
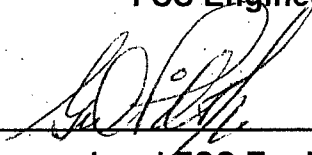
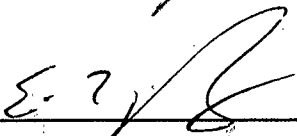


Rancho Seco
Final Status Survey Summary Report
March 26, 2008
Retention Basin Surface Soils
Survey Unit F8480017

Prepared By:  Date: 3-31-08
FSS Engineer

Reviewed By:  Date: 3/31/08
Lead FSS Engineer

Approved By:  Date: 5-1-08
Dismantlement Superintendent, Radiological

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8480017, Retention Basin Surface Soils

Survey Unit Description:

Operating History: This area is located at the southwest corner of the site. The area surrounds the structures that were used for containment and final treatment of liquid effluents prior to their release from the site. Contaminated resin was reported to have been found in the basins. Operating records and the HSA document occurrences of radioactive material with the potential for a release of radioactivity associated with this survey area. Records confirmed the presence of radioactive material within the area and basin sediment/soil contamination levels up to ~290 pCi/g. In addition, soil contamination levels up to ~5 pCi/g prior to some decontamination activities.

Site Characterization: Soil samples were collected and showed Cs-137 at mean activity levels of 0.086 pCi/g and a maximum activity of 0.196 pCi/g. Based on the classification procedure (DSIP-0020) and levels of gross activity reported, the soil area around the asphalt was determined to be Class 3.

HSA Events: LER-8812.

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. Direct measurement locations were randomly determined and 420 m² were scanned for approximately 12% coverage. 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:	F848	Retention Basin Surface Soils
Survey Unit:	0017	Open Land Area
Class:	3	LTP Table 5-4
SU Area (m²):	3590	
Evaluator:	Gary Frank	
DCGL Cs137 surrogate (pCi/g):	51.2	
Area Factor:	N/A	Class 3
Design DCGL_{emc} (pCi/g):	N/A	Class 3
LBGR (pCi/g):	25.6	Default = 50% DCGL
Design Sigma (pCi/g):	0.49	DTBD-06-001, Table 5-4D
Type I Error:	0.05	
Type II Error:	0.05	
Nuclide:	Cs137	
Sample Area (m²):	N/A	Class 3
Total Area Scanned (m²):	420	
Scan Coverage (%):	11.7%	Class 3
Z_{1-α}:	1.645	
Z_{1-β}:	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	52.2	
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:	N/A	Class 3

Survey Results:

A total of 14 direct measurements were made in F8480017. 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 scan 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:		5.92E-02	
Median:		5.87E-02	
Standard Deviation:		1.25E-02	
Range:	4.34E-02 to 9.67E-02		
F8480017S0001SS	6.56E-02	< 6.56E-02	
F8480017S0002SS	6.14E-02	< 6.14E-02	
F8480017S0003SS	5.27E-02	< 5.27E-02	3.47E-02
F8480017S0004SS	5.88E-02	< 5.88E-02	
F8480017S0005SS	5.45E-02	< 5.45E-02	
F8480017S0006SS	6.18E-02	< 6.18E-02	
F8480017S0007SS	4.86E-02	< 4.86E-02	2.97E-02
F8480017S0008SS	5.86E-02	< 5.86E-02	
F8480017S0009SS	5.74E-02	< 5.74E-02	
F8480017S0010SS	4.80E-02	< 4.80E-02	
F8480017S0011SS	6.02E-02	< 6.02E-02	
F8480017S0012SS	4.76E-02	9.67E-02	3.70E-02
F8480017S0013SS	4.34E-02	< 4.34E-02	
F8480017S0014SS	6.06E-02	< 6.06E-02	

Survey Unit Data Assessment:

The survey design required 14 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):	14	
Median (pCi/g):	5.87E-02	
Mean (pCi/g):	5.92E-02	
Standard Deviation (pCi/g):	1.25E-02	
Maximum (pCi/g):	9.67E-02	
Sign Test Final N Value:	14	
S+ Value:	14	
Critical Value:	9	
Sufficient Samples Collected:	Yes	
Maximum Value < DCGL:	Yes	
Median Value < DCGL:	Yes	
Mean Value < DCGL:	Yes	
Maximum Value < DCGL_{emc}:	N/A	Class 3
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 either direct or scan 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 3 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 3 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.

