

Hematite Decommissioning Project	Procedure: HDP-PR-FSS-701, Final Status Survey Plan Development		
		Revision: 10	Appendix P-4, Page 1 of 1

APPENDIX P-4

FSS SAMPLE & MEASUREMENT LOCATIONS & COORDINATES

Survey Area:	LSA 04	Description:	Plant Soils SEA Open Land Area
Survey Unit:	04	Description:	South Central SU in "Area 14" Surrounding Site Fence Line
Survey Type:	FSS	Classification:	Class 1

Measurement or Sample ID	Surface or CSM	Type	Start Elevation*	End Elevation*	Northing** (Y Axis)	Easting** (X Axis)	Remarks / Notes
L04-04-01-P-R-S-00	Uniform	S	428.9	424.6	864079.0	826811.0	Root 4.3-ft composite
L04-04-02-P-E-S-00	Uniform	S	424.6	424.1	864079.0	826811.0	Excavation 6-inch grab
L04-04-03-P-R-S-00	Uniform	S	433.7	429.7	864125.0	826838.0	Root 4.0-ft composite
L04-04-04-P-E-S-00	Uniform	S	429.7	429.2	864125.0	826838.0	Excavation 6-inch grab
L04-04-05-P-S-S-00	Uniform	S	434.7	434.2	864171.0	826864.0	Surface 6-inch grab
L04-04-06-P-R-S-00	Uniform	S	434.2	429.8	864171.0	826864.0	Root 4.4-ft composite
L04-04-07-P-E-S-00	Uniform	S	429.8	429.3	864171.0	826864.0	Excavation 6-inch grab
L04-04-08-P-S-S-00	Uniform	S	432.2	431.7	864216.0	826943.0	Surface 6-inch grab
L04-04-09-P-R-S-00	Uniform	S	431.7	427.3	864216.0	826943.0	Root 4.4-ft composite
L04-04-10-P-E-S-00	Uniform	S	427.3	426.8	864216.0	826943.0	Excavation 6-inch grab
L04-04-11-P-R-S-00	Uniform	S	431.6	427.7	864262.0	826970.0	Root 3.9-ft composite
L04-04-12-P-E-S-00	Uniform	S	427.7	427.2	864262.0	826970.0	Excavation 6-inch grab
L04-04-13-P-S-S-00	Uniform	S	433.9	433.4	864307.0	826996.0	Surface 6-inch grab
L04-04-14-P-R-S-00	Uniform	S	433.4	429.0	864307.0	826996.0	Root 4.4-ft composite
L04-04-15-P-E-S-00	Uniform	S	429.0	428.5	864307.0	826996.0	Excavation 6-inch grab
L04-04-16-P-R-S-00	Uniform	S	430.0	426.4	864307.0	827049.0	Root 3.7-ft composite
L04-04-17-P-E-S-00	Uniform	S	426.4	425.9	864307.0	827049.0	Excavation 6-inch grab
L04-04-18-P-S-S-00	Uniform	S	433.7	433.2	864353.0	827075.0	Surface 6-inch grab
L04-04-19-P-R-S-00	Uniform	S	433.2	428.8	864353.0	827075.0	Root 4.4-ft composite
L04-04-20-P-E-S-00	Uniform	S	428.8	428.3	864353.0	827075.0	Excavation 6-inch grab
L04-04-03-P-R-Q-00	Uniform	Q	433.7	429.7	864125.0	826838.0	Root 4.0-ft composite
L04-04-09-P-R-Q-00	Uniform	Q	431.7	427.3	864216.0	826943.0	Root 4.4-ft composite
L04-04-23-P-E-Q-00	Uniform	Q	427.7	427.2	864255.0	826956.0	Biased 6-inch grab
L04-04-21-P-E-B-00	Uniform	B	434.6	434.1	864171.3	826855.7	Biased 6-inch grab
L04-04-22-P-E-B-00	Uniform	B	432.7	432.2	864163.0	826863.1	Sidewall sample
L04-04-23-P-E-B-00	Uniform	B	427.7	427.2	864255.0	826956.0	Sidewall sample

Green shaded samples are the samples at each sample location, for use in WRS test.

