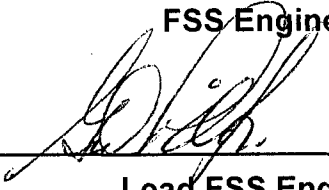


Rancho Seco
Final Status Survey Summary Report
April 1, 2008
Upper/Outer Laydown Area
Survey Unit F5010031

Prepared By: Dan A. Tallman  Date: April 1, 2008
FSS Engineer

Reviewed By:  Date: 4/1/08
Lead FSS Engineer

Approved By:  Date: 5-14-08
Dismantlement Superintendent, Radiological

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F5010031, Upper/Outer Laydown Area

Survey Unit Description:

Operating History: The area, located in the southeastern portion of the upper parking lot north of the main employee parking lot, (the Upper/Outer yard), consists of the fenced pavement surrounding (on three sides) the Hazardous Materials Warehouse plus an apron extending ~ 40 feet south of the fence line that is also paved except for the eastern 30-40 feet, which is soil. Operating records and the HSA document the potential for a release of radioactivity in this survey area. The HSA recorded two potential release events. One event involved the discovery of a pallet of articles labeled as "Contact RP prior to disassembly outside the RCA". In addition, the area was used as a staging area for outgoing and incoming radioactive material shipments. The access road over which shipments were made runs through the area.

Site Characterization: These paved areas were surveyed and found to have a maximum mean value of 2,522 dpm/100 cm² and a maximum of 3,251 dpm/100 cm². Based on the classification procedure (DSIP-0020), the area was determined to be a Class 3 area.

HSA Events: none

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 392 m² were scanned for approximately 15% coverage. Direct Gamma spectrums were taken at each direct measurement location using the InSpector 1000 and analyzed by the Canberra Genie 2000 software. 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:	F501	Upper/Outer Laydown Area
Survey Unit:	0031	Open Land Area
Class:	3	LTP Table 5-4
SU Area (m²):	2665	
Evaluator:	D.A.Tallman	
DCGL Cs137 surrogate (pCi/g):	51.2	
Area Factor:	N/A	Class 3
Design DCGL_{me} (pCi/g):	N/A	Class 3
LBGR (pCi/g):	25.6	Default = 50% DCGL
Design Sigma (pCi/g):	0.034	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):	392	
Scan Coverage (%):	14.7%	Class 3
Z_{1-α}:	1.645	
Z_{1-β}:	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	752.9	
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 F5010031. 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:		7.64E-01	
Median:		7.69E-01	
Standard Deviation:		4.93E-02	
Range:	7.00E-01 to 8.47E-01		
F5010031 A0001GD	8.35E-01	< 8.35E-01	
F5010031 A0002GD	7.72E-01	< 7.72E-01	
F5010031 A0003GD	7.97E-01	< 7.97E-01	
F5010031 A0004GD	7.97E-01	< 7.97E-01	
F5010031 A0005GD	8.06E-01	< 8.06E-01	
F5010031 A0006GD	7.11E-01	< 7.11E-01	
F5010031 A0007GD	7.25E-01	< 7.25E-01	
F5010031 A0008GD	7.66E-01	< 7.66E-01	
F5010031 A0009GD	7.12E-01	< 7.12E-01	
F5010031 A0010GD	8.47E-01	< 8.47E-01	
F5010031 A0011GD	7.28E-01	< 7.28E-01	
F5010031 A0012GD	7.13E-01	< 7.13E-01	
F5010031 A0013GD	7.89E-01	< 7.89E-01	
F5010031 A0014GD	7.00E-01	< 7.00E-01	

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 greater than the design standard deviation. However, the use of either value results in a relative shift of greater than 3 and so no additional samples were required.

Table 3. Data Assessment Results

Survey Results Parameter	Value	Comment
Actual Direct Measurements (N):	14	
Median (pCi/g):	7.69E-01	
Mean (pCi/g):	7.64E-01	
Standard Deviation (pCi/g):	4.93E-02	
Maximum (pCi/g):	8.47E-01	
Sign Test Final N Value:	14	
S+ Value:	14	
Critical Value:	10	
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:	Investigate	Use of Standard Deviation vs. design sigma does not alter the relative shift used to determine the minimum number of direct measurements required.
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 (i.e. the survey unit average activity is less than the DCGL and the EMC criterion has been met), 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 greater 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.

