

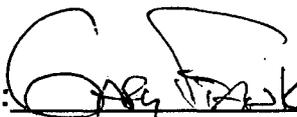
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Final Status Survey Summary Report

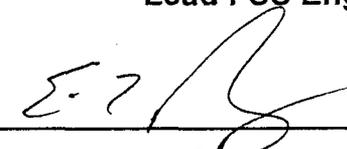
December 10, 2008

Tank Farm Trench #1 Eastern Portion Subsurface Soil

Survey Unit F8100053

Prepared By:  Date: 12-10-2008
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FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8100053, Tank Farm Trench #1 Eastern Portion Subsurface Soil

Survey Unit Description:

Operating History: The area surrounded the tanks used to store radioactive liquids. This area was used for the storage of radioactive material. Operating records and the HSA document several events with the potential for a release of radioactivity associated with this survey area. The HSA documented the storage of radioactive material within the area that may have had the potential to contaminate the area.

Records of soil samples taken near the BWST showed soil contamination levels as high as 230 pCi/g prior to remediation.

Site Characterization: Soil samples were collected and analyzed for the presence of plant-derived radionuclides. Cs-137 was the primary nuclide of plant origin detected with a mean activity level of 379 pCi/g and a maximum value of 1,040 pCi/g. Based on the classification procedure (DSIP-0020) and levels of Cs-137 reported, the area was determined to be a Class 1 land area.

Based on results of soil samples and measurements acquired during buried piping remediation the subsurface area was determined to be a Class 2 land area.

Survey Unit Design Information:

The Survey Unit Design Parameters are presented in Table 1 below. The survey unit and measurement locations are depicted on the maps in Attachment 1. The purpose of this survey unit was to perform subsurface evaluation at -1 meter and -2 meters below the surface of the area outside the equipment hatch. The surface area outside the equipment hatch is covered under F8100052. Direct measurement locations were determined using a random-start, fixed grid pattern. Soil samples were collected at each direct measurement location and analyzed by HPGe detector. The instrumentation used for the survey along with the MDC values are listed in Tables 2-1 and 2-2 in Attachment 2.

Table 1. Survey Unit Design Parameters

Survey Design Parameter	Value	Comment
Survey Area:	F810	Tank Farm Trench #1 Eastern Portion Subsurface Soil
Survey Unit:	0053	Open Land Area
Class:	2	LTP Table 5-4
SU Area (m²):	660	
Evaluator:	Gary Frank	
DCGL Cs137 surrogate (pCi/g):	51.2	
Area Factor:	N/A	Class 2
Design DCGL_{mc} (pCi/g):	N/A	Class 2
LBGR (pCi/g):	25.6	Default = 50% DCGL
Design Sigma (pCi/g):	0.1	DTBD-06-001, Table 5-4D
Type I Error:	0.05	
Type II Error:	0.05	
Nuclide:	Cs137	
Sample Area (m²):	27.5	Class 2
Total Area Scanned (m²):	660	
Scan Coverage (%):	100%	Class 2
Z_{1-α}:	1.645	
Z_{1-β}:	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	256	
Relative Shift Used:	3	Uses 3.0 if Rel Shift >3
N-Value:	11	
Design N-Value + 20%:	14	NUREG-1575 Table 5-5
Grid Spacing L:	6.9	Class 2

Survey Results:

A total of 28 direct measurements were made in F8100053. The results including mean, median, standard deviation and range are shown in Table 2. All of the direct measurements were less than the DCGL. None of the direct measurements indicated areas of elevated activity. Soil samples were counted to the MDC shown in Table 2-1 of Attachment 2.

Table 2. Direct Measurement Results
(all activity values in pCi/g)