*Elevations are in feet above mean sea level.
 ** Missouri - East State Plane Coordinates [North American Datum (NAD) 1983]
 Surface: Floor = F; Wall = W; Ceiling = C; Roof = R
 CSM: Three-Layer (Surface-Root-Excavation) or Uniform DCGLs used
 Type: Systematic = S, Biased = B, QC = Q; Investigation = I

HDP-PR-FSS-721 Final Status Survey Data Evaluation
Steps 8.3 Preliminary Data Review and 8.4 Calculation of the Sum-of-Fractions (SOF)

Evaluate Final Status Survey Data: LSA-04-04

Sample ID	Sample Depth (ft)	Type (Systematic, Bias, QC)	TestAmerica Analytical Results Step 8.3.2																												
			Ra-226						Tc-99					Th-232					Inferred U-234				U-235				U-238				
			Result	Uncertainty	MDC	Qualifier	Net Result*	Corrected Result	Result	Corrected Result	Uncertainty	MDC	Qualifier	Result	Uncertainty	MDC	Qualifier	Net Result**	Corrected Result	Result	Uncertainty	MDC	Qualifier	Result	Uncertainty	MDC	Qualifier	Result	Uncertainty	MDC	Qualifier
L04-04-01-P-R-S-00	0.60	S	1.160	0.153	0.050	N/A	0.090	0.090	0.021	0.021	0.067	0.222	U	1.000	0.147	0.096	N/A	0.000	0.000	1.371	NA	NA	NA	0.068	0.134	0.213	U	1.280	0.473	0.707	N/A
L04-04-02-P-E-S-00	4.92	S	1.270	0.190	0.086	N/A	0.200	0.200	0.056	0.056	0.051	0.227	U	1.010	0.208	0.114	N/A	0.010	0.010	0.905	NA	NA	NA	-0.028	0.539	0.288	U	0.905	0.340	0.971	U
L04-04-03-P-R-S-00	1.50	S	0.847	0.120	0.048	N/A	-0.223	0.000	0.289	0.289	0.040	0.196	N/A	0.818	0.128	0.089	N/A	-0.182	0.000	2.694	NA	NA	NA	0.143	0.128	0.195	U	1.370	0.452	0.658	N/A
L04-04-04-P-E-S-00	4.92	S	1.170	0.179	0.082	N/A	0.100	0.100	0.007	0.007	0.011	0.217	U	1.150	0.186	0.111	N/A	0.150	0.150	2.517	NA	NA	NA	0.132	0.154	0.268	U	1.550	0.729	0.936	N/A
L04-04-05-P-S-S-00	0.00	S	0.766	0.115	0.056	N/A	-0.304	0.000	0.118	0.118	0.024	0.220	U	0.819	0.133	0.086	N/A	-0.181	0.000	1.825	NA	NA	NA	0.099	0.116	0.213	U	0.700	0.258	0.745	U
L04-04-06-P-R-S-00	0.50	S	1.100	0.146	0.061	N/A	0.030	0.030	0.025	0.025	0.011	0.215	U	1.020	0.173	0.096	N/A	0.020	0.020	1.581	NA	NA	NA	0.078	0.137	0.218	U	1.380	0.507	0.762	N/A
L04-04-07-P-E-S-00	4.92	S	1.030	0.145	0.064	N/A	-0.040	0.000	-0.008	0.000	0.019	0.221	U	1.160	0.167	0.088	N/A	0.160	0.160	2.488	NA	NA	NA	0.135	0.128	0.198	U	0.947	0.267	0.709	N/A
L04-04-08-P-S-S-00	0.00	S	1.240	0.200	0.094	N/A	0.170	0.170	0.643	0.643	0.180	0.233	N/A	0.897	0.185	0.124	N/A	-0.103	0.000	16.148	NA	NA	NA	0.886	0.213	0.251	N/A	1.980	0.707	1.040	N/A
L04-04-09-P-R-S-00	0.50	S	1.280	0.172	0.075	N/A	0.210	0.210	0.037	0.037	0.037	0.227	U	1.210	0.195	0.123	N/A	0.210	0.210	1.978	NA	NA	NA	0.102	0.146	0.243	U	1.360	0.514	0.776	N/A
L04-04-10-P-E-S-00	4.92	S	1.230	0.165	0.060	N/A	0.160	0.160	0.037	0.037	0.034	0.222	U	1.020	0.154	0.107	N/A	0.020	0.020	1.983	NA	NA	NA	0.104	0.137	0.218	U	1.140	0.498	0.767	N/A
L04-04-11-P-R-S-00	1.70	S	1.280	0.198	0.095	N/A	0.210	0.210	-0.003	0.000	0.032	0.222	U	1.210	0.209	0.146	N/A	0.210	0.210	1.680	NA	NA	NA	0.089	0.164	0.281	U	0.906	0.345	0.906	N/A
L04-04-12-P-E-S-00	4.92	S	1.120	0.154	0.067	N/A	0.050	0.050	0.002	0.002	0.021	0.222	U	0.934	0.172	0.103	N/A	-0.066	0.000	3.197	NA	NA	NA	0.176	0.129	0.179	U	0.829	0.285	0.688	N/A
