

**HDP-PR-FSS-701 Final Status Survey Plan Development**  
**Appendix P-1 Step 8. Calculate the Number of Samples in the Statistical Survey Population**

Uniform DCGL Criteria Evaluation	
N/2 Value Verification	
Isotope(s)	SOF (Ra/Tc/Th/Iso U)
St. Dev.	0.11
DCGL <sub>SOF</sub>	1
LBGR (Mean)	0.15
Shift	0.85
Relative Shift ( $\Delta/\sigma$ )	7.62
MARSSIM Table 5.1 ( $P_r$ )	1.000000
N	12
N + 20%	14.4
N/2	8
FSS N/2	8
Verification Check	<b>SUFFICIENT MEASUREMENTS</b>
"N/2" Corresponds to the number of survey unit measurement locations required for the WRS Test	

**MARSSIM Table 5.1**

$\Delta/\sigma$	$P_r$
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,  $\alpha = 0.05$ ,  $\beta = 0.10$**

$\alpha$ (or $\beta$ )	$Z_{1-\alpha}$ (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

$\alpha$   
 $\beta$

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

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

Survey Unit No.:	LSA 11-06				Survey Unit Description:	Class 1 "Area 12"; (South of Rail 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 <sup>2</sup>	Warning Limit	Control Limit	Statistic Exceeds Limit? (Y/N)
			Activity ( $x_i$ )	MDC	Activity ( $x_i$ )	MDC						
L11-06-17-P-R-S-00	L11-06-17-P-R-Q-00	Ra-226	1.34	0.089	1.37	0.0793	1.355	1.9	0.03	0.269	0.403	N
L11-06-17-P-R-S-00	L11-06-17-P-R-Q-00	Tc-99	0.0396	0.233	0.057	0.228	0.0483	25.1	NA	3.552	5.321	NA
L11-06-17-P-R-S-00	L11-06-17-P-R-Q-00	Th-232	0.848	0.134	1.12	0.151	0.984	2.0	0.272	0.283	0.424	N
L11-06-17-P-R-S-00	L11-06-17-P-R-Q-00	U-234 <sup>1</sup>	1.140	NA	1.008	NA	1.074	195.4	0.132	27.649	41.425	N
L11-06-17-P-R-S-00	L11-06-17-P-R-Q-00	U-235	-0.135	0.707	0.0463	0.683	-0.044	51.6	NA	7.301	10.939	NA
L11-06-17-P-R-S-00	L11-06-17-P-R-Q-00	U-238	1.14	0.923	1.3	1.03	1.22	168.8	0.16	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: Thomas Yardy \_\_\_\_\_

Reviewed by: Clark Evers \_\_\_\_\_

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 11-06			Survey Unit Description:	Class 1 "Area 12"; (South of Rail 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 <sup>2</sup>	Warning Limit	Control Limit	Statistic Exceeds Limit? (Y/N)
			Activity ( $x_i$ )	MDC	Activity ( $x_i$ )	MDC						
L11-06-23-P-R-S-00	L11-06-23-P-R-Q-00	Ra-226	1.41	0.07	1.23	0.0782	1.32	1.9	0.18	0.269	0.403	N
L11-06-23-P-R-S-00	L11-06-23-P-R-Q-00	Tc-99	0.00681	0.227	0.0374	0.234	0.022105	25.1	NA	3.552	5.321	NA
L11-06-23-P-R-S-00	L11-06-23-P-R-Q-00	Th-232	1.07	0.134	1.01	0.149	1.040	2.0	0.060	0.283	0.424	N
L11-06-23-P-R-S-00	L11-06-23-P-R-Q-00	U-234 <sup>1</sup>	0.880	NA	1.160	NA	1.020	195.4	0.280	27.649	41.425	N
L11-06-23-P-R-S-00	L11-06-23-P-R-Q-00	U-235	-0.102	0.649	-0.144	0.689	-0.123	51.6	NA	7.301	10.939	NA
L11-06-23-P-R-S-00	L11-06-23-P-R-Q-00	U-238	0.88	0.861	1.16	0.978	1.02	168.8	0.28	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: Thomas Yardy Reviewed by: Clark Evers

