 8th Set

Electronic: S. Roberts, ORISE T. Vitkus, ORISE

Distribution approval and concurrence:	Initials
Technical Review	WCA
Quality Review	XB

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TABLE 1
SAMPLE IDENTIFICATIONS
AND COLLECTION INFORMATION
ABB, INC.
WINDSOR, CONNECTICUT

ORISE Sample ID	NRC Region I Sample ID	Collection Date	Collection Time
2016S0157	ABB-11-4-1	4/14/11	8:30
2016S0158	ABB-11-4-2	4/14/11	8:45
2016S0159	ABB-11-4-3	4/14/11	11:15
2016S0160	ABB-11-5-1	4/27/11	10:45
2016S0161	ABB-11-5-2	4/27/11	10:55
2016S0162	ABB-11-5-3	4/27/11	11:05
2016S0163	ABB-11-5-4	4/27/11	11:10
2016S0164	ABB-11-5-5	4/27/11	11:25
2016S0165	ABB-11-5-6	4/27/11	11:30
2016S0166	ABB-11-6-1	5/10/11	11:20
2016S0167	ABB-11-6-2	5/10/11	11:25
2016S0168	ABB-11-6-3	5/10/11	11:30
2016S0169	ABB-11-6-4	5/10/11	11:35
2016S0170	ABB-11-6-5	5/10/11	11:45
2016S0171	ABB-11-6-6	5/10/11	11:55
2016S0172	ABB-11-6-7	5/10/11	12:00
2016S0173	ABB-11-7-1	5/13/11	9:30
2016S0174	ABB-11-7-2	5/13/11	9:40
2016S0175	ABB-11-8-1	5/27/11	9:20
2016S0176	ABB-11-8-2	5/27/11	9:25
2016S0177	ABB-11-8-3	5/27/11	13:20
2016S0178	ABB-11-8-4	5/27/11	13:25
2016S0179	ABB-11-8-5	5/27/11	13:35
2016S0180	ABB-11-8-6	5/27/11	13:40
2016S0181	ABB-11-8-7	5/27/11	13:55
2016S0182	ABB-11-8-8	5/27/11	14:05
2016S0183	ABB-11-8-9	5/27/11	14:25
2016S0184	ABB-11-8-10	5/27/11	14:35
2016S0185	ABB-11-10-01	6/3/11	10:10
2016S0186	ABB-11-10-02	6/3/11	10:14
2016S0187	ABB-11-10-03	6/3/11	10:17
2016S0188	ABB-11-10-04	6/3/11	10:21
2016S0189	ABB-11-10-05	6/3/11	10:28
2016S0190	ABB-11-9-01	6/2/11	12:57

**TABLE 1
SAMPLE IDENTIFICATIONS
AND COLLECTION INFORMATION
ABB, INC.
WINDSOR, CONNECTICUT**

ORISE Sample ID	NRC Region I Sample ID	Collection Date	Collection Time
2016S0191	ABB-11-9-02	6/2/11	13:02
2016S0192	ABB-11-9-03	6/2/11	13:07
2016S0193	ABB-11-9-04	6/2/11	13:10
2016S0194	ABB-11-9-05	6/2/11	13:14
2016S0195	ABB-11-9-06	6/2/11	13:20
2016S0196	ABB-11-9-07	6/2/11	13:28
2016S0197	ABB-11-9-08	6/2/11	13:35
2016S0198	ABB-11-9-09	6/2/11	13:39
2016S0199	ABB-11-9-10	6/2/11	13:43
2016S0200	ABB-11-9-11	6/2/11	13:48
2016S0201	ABB-11-9-12	6/2/11	13:53
2016S0202	ABB-11-9-13	6/2/11	13:59