L04-04-13-P-S-S-00	0.00	S	0.886	0.129	0.064	N/A	-0.184	0.000	1.220	1.220	0.128	0.210	N/A	0.861	0.143	0.080	N/A	-0.139	0.000	2.642	NA	NA	NA	0.143	0.130	0.211	U	1.040	0.462	0.713	N/A
L04-04-14-P-R-S-00	0.50	S	1.060	0.146	0.063	N/A	-0.010	0.000	0.419	0.419	0.069	0.223	N/A	1.000	0.161	0.090	N/A	0.000	0.000	1.859	NA	NA	NA	0.100	0.090	0.143	U	0.846	0.259	0.683	N/A
L04-04-15-P-E-S-00	4.92	S	1.040	0.158	0.075	N/A	-0.030	0.000	0.095	0.095	0.074	0.216	U	0.911	0.189	0.115	N/A	-0.089	0.000	2.187	NA	NA	NA	0.118	0.151	0.253	U	0.916	0.377	1.120	U
L04-04-16-P-R-S-00	1.90	S	1.240	0.169	0.067	N/A	0.170	0.170	0.134	0.134	0.032	0.224	U	1.120	0.162	0.103	N/A	0.120	0.120	2.399	NA	NA	NA	0.128	0.151	0.240	U	1.220	0.654	0.832	N/A
L04-04-17-P-E-S-00	4.92	S	1.210	0.161	0.065	N/A	0.140	0.140	0.091	0.091	0.034	0.222	U	1.230	0.173	0.112	N/A	0.230	0.230	1.365	NA	NA	NA	0.066	0.163	0.260	U	1.320	0.522	0.792	N/A
L04-04-18-P-S-S-00	0.00	S	0.139	0.038	0.030	N/A	-0.931	0.000	0.055	0.055	0.034	0.194	U	0.137	0.034	0.019	N/A	-0.863	0.000	0.656	NA	NA	NA	0.036	0.053	0.090	U	0.241	0.193	0.289	U
L04-04-19-P-R-S-00	0.50	S	1.090	0.149	0.057	N/A	0.020	0.020	1.260	1.260	0.148	0.223	N/A	0.966	0.144	0.109	N/A	-0.034	0.000	1.701	NA	NA	NA	0.086	0.128	0.219	U	1.370	0.462	0.675	N/A
L04-04-20-P-E-S-00	4.92	S	1.260	0.191	0.089	N/A	0.190	0.190	0.387	0.387	0.036	0.229	N/A	1.160	0.217	0.142	N/A	0.160	0.160	1.701	NA	NA	NA	0.086	0.122	0.278	U	1.410	0.607	0.926	N/A
L04-04-03-P-R-Q-00	0.00	Q	1.240	0.164	0.060	N/A	0.170	0.170	0.006	0.006	0.028	0.219	U	1.150	0.173	0.095	N/A	0.150	0.150	1.007	NA	NA	NA	0.051	0.158	0.248	U	0.845	0.274	0.723	N/A
L04-04-09-P-R-Q-00	0.00	Q	1.140	0.160	0.068	N/A	0.070	0.070	0.061	0.061	0.068	0.222	U	1.090	0.161	0.106	N/A	0.090	0.090	1.753	NA	NA	NA	0.094	0.148	0.246	U	0.870	0.295	0.816	N/A
L04-04-23-P-E-Q-00	0.00	Q	1.140	0.153	0.065	N/A	0.070	0.070	0.065	0.065	0.068	0.222	U	1.240	0.173	0.096	N/A	0.240	0.240	1.250	NA	NA	NA	0.061	0.156	0.243	U	1.260	0.503	0.767	N/A
L04-04-21-P-E-B-00	0.00	B	1.12	0.163	0.0701	N/A	0.050	0.050	0.142	0.142	0.081	0.218	U	1.01	0.165	0.0989	N/A	0.010	0.010	3.419	NA	NA	NA	0.187	0.139	0.188	U	1.13	0.335	0.853	N/A
L04-04-22-P-E-B-00	0.00	B	1.02	0.147	0.0676	N/A	-0.050	0.000	0.207	0.207	0.05	0.217	U	1.04	0.202	0.14	N/A	0.040	0.040	4.077	NA	NA	NA	0.22	0.115	0.175	N/A	1.7	0.57	0.839	N/A
L04-04-23-P-E-B-00	0.00	B	1.040	0.141	0.055	N/A	-0.030	0.000	0.110	0.110	0.061	0.229	U	1.010	0.151	0.102	N/A	0.010	0.010	1.272	NA	NA	NA	0.066	0.142	0.212	U	0.900	0.264	0.743	N/A
Systematic Minimum			0.000						0.000					0.000						0.656				0.028						0.241	
Systematic Maximum			0.210						1.260					0.230						16.148				0.886						1.980	
Systematic Mean			0.087						0.245					0.065						2.644				0.137						1.136	
Systematic Median			0.070						0.074					0.005						1.919				0.101						1.180	
Systematic Standard Deviation			0.085						0.381					0.088						3.238				0.182						0.371	
Step 8.3.3																															
Step 8.4.2			With ingrowth, use Ra226 bkg =				1.07							Th232 bkg =		1.0															