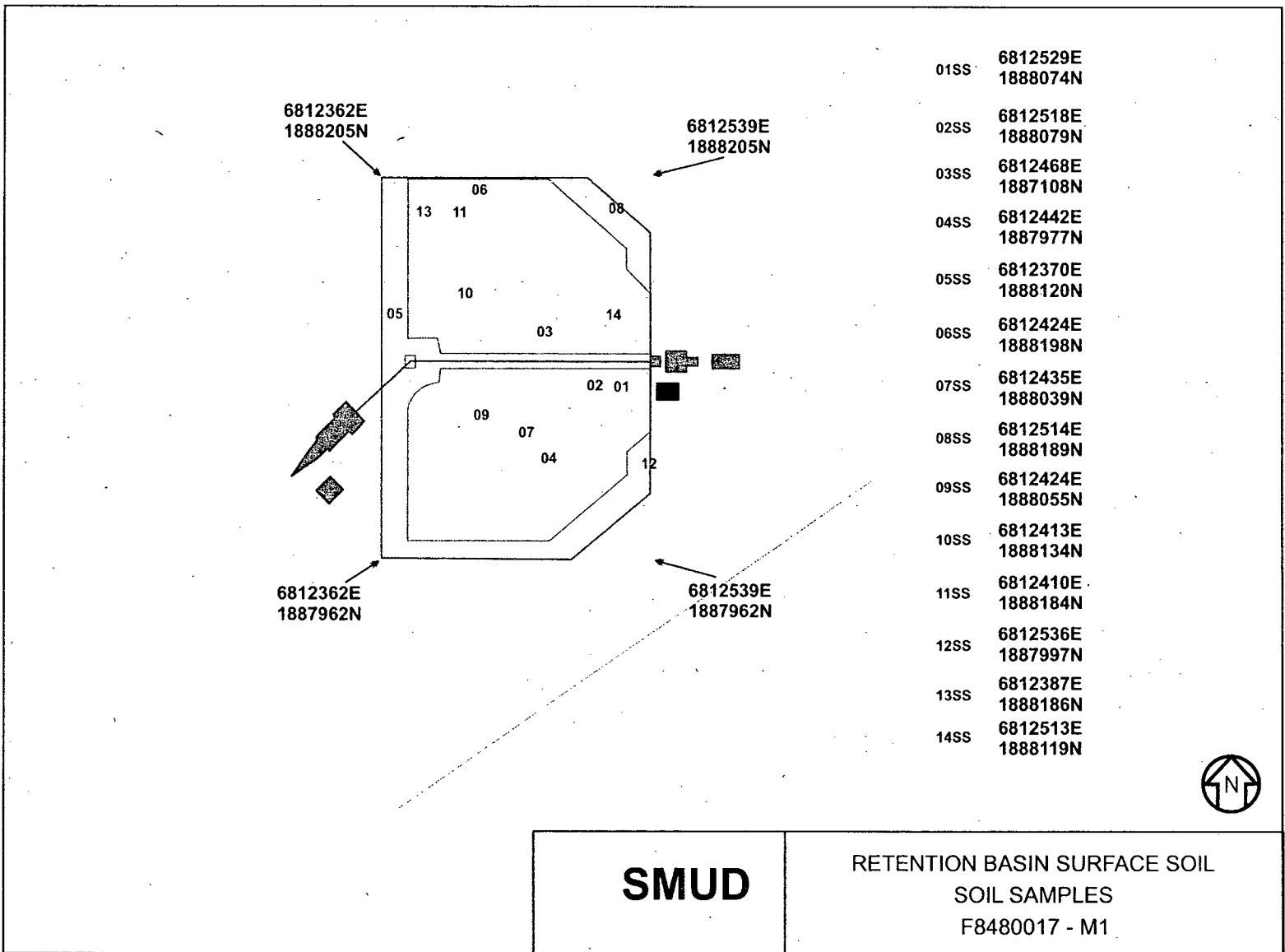
It is concluded that survey unit F8480017 meets the release criteria of 10CFR20.1402.