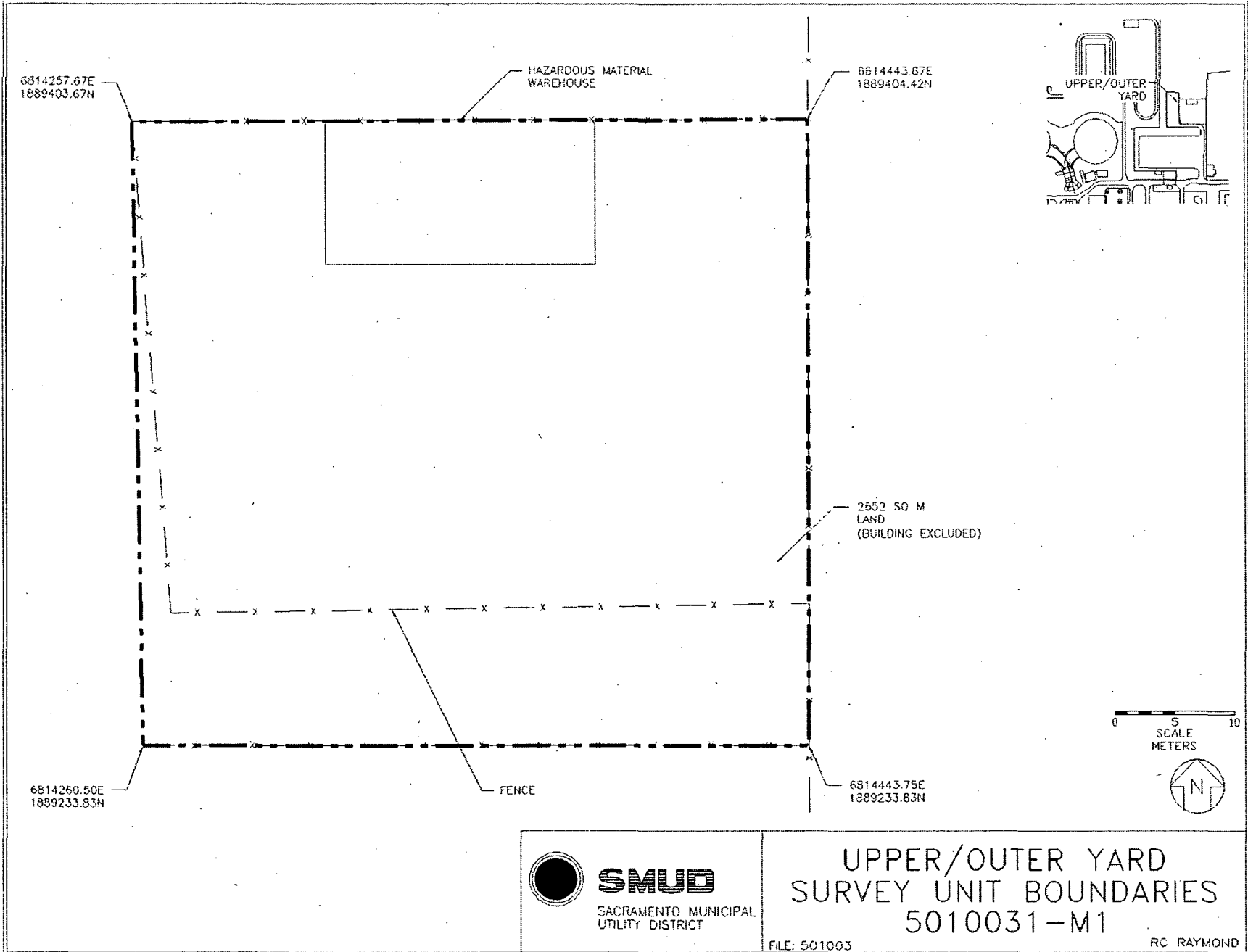
It is concluded that survey unit F5010031 meets the release criteria of 10CFR20.1402.