NOTES:
Gross results in units of pCi/g.
* Background with ingrowth (1.07 pCi/g) subtracted from gross result.
**Background (1.0 pCi/g) subtracted from gross result.
U Qualifier: Result is less than the sample detection limit.
All uncertainty values are reported at the 2-sigma confidence level.

Ave Conc. Ra-226, SS	Ave Conc. Tc-99, SS	Ave Conc. Th-232, SS	Ave Conc. U-234, SS	Ave Conc. U-235, SS	Ave Conc. U-238, SS
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
0.000	0.118	0.000	1.825	0.099	0.700
-	-	-	-	-	-
0.170	0.643	0.000	16.148	0.886	1.980
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
0.000	1.220	0.000	2.642	0.143	1.040
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
0.000	0.055	0.000	0.656	0.036	0.241
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
0.043	0.509	0.000	5.318	0.291	0.990

HDP-PR-FSS-721 Final Status Survey Data Evaluation
 Steps 8.3 Preliminary Data Review and 8.4 Calculation of the Sum-of-Fractions (SOF)

Sample ID	Sample Depth (ft)	Type (Systematic, Bias, QC)	SOF		Root Stratum SOF Verification (unexcavated/not backfilled only) Step 8.4.4a.1					
			Enr. Enrichment (%)	SOF Step 8.4.3	Is Sample in the Root Stratum?	Is ROOT Sample SOF > 0.87	root count	excavation count	surface count	
L04-04-01-P-R-S-00	0.60	S	0.9	0.06	ROOT	good	1			
L04-04-02-P-E-S-00	4.92	S	0.7	0.12	EXCAVATION	good		1		
L04-04-03-P-R-S-00	1.50	S	1.6	0.04	ROOT	good	1			
L04-04-04-P-E-S-00	4.92	S	1.4	0.15	EXCAVATION	good		1		
L04-04-05-P-S-S-00	0.00	S	2.2	0.02	SURFACE	good			1	
L04-04-06-P-R-S-00	0.50	S	0.9	0.04	ROOT	good	1			
L04-04-07-P-E-S-00	4.92	S	2.2	0.10	EXCAVATION	good		1		
L04-04-08-P-S-S-00	0.00	S	6.6	0.23	SURFACE	good			1	
L04-04-09-P-R-S-00	0.50	S	1.2	0.24	ROOT	good	1			
L04-04-10-P-E-S-00	4.92	S	1.4	0.11	EXCAVATION	good		1		
L04-04-11-P-R-S-00	1.70	S	1.6	0.23	ROOT	good	1			
L04-04-12-P-E-S-00	4.92	S	3.2	0.05	EXCAVATION	good		1		
L04-04-13-P-S-S-00	0.00	Q	2.1	0.07	SURFACE	good			1	
L04-04-14-P-R-S-00	0.50	S	1.9	0.03	ROOT	good	1			
L04-04-15-P-E-S-00	4.92	S	2.0	0.02	EXCAVATION	good		1		
L04-04-16-P-R-S-00	1.90	S	1.7	0.18	ROOT	good	1			
L04-04-17-P-E-S-00	4.92	S	0.8	0.21	EXCAVATION	good		1		
L04-04-18-P-S-S-00	0.00	S	2.3	0.01	SURFACE	good			1	
L04-04-19-P-R-S-00	0.50	S	1.0	0.08	ROOT	good	1			
L04-04-20-P-E-S-00	4.92	S	1.0	0.21	EXCAVATION	good		1		
L04-04-03-P-R-Q-00	0.00	Q	1.0	0.18		good				
L04-04-09-P-R-Q-00	0.00	Q	1.7	0.10		good				
L04-04-23-P-E-Q-00	0.00	Q	0.8	0.17		good				
L04-04-21-P-E-B-00	0.00	B	2.6	0.06		good				
L04-04-22-P-E-B-00	0.00	B	2.0	0.06		good				
L04-04-23-P-E-B-00	0.00	B	1.8	0.02		good				
			Average Enrichment (%)				20	8	8	4
							count tot			