Measurement ID	Cs137 MDA	Cs137 Activity	Uncertainty
Mean:		4.62E-02	
Median:		4.47E-02	
Standard Deviation:		1.11E-02	
Range:	2.64E-02 to 7.45E-02		
F8100053S0001SS	5.05E-02	< 5.05E-02	
F8100053S0002SS	5.63E-02	< 5.63E-02	
F8100053S0003SS	4.56E-02	< 4.56E-02	
F8100053S0004SS	5.39E-02	< 5.39E-02	
F8100053S0005SS	3.72E-02	< 3.72E-02	
F8100053S0006SS	5.95E-02	< 5.95E-02	
F8100053S0007SS	6.07E-02	< 6.07E-02	
F8100053S0008SS	4.89E-02	7.45E-02	3.58E-02
F8100053S0009SS	5.87E-02	< 5.87E-02	
F8100053S0010SS	4.75E-02	< 4.75E-02	
F8100053S0011SS	4.48E-02	< 4.48E-02	
F8100053S0012SS	5.38E-02	< 5.38E-02	
F8100053S0013SS	3.95E-02	< 3.95E-02	
F8100053S0014SS	5.56E-02	< 5.56E-02	
F8100053S0015SS	5.96E-02	< 5.96E-02	
F8100053S0016SS	3.81E-02	< 3.81E-02	
F8100053S0017SS	3.56E-02	< 3.56E-02	
F8100053S0018SS	4.46E-02	< 4.46E-02	
F8100053S0019SS	2.92E-02	< 2.92E-02	
F8100053S0020SS	3.99E-02	< 3.99E-02	
F8100053S0021SS	3.29E-02	< 3.29E-02	
F8100053S0022SS	4.81E-02	< 4.81E-02	
F8100053S0023SS	3.43E-02	< 3.43E-02	
F8100053S0024SS	4.34E-02	< 4.34E-02	
F8100053S0025SS	3.64E-02	< 3.64E-02	
F8100053S0026SS	4.25E-02	< 4.25E-02	
F8100053S0027SS	4.41E-02	< 4.41E-02	
F8100053S0028SS	2.64E-02	< 2.64E-02	

Survey Unit Data Assessment:

The survey design required 28 direct measurements for the Sign Test. The critical value and the results of the Sign Test are presented in Table 3. The sample mean and median values were less than the DCGL. The sample standard deviation was less than the design standard deviation so no additional samples were required.

Table 3. Data Assessment Results

Survey Results Parameter	Value	Comment
Actual Direct Measurements (N):	28	
Median (pCi/g):	4.47E-02	
Mean (pCi/g):	4.62E-02	
Standard Deviation (pCi/g):	1.11E-02	
Maximum (pCi/g):	7.45E-02	
Sign Test Final N Value:	28	
S+ Value:	28	
Critical Value:	18	
Sufficient Samples Collected:	Yes	
Maximum Value < DCGL:	Yes	
Median Value < DCGL:	Yes	
Mean Value < DCGL:	Yes	
Maximum Value < DCGL_{mc}:	N/A	Class 2
Standard Deviation <= Sigma:	Yes	
Pass the Sign Test?	Yes	
Reject the Null Hypothesis?	Yes	
The survey unit passes all conditions?	Yes	

Survey Unit Investigations and Results:

No investigations were required for direct measurements and no investigation results are reported.

ALARA Statement:

As stated in Chapter 4 of the LTP, as long as the residual activity within the survey unit is less than the DCGL, the ALARA criterion has been met.

Changes in Initial Survey Unit Assumptions:

The survey unit was designed as a Class 2 land survey and the sample results are consistent with that classification. The variability of the survey results was less than the characterization data used for survey design. No potential areas of elevated activity were detected.

Conclusion:

The FSS of this survey unit was properly designed as a Class 2 survey based on Table 5-4 of the LTP. The required number of direct measurements was made and the scan coverage met the requirement of Table 5-6 of the LTP. All of the direct measurements were less than the DCGL. No investigations were required.

The direct measurement data support rejection of the null hypothesis, providing high confidence that the survey unit satisfied the release criteria and that the data quality objectives were met.

It is concluded that survey unit F8100053 meets the release criteria of 10CFR20.1402.