Attachment 1

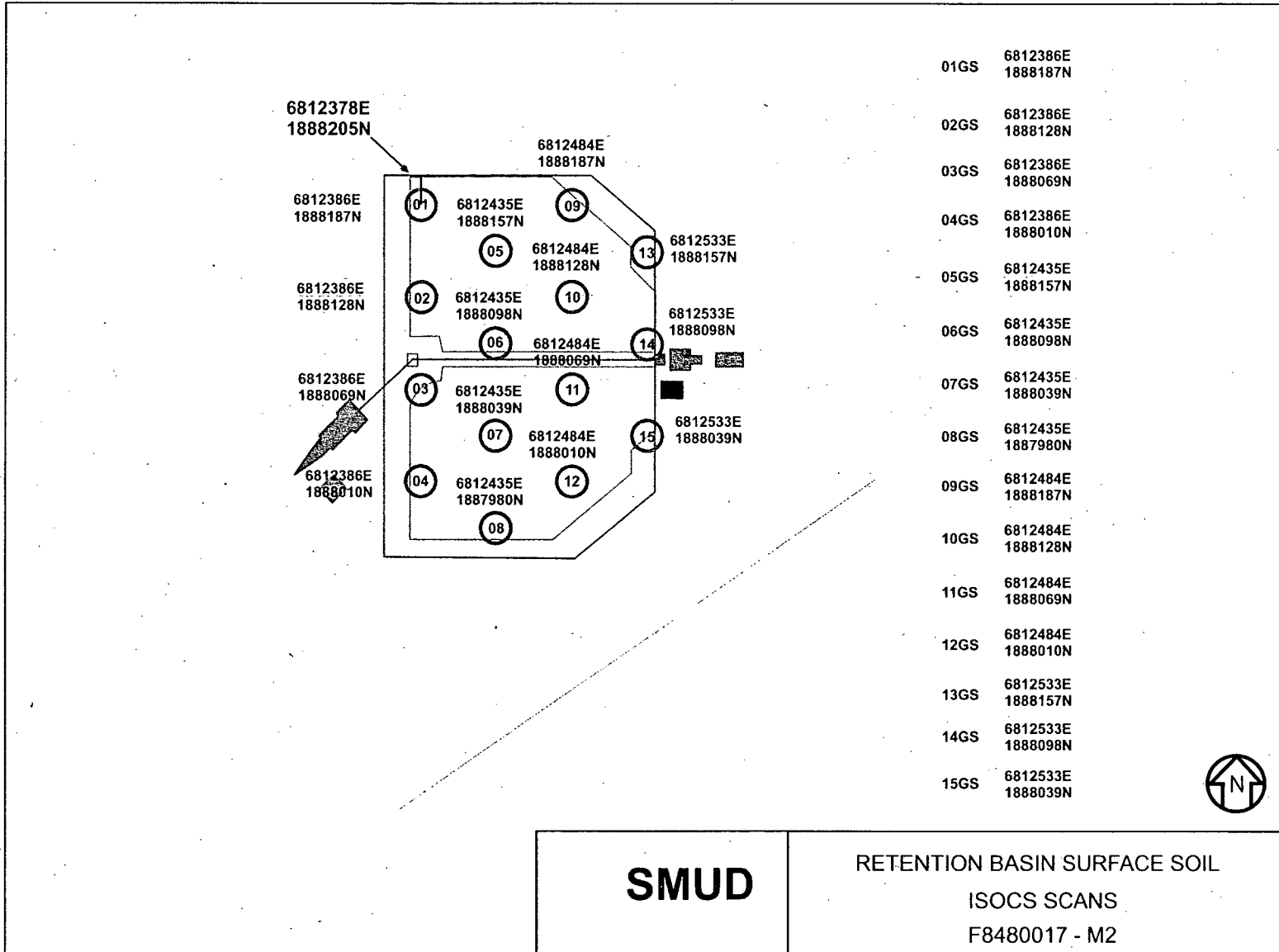
Maps

March 26, 2008

Survey Unit F8480017



- 01SS 6812529E
1888074N
- 02SS 6812518E
1888079N
- 03SS 6812468E
1887108N
- 04SS 6812442E
1887977N
- 05SS 6812370E
1888120N
- 06SS 6812424E
1888198N
- 07SS 6812435E
1888039N
- 08SS 6812514E
1888189N
- 09SS 6812424E
1888055N
- 10SS 6812413E
1888134N
- 11SS 6812410E
1888184N
- 12SS 6812536E
1887997N
- 13SS 6812387E
1888186N
- 14SS 6812513E
1888119N



Attachment 2

Instrumentation

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Survey Unit F8480017

Table 2-1. Survey Unit Instrumentation

Instrument	Detector Model No.	Detector Serial No.	MDC
HPGe	N/A	05069128	Soil – 6.56e-2 pCi/g Cs-137 Soil – 5.79e-2 pCi/g
ISOCS	N/A	2983947	Soil – 2.18e-1 pCi/g Cs-137 Soil – 1.29e-1 pCi/g Co-60

Table 2-2. Investigation Criteria and DCGL

Instrument	Parameter	Value
ISOCS	Investigation Criteria - Scan	Soil – 26.3 pCi/g Cs-137 Soil – 6.3 pCi/g Co-60
All	DCGL _w	51.2 Cs-137 12.6 Co-60
All	DCGL _{EMC}	N/A

Attachment 3

Investigation

March 26, 2008

Survey Unit F8480017

(none required)

Attachment 4

Data Assessment

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