Use corrected net results for all DE calcs 721 Sec. 8.4.2

MDC SOF Step 8.1.1c
0.11
0.14
0.11
0.14
0.11
0.12
0.13
0.12
0.10
0.14
0.10
0.09
0.09
0.12
0.11
0.10
0.14
0.10
0.11
0.12
0.10

Step 8.4.1 DCLG_w, Measure Tc-99, All SEAs

Uniform	
U-234	195.4
U-235	51.6
U-238	168.8
Tc-99	25.1
Th-232	2.0
Ra-226	1.9

Step 8.4.5b

Weighted SOF_{MEAN} 0.11

fractions	SS	RS	ES
	0.2	0.4	0.4

Step 8.4.5c SOF_{MEAN} Re-use Backfill Material

0

Step 8.4.5e SOF_{MEAN} Groundwater

0.16

Step 8.4.5g (≤1)

SOF_{MEAN,SU} 0.27 PASS

Step 8.4.6 Calculate the dose contribution for the SU by multiplying SOF_{MEAN,SU} (including contribution from Re-use backfill and Groundwater) by 25 mrem.

6.8 mrem

HDP-PR-FSS-721 Final Status Survey Data Evaluation
Steps 8.3 Preliminary Data Review and 8.4 Calculation of the Sum-of-Fractions (SOF)

Infer U234 Step 8.3.4			
U-238/U235	U-234/U235	U-234	%
18.8	20.2	1.4	0.9
0.0	0.0	0.9	0.7
9.6	18.8	2.7	1.6
11.7	19.1	2.5	1.4
7.1	18.4	1.8	2.2
17.6	20.2	1.6	0.9
7.0	18.4	2.5	2.2
2.2	18.2	16.1	6.6
13.3	19.4	2.0	1.2
11.0	19.1	2.0	1.4
10.2	18.8	1.7	1.6
4.7	18.2	3.2	3.2
7.3	18.5	2.6	2.1
8.5	18.6	1.9	1.9
7.8	18.5	2.2	2.0
9.5	18.7	2.4	1.7
19.9	20.6	1.4	0.8
6.8	18.4	0.7	2.3
16.0	19.9	1.7	1.0
16.5	19.9	1.7	1.0
16.7	19.9	1.0	1.0
9.3	18.7	1.8	1.7
20.7	20.8	1.3	0.8
6.0	18.3	3.4	2.6
7.7	18.5	4.1	2.0
13.7	19.4	1.3	1.2
Average Enrichment (%)			1.77

Infer U-234 MDC using U-235 MDC * ratio of U-234:U-235 @ that sample's enrichment

4.295314
0
3.673607
5.111153
3.925496
4.396143
3.649052
4.574747
4.712231
4.15758
5.293762
3.251895
3.898817
2.659014
4.68871
4.499057
5.345758
1.662173
4.347827
5.519159
4.923566
4.611533
4.398228
3.437727
3.243179
4.111083

HDP-PR-FSS-721 Final Status Survey Data Evaluation
Steps 8.3 Preliminary Data Review and 8.4 Calculation of the Sum-of-Fractions (SOF)