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, TPU ^a , and MDC ^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
2016S0157	ABB-11-4-1	0.85 ± 0.13 , 0.14	0.63 ± 0.07 , 0.08	-0.02 ± 0.05 , 0.08	0.75 ± 0.88 , 0.86	-0.04 ± 0.14 , 0.27	1.5 ± 1.8
2016S0158	ABB-11-4-2	0.69 ± 0.11 , 0.12	0.57 ± 0.06 , 0.06	0.04 ± 0.04 , 0.07	0.71 ± 0.25 , 0.63	0.14 ± 0.12 , 0.24	1.56 ± 0.51
2016S0159	ABB-11-4-3	0.77 ± 0.14 , 0.15	0.54 ± 0.07 , 0.08	0.01 ± 0.05 , 0.09	0.62 ± 0.32 , 0.87	0.20 ± 0.20 , 0.34	1.44 ± 0.67
2016S0160	ABB-11-5-1	0.67 ± 0.11 , 0.11	0.51 ± 0.05 , 0.05	0.00 ^d ± 0.03 , 0.06	0.41 ± 0.16 , 0.54	0.12 ± 0.13 , 0.23	0.94 ± 0.35
2016S0161	ABB-11-5-2	0.85 ± 0.14 , 0.13	0.61 ± 0.06 , 0.07	0.04 ± 0.06 , 0.10	0.70 ± 0.40 , 0.93	-0.06 ± 0.22 , 0.34	1.34 ± 0.83
2016S0162	ABB-11-5-3	0.81 ± 0.12 , 0.10	0.55 ± 0.05 , 0.05	-0.03 ± 0.04 , 0.07	0.90 ± 0.23 , 0.58	0.05 ± 0.14 , 0.24	1.85 ± 0.48
2016S0163	ABB-11-5-4	0.86 ± 0.13 , 0.14	0.59 ± 0.06 , 0.07	0.02 ± 0.05 , 0.08	0.69 ± 0.27 , 0.82	0.04 ± 0.13 , 0.26	1.42 ± 0.56
2016S0164	ABB-11-5-5	0.69 ± 0.12 , 0.13	0.55 ± 0.07 , 0.07	0.03 ± 0.05 , 0.09	0.92 ± 0.31 , 0.88	0.06 ± 0.19 , 0.31	1.90 ± 0.65
2016S0165	ABB-11-5-6	0.89 ± 0.13 , 0.11	0.57 ± 0.05 , 0.05	0.00 ± 0.04 , 0.07	0.69 ± 0.22 , 0.59	0.06 ± 0.15 , 0.25	1.44 ± 0.46
2016S0166	ABB-11-6-1	0.90 ± 0.14 , 0.11	0.66 ± 0.07 , 0.07	0.01 ± 0.05 , 0.09	0.67 ± 0.27 , 0.73	0.10 ± 0.14 , 0.27	1.44 ± 0.56
2016S0167	ABB-11-6-2	0.82 ± 0.14 , 0.16	0.65 ± 0.08 , 0.07	-0.05 ± 0.06 , 0.09	0.93 ± 0.32 , 0.97	0.03 ± 0.21 , 0.33	1.89 ± 0.67
2016S0168	ABB-11-6-3	0.90 ± 0.13 , 0.13	0.66 ± 0.06 , 0.05	0.01 ± 0.04 , 0.07	0.90 ± 0.23 , 0.61	0.00 ± 0.16 , 0.26	1.80 ± 0.49
2016S0169	ABB-11-6-4	0.96 ± 0.15 , 0.14	0.63 ± 0.06 , 0.07	0.01 ± 0.05 , 0.09	0.64 ± 0.34 , 0.87	1.25 ± 0.13 , 0.23	2.53 ± 0.69
2016S0170	ABB-11-6-5	0.86 ± 0.15 , 0.15	0.60 ± 0.07 , 0.08	0.03 ± 0.05 , 0.09	0.59 ± 0.28 , 0.86	0.01 ± 0.21 , 0.33	1.19 ± 0.60
