



INTER-OFFICE MEMORANDUM

Date: May 29, 2015 HEM-15-MEMO-044

To: Brian Miller, FSS Manager
Ellen Jakub, FSS Data Manager

From: W. Clark Evers, Radiation Safety Officer

Cc: Steven A. Grice

Subject: WRS Test Background Data Set

An evaluation of the appropriate data set for background reference areas was performed to assess the values utilized in various portions of the FSS program.

There are two different sets of background data. The first set was obtained for DO-08-003, the *Hematite Radiological Characterization Report* (HRCR). The samples were taken and analyzed in 2005; Paragon Analytics performed the analyses. The second set was obtained for HDP-RPT-FSS-301, *Off-Site Borrow Soil Analysis 2112 Horine Road, Festus, Missouri*. These samples were taken and analyzed in 2014; Test America St. Louis performed the analyses.

The Westinghouse HDP collected and analyzed soil samples from sites used to establish background soil concentrations for the HRCR. HDP collected new soil samples at 8 sample points at each of the two locations previously specified in the HRCR when HDP-RPT-FSS-301 was under development. Each sample location was sampled in 3 foot intervals to a depth of at least 6 feet, or until refusal was met. A total of 32 samples were taken from the two reference areas. This resulted in the second data set for the background reference areas.

The unknown ingrowth value of 0.9 pCi/g for Ra-226 will be retained from the HRCR data set, as this value is conservative compared to HDP-RPT-FSS-301 data set (0.99 pCi/g). The value for subtracting background for Th-232 (1.0 pCi/g) has also been retained from the HRCR, since the HDP-RPT-FSS-301 data set is very close to this value (1.02 pCi/g) and is also conservative.

For retrospective analysis and for utilization in the Wilcoxon Rank Sum (WRS) test, individual samples from HDP-RPT-FSS-301 have a lower sum of fraction (SOF) values than for samples analyzed in the HRCR. Performing the WRS statistical test is not necessary when the difference between the maximum survey unit data set measurement SOF and the minimum background area measurement SOF was less than one. The HDP-RPT-FSS-301 data set was also created with the analyses performed at the same laboratory for FSS sample analysis. For these reasons, the data set from HDP-RPT-FSS-301 will be utilized for the performance of the WRS test as a conservative measure.

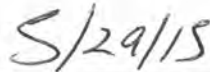
Attachments:

Table 1 – 2014 Reference Area Results

Owner/Author:

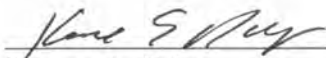


W. Clark Evers
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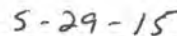


Date

Reviewed & Approved By:



Steven A. Grice
FSS Task Manager



Date

Table 1 – 2014 Reference Area Results

Reference Area Results																									
Sample ID	Sample Date	Technetium-99 (pCi/g)			Radium-226 (pCi/g) Unknown Ingrowth			Radium-226 (pCi/g) 21 Day Ingrowth			Thorium-232 (pCi/g) (Ac-228) Initial Count			Thorium-232 (pCi/g) (Ac-228) Final Count			Uranium-234 (pCi/g) Alpha Spec			Uranium-235 (pCi/g) Alpha Spec			Uranium-238 (pCi/g) Alpha Spec		
		Result	Error	MDC	Result	Error	MDC	Result	Error	MDC	Result	Error	MDC	Result	Error	MDC	Result	Error	MDC	Result	Error	MDC	Result	Error	MDC
9574-SS-140910-01-01	9/10/2014	0.06	0.0254	0.228	0.92	0.135	0.0648	1.15	0.164	0.0678	1.04	0.181	0.113	1.15	0.178	0.133	0.671	0.181	0.0502	0.0223	0.0395	0.0713	0.724	0.189	0.0501
9574-SS-140910-01-02	9/10/2014	0.0451	0.143	0.212	0.727	0.123	0.0676	0.719	0.103	0.0447	0.688	0.127	0.0802	0.749	0.12	0.0896	0.353	0.129	0.0505	0.0112	0.0281	0.0629	0.379	0.135	0.0676
9574-SS-140910-01-03	9/10/2014	0.0272	0.116	0.214	0.871	0.134	0.0656	1.04	0.166	0.0772	0.893	0.162	0.0986	0.936	0.183	0.145	0.518	0.164	0.0617	0.0148	0.0296	0.0444	0.723	0.195	0.0356
9574-SS-140910-01-04	9/10/2014	0.00489	0.161	0.222	0.863	0.123	0.0529	1.01	0.138	0.0513	0.853	0.134	0.0854	0.962	0.171	0.0901	0.39	0.138	0.0344	0.0143	0.0286	0.0428	0.591	0.172	0.0595
9574-SS-140910-01-05	9/10/2014	0.000801	0.00339	0.2	0.867	0.149	0.0853	0.995	0.16	0.0848	0.847	0.152	0.109	0.948	0.178	0.0908	0.345	0.163	0.0834	0	0.00855	0.0684	0.421	0.179	0.0549
9574-SS-140910-01-07	9/10/2014	0.0923	0.17	0.209	0.761	0.13	0.0682	0.858	0.133	0.0642	0.802	0.165	0.149	0.831	0.15	0.11	0.512	0.16	0.0349	0.038	0.0508	0.0752	0.453	0.15	0.0348
9574-SS-140910-01-08	9/10/2014	0.205	0.439	0.213	0.893	0.124	0.046	1.03	0.143	0.064	0.84	0.148	0.0802	0.979	0.139	0.0868	0.832	0.21	0.0748	0	0.00539	0.0431	0.632	0.179	0.0525
9574-SS-140910-01-09	9/10/2014	0.186	0.235	0.226	0.868	0.142	0.0713	1.08	0.169	0.0702	0.683	0.164	0.148	0.768	0.188	0.184	0.484	0.159	0.0554	0.0426	0.0529	0.0689	0.493	0.161	0.0631
9574-SS-140910-01-10	9/10/2014	0.0546	0.129	0.22	1.05	0.156	0.0793	1.17	0.174	0.0772	1.12	0.174	0.0618	1.16	0.191	0.143	0.571	0.169	0.0644	0.0343	0.0497	0.0801	0.757	0.196	0.0339
9574-SS-140910-01-11	9/10/2014	0.0506	0.165	0.22	0.972	0.145	0.0737	0.972	0.136	0.0838	1.1	0.163	0.0831	0.977	0.142	0.0792	0.606	0.174	0.0587	0.0281	0.0398	0.0422	0.575	0.168	0.0338
9574-SS-140910-01-12	9/10/2014	0.0186	0.0775	0.221	1.01	0.154	0.0667	1.22	0.184	0.0858	1.02	0.192	0.156	1.14	0.21	0.139	0.747	0.199	0.0541	0.0564	0.0596	0.0673	0.997	0.233	0.0356
9574-SS-140910-01-13	9/10/2014	0.196	0.214	0.228	0.955	0.136	0.0657	1.02	0.14	0.0759	1.03	0.157	0.0856	0.978	0.157	0.0959	0.724	0.198	0.0368	0.0458	0.053	0.0458	0.744	0.201	0.0557
9574-SS-140910-01-14	9/10/2014	0.0705	0.0929	0.214	0.928	0.143	0.07	1.05	0.146	0.0605	0.967	0.162	0.0738	0.889	0.156	0.0802	0.705	0.193	0.0614	0.0294	0.0417	0.0441	0.607	0.178	0.