Ave Conc. Ra-226, RS	Ave Conc. Tc-99, RS	Ave Conc. Th-232, RS	Ave Conc. U-234, RS	Ave Conc. U-235, RS	Ave Conc. U-238, RS
0.090	0.021	0.000	1.371	0.068	1.280
-	-	-	-	-	-
0.000	0.289	0.000	2.694	0.143	1.370
-	-	-	-	-	-
0.030	0.025	0.020	1.581	0.078	1.380
-	-	-	-	-	-
0.210	0.037	0.210	1.978	0.102	1.360
-	-	-	-	-	-
0.210	0.000	0.210	1.680	0.089	0.906
-	-	-	-	-	-
0.000	0.419	0.000	1.859	0.100	0.846
-	-	-	-	-	-
0.170	0.134	0.120	2.399	0.128	1.220
-	-	-	-	-	-
0.020	1.260	0.000	1.701	0.086	1.370
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
0.091	0.273	0.070	1.908	0.099	1.217
Ave Conc. Ra-226, ES	Ave Conc. Tc-99, ES	Ave Conc. Th-232, ES	Ave Conc. U-234, ES	Ave Conc. U-235, ES	Ave Conc. U-238, ES
-	-	-	-	-	-
0.2	0.0562	0.01	0.905	-0.0275	0.905
-	-	-	-	-	-
0.1	0.0065	0.15	2.5174	0.132	1.55
-	-	-	-	-	-
0	0	0.16	2.488	0.135	0.947
-	-	-	-	-	-
0.16	0.0373	0.02	1.9834	0.104	1.14
-	-	-	-	-	-
0.05	0.0018	0	3.1974	0.176	0.829
-	-	-	-	-	-
0	0.0952	0	2.1868	0.118	0.916
-	-	-	-	-	-
0.14	0.0913	0.23	1.3652	0.0664	1.32
-	-	-	-	-	-
0.19	0.387	0.16	1.7014	0.0857	1.41
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
0.105	0.084	0.091	2.043	0.099	1.127

HDP-PR-FSS-701 Final Status Survey Plan Development

Appendix B.1 Step 8 Calculate the Number of Samples in the Statistical Population

Uniform DCGL Criteria Evaluation	
N/2 Value Verification	
Isotope(s)	SOF (Ra/Tc/Th/Iso U)
St. Dev.	0.08
DCGL _{SOF}	1
LBGR (Mean)	0.11
Shift	0.89
Relative Shift (Δ/σ)	11.13
MARSSIM Table 5.1 (P_r)	1.000000
N	12
N + 20%	14.4
N/2	8
FSS N/2	8
Verification Check	SUFFICIENT MEASUREMENTS
"N/2" Corresponds to the number of survey unit measurement locations required for the WRS Test	

MARSSIM Table 5.1

Δ/σ	P_r
0.1	0.528182
0.2	0.556223
0.3	0.583985
0.4	0.611335
0.5	0.638143
0.6	0.664290
0.7	0.689665
0.8	0.714167
0.9	0.737710
1.0	0.760217
1.1	0.781627
1.2	0.801892
1.3	0.820978
1.4	0.838864
1.5	0.855541
1.6	0.871014
1.7	0.885299
1.8	0.898420
1.9	0.910413
2.0	0.921319
2.25	0.944167
2.5	0.961428
2.75	0.974067
3.0	0.983039
3.5	0.993329
4.0	0.997658
4.01	1.000000

MARSSIM Table 5.2, $\alpha = 0.05$, $\beta = 0.10$

α (or β)	$Z_{1-\alpha}$ (or $Z_{1-\beta}$)
0.005	2.576
0.01	2.326
0.015	2.241
0.025	1.960
0.05	1.645
0.10	1.282
0.15	1.036
0.2	0.842
0.25	0.674
0.30	0.524

α
 β

Hematite Decommissioning Project	Procedure: HDP-PR-FSS-703, Final Status Survey Quality Control										
								Revision: 2	Page 1 of 1		

**FORM HDP-PR-FSS-703-1
FIELD DUPLICATE SAMPLE ASSESSMENT**

Survey Unit No.:	LSA 04-04				Survey Unit Description:	South Central SU in "Area 14" Surrounding Site Fence Line						
Sample ID	Field Duplicate Sample ID	Radionuclide	Sample (pCi/g)		Field Duplicate Sample (pCi/g)		Average Activity (\bar{x}) (pCi/g)	Nuclide DCGL (pCi/g)	Statistic ²	Warning Limit	Control Limit	Statistic Exceeds Limit? (Y/N)
			Activity (x_i)	MDC	Activity (x_i)	MDC						
L04-04-03-P-R-S-00	L04-04-03-P-R-Q-00	Ra-226	0.847	0.0475	1.24	0.0603	1.044	1.9	0.393	0.269	0.403	Y
L04-04-03-P-R-S-00	L04-04-03-P-R-Q-00	Tc-99	0.289	0.196	0.00613	0.219	0.148	25.1	NA	3.552	5.321	NA
L04-04-03-P-R-S-00	L04-04-03-P-R-Q-00	Th-232	0.818	0.0886	1.15	0.095	0.984	2.0	0.332	0.283	0.424	Y
L04-04-03-P-R-S-00	L04-04-03-P-R-Q-00	U-234 ¹	2.694	N/A	1.007	N/A	1.850	195.4	1.687	27.649	41.425	N
L04-04-03-P-R-S-00	L04-04-03-P-R-Q-00	U-235	0.143	0.195	0.0507	0.248	0.097	51.6	NA	7.301	10.939	NA
L04-04-03-P-R-S-00	L04-04-03-P-R-Q-00	U-238	1.37	0.658	0.845	0.723	1.108	168.8	0.525	23.885	35.786	N