2016S0171	ABB-11-6-6	0.87 ± 0.12 , 0.12	0.61 ± 0.05 , 0.05	0.01 ± 0.04 , 0.07	0.60 ± 0.21 , 0.61	0.07 ± 0.15 , 0.25	1.27 ± 0.45
2016S0172	ABB-11-6-7	0.82 ± 0.13 , 0.13	0.58 ± 0.06 , 0.08	0.04 ± 0.05 , 0.09	0.93 ± 0.34 , 1.01	0.27 ± 0.19 , 0.33	2.13 ± 0.71
2016S0173	ABB-11-7-1	0.78 ± 0.13 , 0.15	0.63 ± 0.06 , 0.07	-0.02 ± 0.05 , 0.08	0.98 ± 0.29 , 0.76	0.12 ± 0.06 , 0.19	2.08 ± 0.58
2016S0174	ABB-11-7-2	0.63 ± 0.10 , 0.11	0.45 ± 0.05 , 0.05	-0.02 ± 0.04 , 0.06	0.51 ± 0.21 , 0.57	0.09 ± 0.14 , 0.23	1.11 ± 0.44
2016S0175	ABB-11-8-1	0.79 ± 0.13 , 0.15	0.57 ± 0.06 , 0.08	-0.03 ± 0.05 , 0.08	0.90 ± 0.33 , 0.96	1.22 ± 0.13 , 0.22	3.02 ± 0.67
2016S0176	ABB-11-8-2	0.89 ± 0.14 , 0.14	0.65 ± 0.07 , 0.08	0.00 ± 0.05 , 0.09	0.47 ± 0.31 , 1.08	0.20 ± 0.20 , 0.33	1.14 ± 0.65
2016S0177	ABB-11-8-3	0.85 ± 0.13 , 0.16	0.77 ± 0.08 , 0.08	0.01 ± 0.06 , 0.10	0.56 ± 0.30 , 1.00	0.22 ± 0.08 , 0.23	1.34 ± 0.61
2016S0178	ABB-11-8-4	0.57 ± 0.09 , 0.11	0.56 ± 0.05 , 0.05	-0.04 ± 0.04 , 0.06	0.62 ± 0.18 , 0.50	0.11 ± 0.12 , 0.21	1.35 ± 0.38
2016S0179	ABB-11-8-5	0.87 ± 0.14 , 0.13	0.72 ± 0.07 , 0.08	0.03 ± 0.05 , 0.09	1.06 ± 0.34 , 0.83	0.14 ± 0.15 , 0.29	2.26 ± 0.70
2016S0180	ABB-11-8-6	0.85 ± 0.15 , 0.16	0.69 ± 0.07 , 0.09	0.03 ± 0.06 , 0.10	0.59 ± 0.37 , 1.11	0.85 ± 0.12 , 0.28	2.03 ± 0.75
2016S0181	ABB-11-8-7	0.88 ± 0.13 , 0.13	0.76 ± 0.06 , 0.05	0.02 ± 0.04 , 0.07	0.78 ± 0.25 , 0.64	-0.07 ± 0.17 , 0.27	1.49 ± 0.53
2016S0182	ABB-11-8-8	1.20 ± 0.18 , 0.17	0.89 ± 0.09 , 0.10	-0.01 ± 0.06 , 0.09	1.06 ± 0.35 , 0.95	0.15 ± 0.16 , 0.32	2.27 ± 0.72
2016S0183	ABB-11-8-9	0.93 ± 0.15 , 0.16	0.67 ± 0.07 , 0.08	0.00 ± 0.06 , 0.10	0.70 ± 0.36 , 1.22	0.95 ± 0.13 , 0.27	2.35 ± 0.73
2016S0184	ABB-11-8-10	0.90 ± 0.13 , 0.12	0.74 ± 0.06 , 0.05	0.00 ± 0.04 , 0.07	1.00 ± 0.27 , 0.77	0.03 ± 0.16 , 0.27	2.03 ± 0.56