Date: \_\_\_\_\_ Date: \_\_\_\_\_

Quality Record

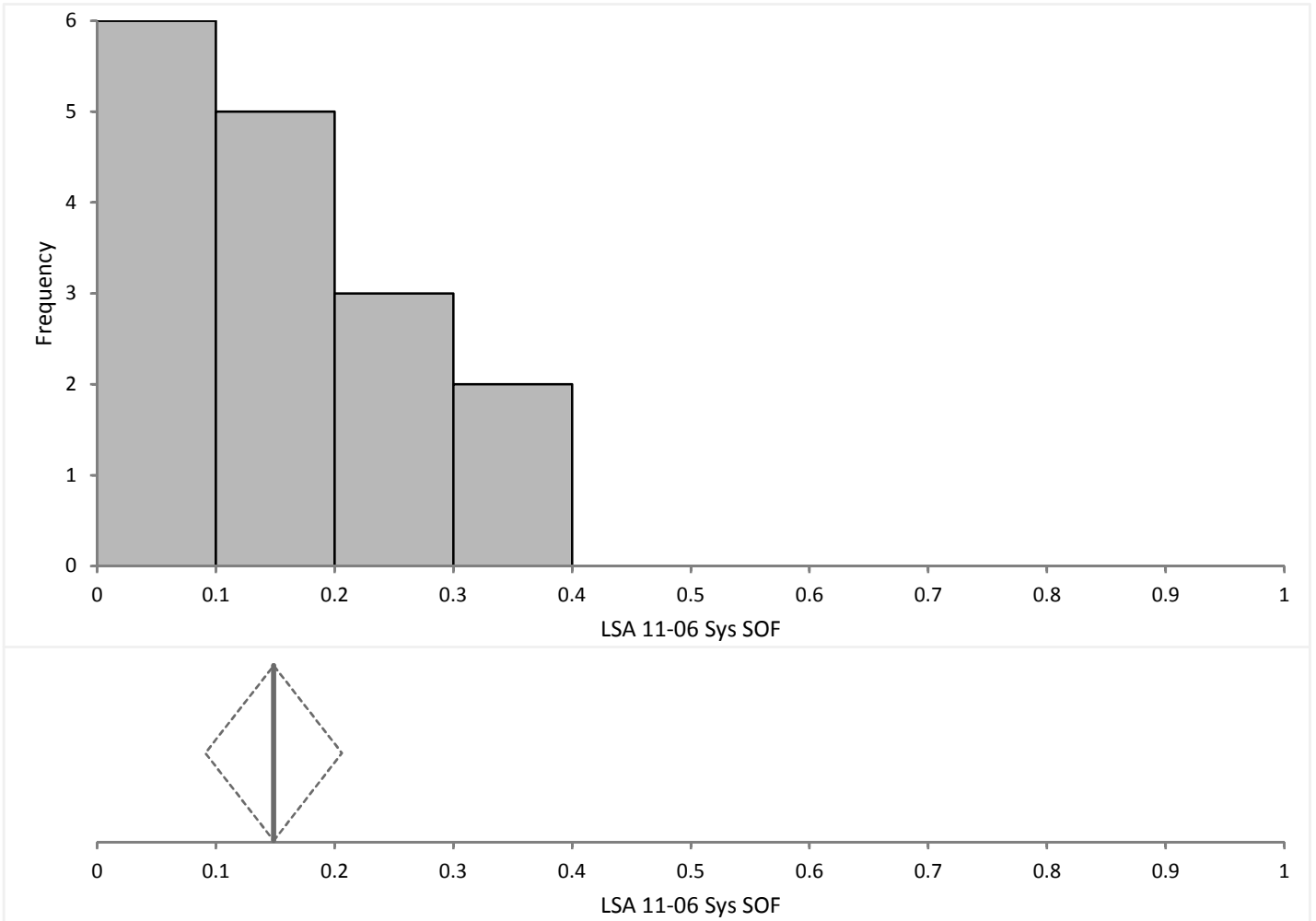
LSA 11-06 Sys SOF

0.1  
0.3  
0.0  
0.2  
0.1  
0.1  
0.4  
0.2  
0.2  
0.1  
0.1  
0.2  
0.0  
0.1  
0.0  
0.2

SOFn Only A1:A17

Last updated 16 February 2017 at 10:32 by W. Clark Evers

**Descriptives**



N | 16

	Mean	95% CI	Mean SE	SD	Variance
LSA 11-06 Sys SOF	0.15	0.09 to 0.21	0.027	0.11	0.01
	Minimum	1st quartile	Median	97.87% CI	3rd quartile
LSA 11-06 Sys SOF	0.01	0.06	0.13	0.06 to 0.22	0.22

---

---

Skewness	Kurtosis
0.9	0.45
Maximum	IQR
0.4	0.15