Comments:

- U-234 is inferred, no MDC available.
- Duplicate assessment is not necessary if the result of either sample is < MDC.

Performed by: _____

Reviewed by: _____

Date: _____

Date: _____

Quality Record

Hematite Decommissioning Project	Procedure: HDP-PR-FSS-703, Final Status Survey Quality Control										
								Revision: 2	Page 1 of 1		

**FORM HDP-PR-FSS-703-1
FIELD DUPLICATE SAMPLE ASSESSMENT**

Survey Unit No.:	LSA 04-04				Survey Unit Description:	South Central SU in "Area 14" Surrounding Site Fence Line						
Sample ID	Field Duplicate Sample ID	Radionuclide	Sample (pCi/g)		Field Duplicate Sample (pCi/g)		Average Activity (\bar{x}) (pCi/g)	Nuclide DCGL (pCi/g)	Statistic ²	Warning Limit	Control Limit	Statistic Exceeds Limit? (Y/N)
			Activity (x_i)	MDC	Activity (x_i)	MDC						
L04-04-09-P-R-S-00	L04-04-09-P-R-Q-00	Ra-226	1.28	0.0748	1.14	0.0684	1.210	1.9	0.14	0.269	0.403	N
L04-04-09-P-R-S-00	L04-04-09-P-R-Q-00	Tc-99	0.0365	0.227	0.0613	0.222	0.049	25.1	NA	3.552	5.321	NA
L04-04-09-P-R-S-00	L04-04-09-P-R-Q-00	Th-232	1.21	0.123	1.09	0.106	1.150	2.0	0.120	0.283	0.424	N
L04-04-09-P-R-S-00	L04-04-09-P-R-Q-00	U-234 ¹	1.978	N/A	1.753	N/A	1.865	195.4	0.225	27.649	41.425	N
L04-04-09-P-R-S-00	L04-04-09-P-R-Q-00	U-235	0.102	0.243	0.0935	0.246	0.098	51.6	NA	7.301	10.939	NA
L04-04-09-P-R-S-00	L04-04-09-P-R-Q-00	U-238	1.36	0.776	0.87	0.816	1.115	168.8	0.490	23.885	35.786	N

Comments:

- U-234 is inferred, no MDC available.
- Duplicate assessment is not necessary if the result of either sample is < MDC.

Performed by: _____

Reviewed by: _____

Date: _____

Date: _____

Quality Record

Hematite Decommissioning Project	Procedure: HDP-PR-FSS-703, Final Status Survey Quality Control										
									Revision: 2	Page 1 of 1	

**FORM HDP-PR-FSS-703-1
FIELD DUPLICATE SAMPLE ASSESSMENT**

Survey Unit No.:	LSA 04-04				Survey Unit Description:	South Central SU in "Area 14" Surrounding Site Fence Line						
Sample ID	Field Duplicate Sample ID	Radionuclide	Sample (pCi/g)		Field Duplicate Sample (pCi/g)		Average Activity (\bar{x}) (pCi/g)	Nuclide DCGL (pCi/g)	Statistic ²	Warning Limit	Control Limit	Statistic Exceeds Limit? (Y/N)
			Activity (x_i)	MDC	Activity (x_i)	MDC						
L04-04-23-P-E-B-00	L04-04-23-P-E-Q-00	Ra-226	1.04	0.0551	1.14	0.0651	1.090	1.9	0.1	0.269	0.403	N
L04-04-23-P-E-B-00	L04-04-23-P-E-Q-00	Tc-99	0.11	0.229	0.0648	0.222	0.087	25.1	NA	3.552	5.321	NA
L04-04-23-P-E-B-00	L04-04-23-P-E-Q-00	Th-232	1.01	0.102	1.24	0.0962	1.125	2.0	0.230	0.283	0.424	N
L04-04-23-P-E-B-00	L04-04-23-P-E-Q-00	U-234 ¹	1.272	N/A	1.250	N/A	1.261	195.4	0.022	27.649	41.425	N
L04-04-23-P-E-B-00	L04-04-23-P-E-Q-00	U-235	0.0656	0.212	0.0608	0.243	0.063	51.6	NA	7.301	10.939	NA
L04-04-23-P-E-B-00	L04-04-23-P-E-Q-00	U-238	0.9	0.743	1.26	0.767	1.080	168.8	0.360	23.885	35.786	N

Comments:

1. U-234 is inferred, no MDC available.
2. Duplicate assessment is not necessary if the result of either sample is < MDC.