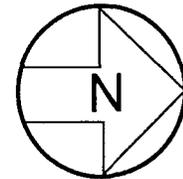
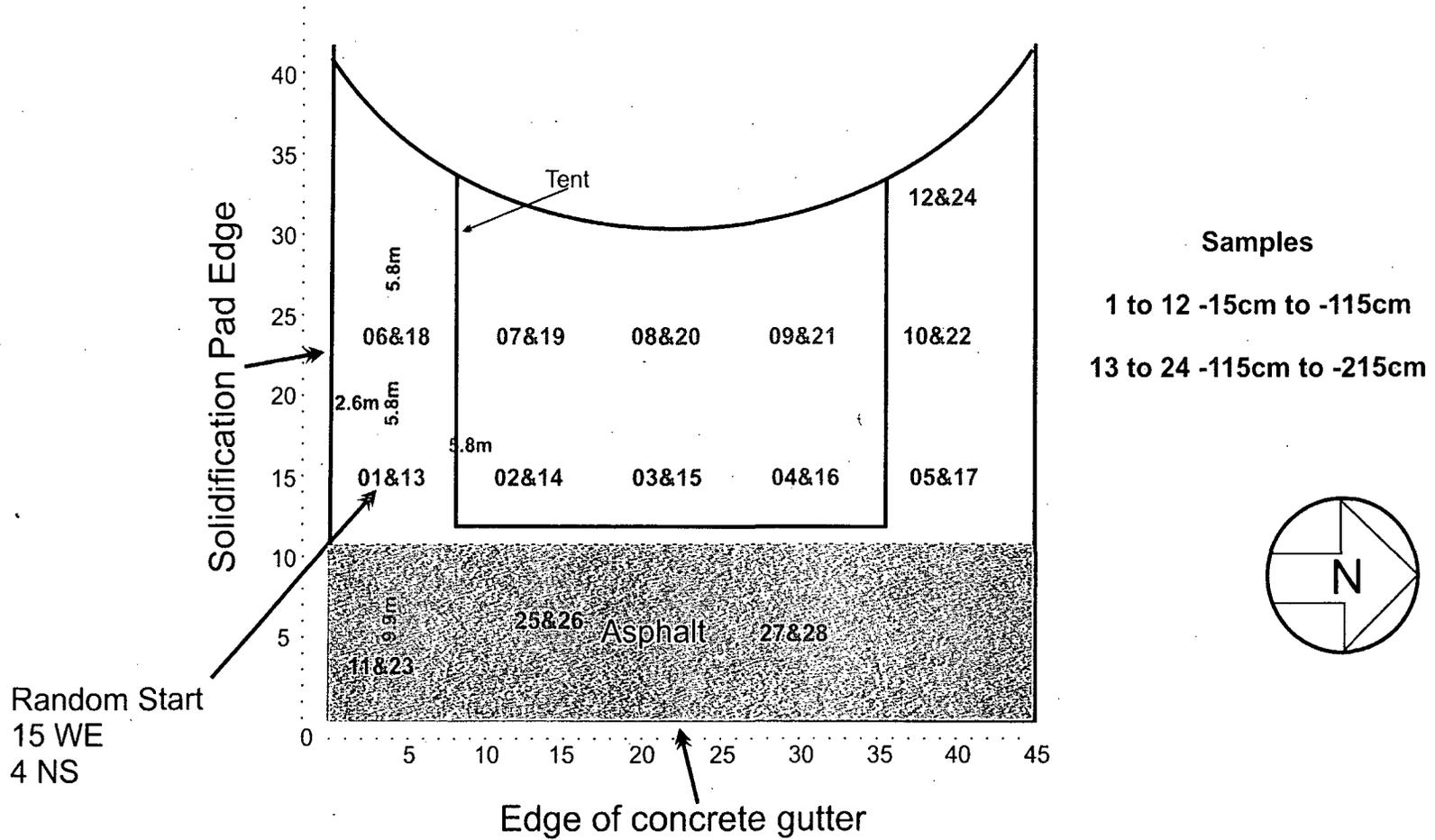
Attachment 1

Maps

December 10, 2008

Survey Unit F8100053

Trench 1 Eastern Portion Soil Samples at Depth



F8100053-M1

Attachment 2
Instrumentation
December 10, 2008
Survey Unit F8100053

Table 2-1. Survey Unit Instrumentation

Instrument	Detector Model No.	Detector Serial No.	MDC
HPGe	N/A	05069128	Soil – 0.026 pCi/g Cs-137, 0.0306 pCi/g Co-60

Table 2-2. Investigation Criteria and DCGL

Instrument	Parameter	Value
ISOCS	Investigation Criteria - Scan	Soil – 20 pCi/g Cs-137 Soil – 6 pCi/g Co-60
All	DCGL _w	51.2 Cs-137 12.6 Co-60

Attachment 3
Investigation
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(none required)

Attachment 4

Data Assessment

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Survey Unit F8100053