TABLE 2
CONCENTRATIONS OF SELECTED GAMMA EMITTERS
IN SOIL SAMPLES
BY GAMMA SPECTROSCOPY CPI, REVISION 17
ABB, INC.
WINDSOR, CONNECTICUT

ORISE Sample ID	NRC Region I Sample ID	Radionuclide Concentrations, TPU ^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
2016S0185	ABB-11-10-01	1.01 ± 0.17 , 0.18	0.71 ± 0.08 , 0.09	0.02 ± 0.06 , 0.10	0.77 ± 0.37 , 1.13	0.11 ± 0.16 , 0.32	1.65 ± 0.76
2016S0186	ABB-11-10-02	0.86 ± 0.16 , 0.19	0.64 ± 0.08 , 0.11	-0.03 ± 0.06 , 0.10	0.62 ± 0.39 , 1.10	0.03 ± 0.25 , 0.40	1.27 ± 0.82
2016S0187	ABB-11-10-03	0.95 ± 0.14 , 0.11	0.61 ± 0.06 , 0.06	0.02 ± 0.04 , 0.07	0.52 ± 0.23 , 0.80	0.06 ± 0.15 , 0.26	1.10 ± 0.48
2016S0188	ABB-11-10-04	0.70 ± 0.13 , 0.16	0.54 ± 0.06 , 0.08	0.01 ± 0.05 , 0.08	0.42 ± 0.29 , 0.82	0.08 ± 0.14 , 0.27	0.92 ± 0.60
2016S0189	ABB-11-10-05	0.72 ± 0.11 , 0.10	0.60 ± 0.05 , 0.05	0.00 ± 0.03 , 0.06	0.54 ± 0.20 , 0.64	0.01 ± 0.14 , 0.23	1.09 ± 0.42
2016S0190	ABB-11-9-01	1.11 ± 0.17 , 0.16	0.83 ± 0.08 , 0.09	0.03 ± 0.06 , 0.10	0.81 ± 0.33 , 1.04	0.20 ± 0.24 , 0.40	1.82 ± 0.70
2016S0191	ABB-11-9-02	0.76 ± 0.12 , 0.12	0.52 ± 0.05 , 0.06	0.02 ± 0.04 , 0.07	0.54 ± 0.24 , 0.77	0.00 ± 0.16 , 0.26	1.08 ± 0.51
2016S0192	ABB-11-9-03	0.66 ± 0.12 , 0.15	0.49 ± 0.06 , 0.07	0.05 ± 0.04 , 0.09	0.67 ± 0.27 , 0.76	0.08 ± 0.13 , 0.26	1.42 ± 0.56
2016S0193	ABB-11-9-04	0.60 ± 0.10 , 0.12	0.52 ± 0.06 , 0.07	0.00 ± 0.05 , 0.07	0.59 ± 0.25 , 0.68	0.00 ± 0.12 , 0.22	1.18 ± 0.51
2016S0194	ABB-11-9-05	1.47 ± 0.22 , 0.16	0.54 ± 0.07 , 0.10	0.01 ± 0.05 , 0.09	0.45 ± 0.31 , 1.10	1.03 ± 0.14 , 0.32	1.93 ± 0.64
2016S0195	ABB-11-9-06	0.97 ± 0.14 , 0.13	0.62 ± 0.06 , 0.06	-0.02 ± 0.05 , 0.07	1.00 ± 1.30 , 0.69	0.16 ± 0.06 , 0.20	2.2 ± 2.6
2016S0196	ABB-11-9-07	0.79 ± 0.14 , 0.16	0.51 ± 0.06 , 0.08	-0.02 ± 0.06 , 0.09	0.69 ± 0.35 , 1.02	0.03 ± 0.14 , 0.27	1.41 ± 0.71
2016S0197	ABB-11-9-08	0.42 ± 0.09 , 0.12	0.30 ± 0.04 , 0.06	0.00 ± 0.04 , 0.06	0.31 ± 0.23 , 0.76	0.07 ± 0.14 , 0.23	0.69 ± 0.48
2016S0198	ABB-11-9-09	1.14 ± 0.16 , 0.12	0.60 ± 0.06 , 0.06	-0.04 ± 0.04 , 0.06	0.75 ± 0.30 , 0.79	0.12 ± 0.06 , 0.17	1.62 ± 0.60
2016S0199	ABB-11-9-10	0.81 ± 0.14 , 0.15	0.51 ± 0.06 , 0.09	0.01 ± 0.05 , 0.08	0.46 ± 0.29 , 0.85	0.03 ± 0.14 , 0.26	0.95 ± 0.60
2016S0200	ABB-11-9-11	1.54 ± 0.22 , 0.16	0.52 ± 0.06 , 0.10	-0.07 ± 0.06 , 0.09	0.90 ± 0.42 , 1.10	0.16 ± 0.25 , 0.40	1.96 ± 0.88
2016S0201	ABB-11-9-12	1.03 ± 0.15 , 0.13	0.69 ± 0.06 , 0.06	-0.04 ± 0.05 , 0.07	0.94 ± 0.26 , 0.65	0.03 ± 0.16 , 0.26	1.91 ± 0.54
2016S0202	ABB-11-9-13	1.01 ± 0.15 , 0.15	0.76 ± 0.08 , 0.08	-0.01 ± 0.05 , 0.08	0.52 ± 0.26 , 0.77	0.06 ± 0.14 , 0.27	1.10 ± 0.54

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

^bMDCs are after the commas.

^cTotal uranium is calculated using U-238*2 + U-235.

^dZero 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, TPU ^a , and MDCs ^b (pCi/g)	
		Gross Alpha	Gross Beta
2016S0157	ABB-11-4-1	1.1 ± 3.0 , 5.4	17.6 ± 3.0 , 4.2
2016S0167	ABB-11-6-2	3.1 ± 3.2 , 5.3	17.1 ± 3.1 , 4.2
2016S0177	ABB-11-8-3	1.2 ± 3.0 , 5.3	18.4 ± 3.1 , 4.2
2016S0187	ABB-11-10-03	2.0 ± 3.0 , 5.1	17.6 ± 3.0 , 4.2
2016S0197	ABB-11-9-08	3.8 ± 3.3 , 5.3	18.4 ± 3.1 , 4.2
2016S0202	ABB-11-9-13	2.2 ± 3.1 , 5.2	18.7 ± 3.1 , 4.1

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

^bThe MDCs are after the comma.