Performed by: _____

Reviewed by: _____

Date: _____

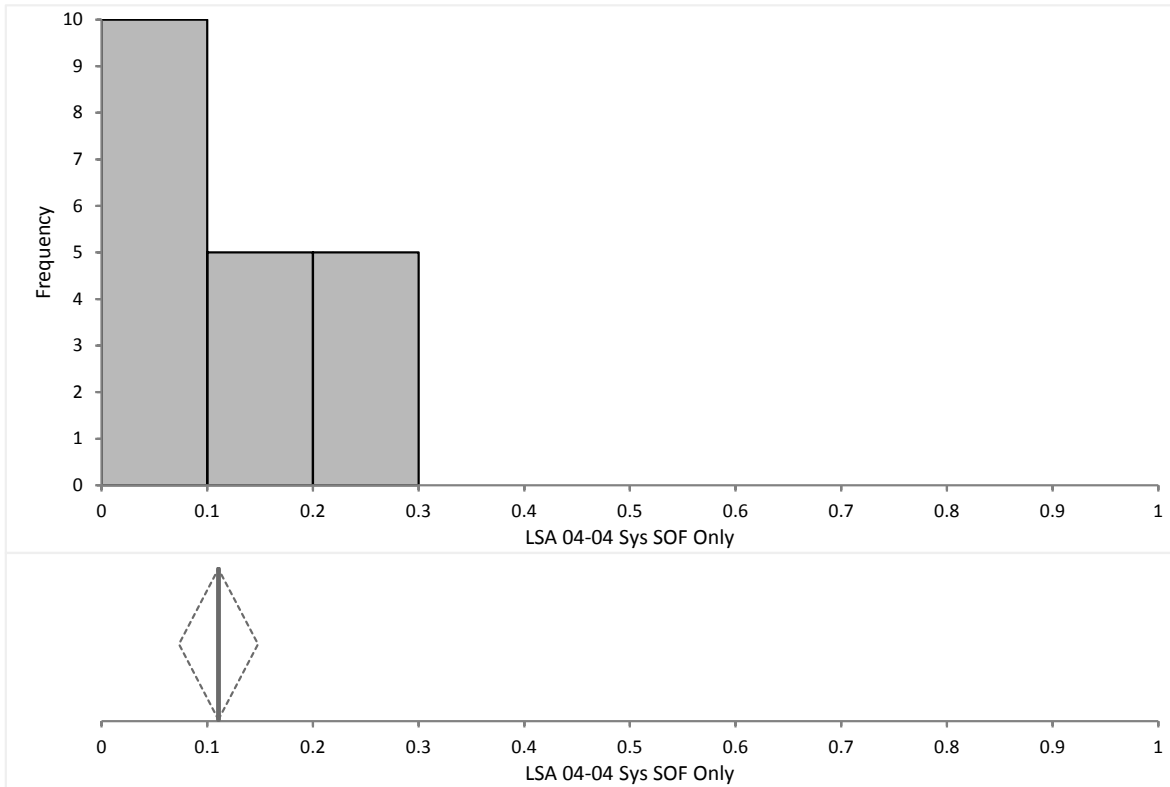
Date: _____

Quality Record

LSA 04-04 Sys SOF Only

0.1
0.1
0.0
0.2
0.0
0.0
0.1
0.2
0.2
0.1
0.2
0.1
0.1
0.0
0.0
0.2
0.2
0.0
0.1
0.2

Descriptives



N | 20

	Mean	95% CI	Mean SE	SD	Variance	Skewness	Kurtosis
LSA 04-04 Sys SOF Only	0.11	0.07 to 0.15	0.018	0.08	0.01	0.4	-1.38
	Minimum	1st quartile	Median	95.86% CI	3rd quartile	Maximum	IQR
LSA 04-04 Sys SOF Only	0.01	0.04	0.09	0.04 to 0.18	0.20	0.2	0.16