Attachment 1

Maps

April 1, 2008

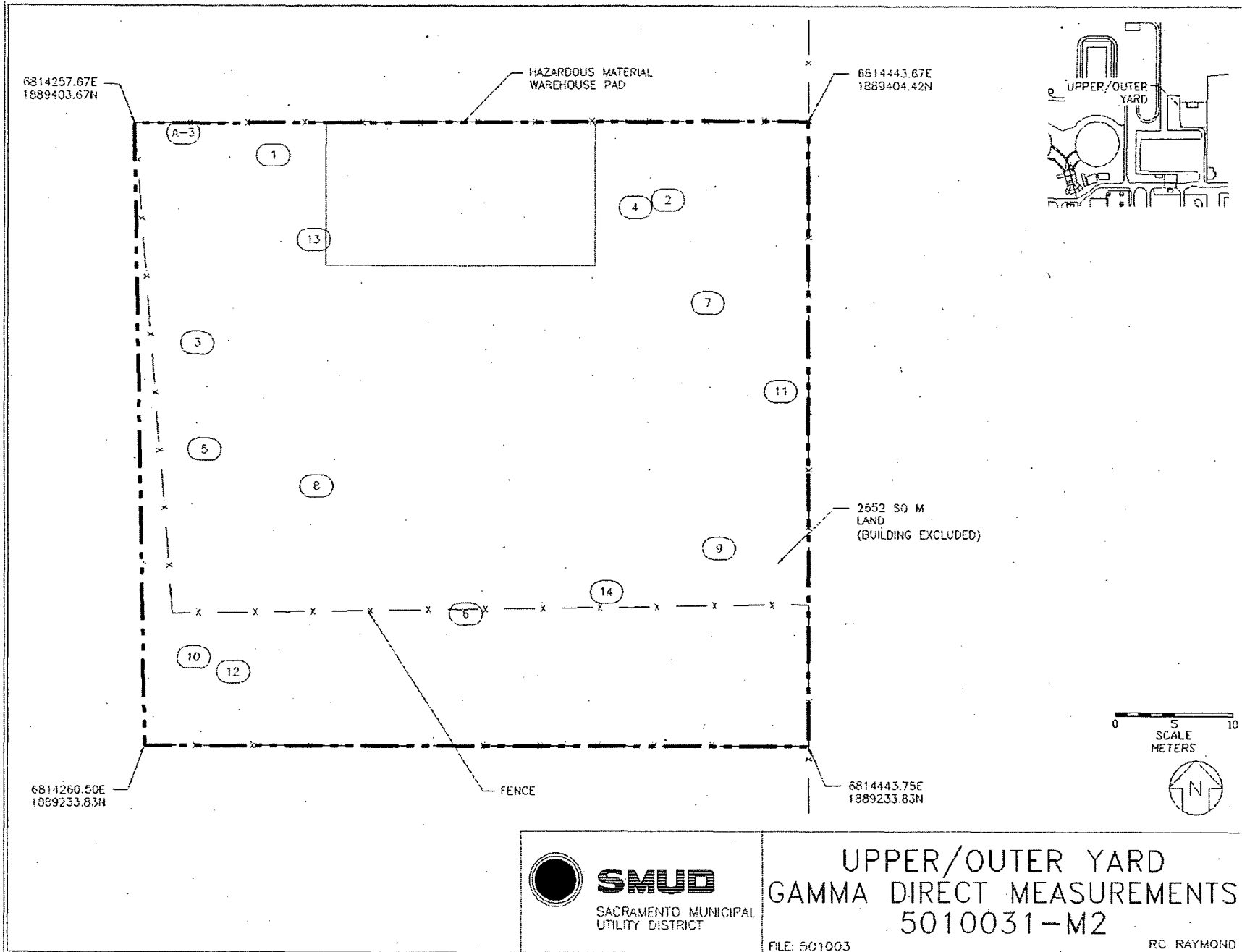
Survey Unit F5010031

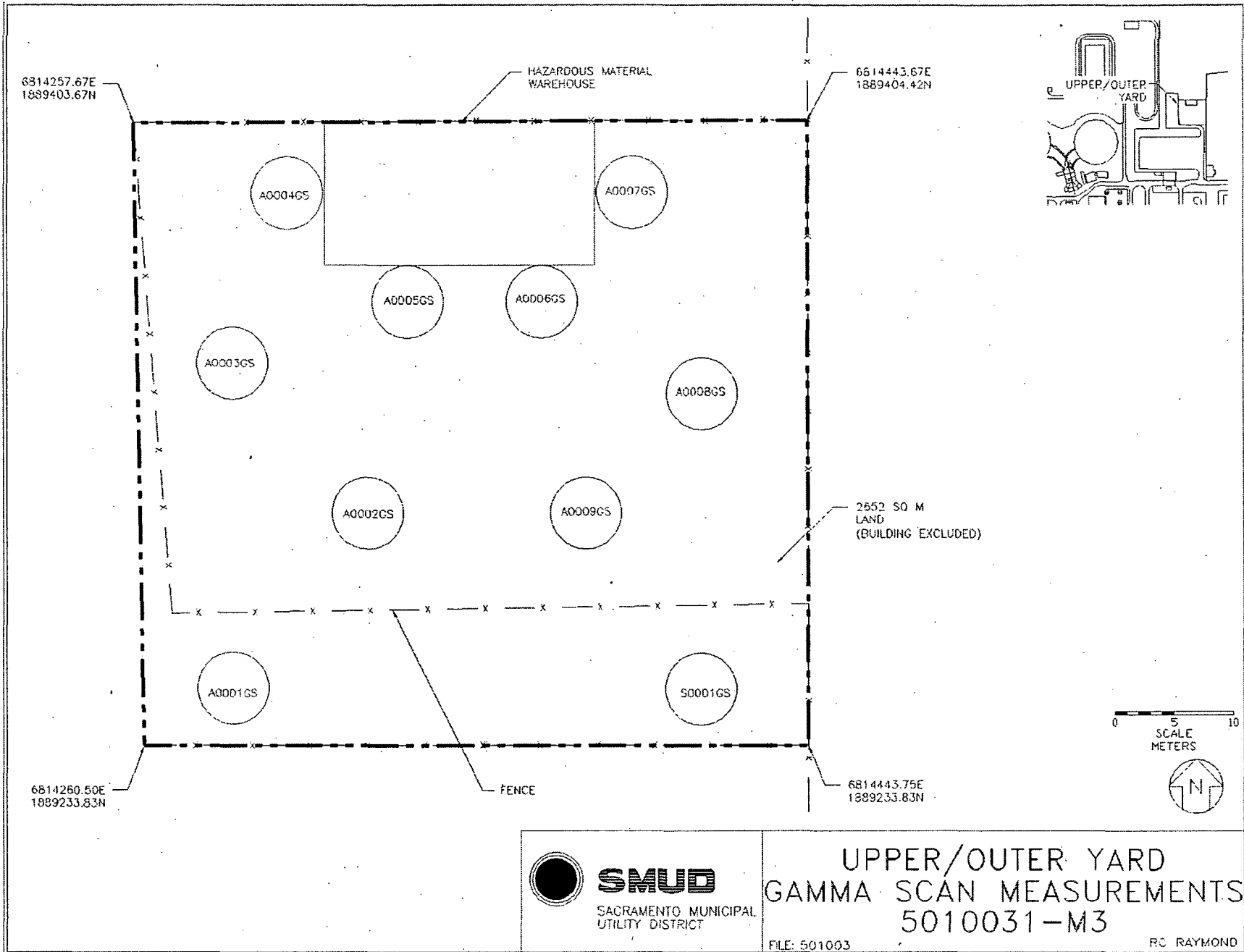


UPPER/OUTER YARD
 SURVEY UNIT BOUNDARIES
 5010031-M1

FILE: 501003

RC RAYMOND





UPPER/OUTER YARD
 GAMMA SCAN MEASUREMENTS
 5010031-M3

FILE: 501003

RC RAYMOND

Attachment 2

Instrumentation

April 1, 2008

Survey Unit F5010031

Table 2-1. Survey Unit Instrumentation

Instrument	Detector Model No.	Detector Serial No.	MDC
Inspector	N/A	08051294	Asphalt – 0.847 pCi/g Cs-137 Asphalt – 0.781 pCi/g Co-60
ISOCS	N/A	2983947	Soil – 0.323 pCi/g Cs-137 Soil – 0.227 pCi/g Co-60 Asphalt – 0.358 pCi/g Cs-137 Asphalt – 0.274 pCi/g Co-60

Table 2-2. Investigation Criteria and DCGL

Instrument	Parameter	Value
Inspector	Investigation Criteria – Direct Measurement	Soil/Asphalt – 5.1 ¹ pCi/g Cs-137 Soil/Asphalt – 5.1 ¹ pCi/g Co-60
ISOCS	Investigation Criteria - Scan	Soil/Asphalt – 20 pCi/g Cs-137 Soil/Asphalt – 5 pCi/g Co-60
All	DCGL _w	51.2 Cs-137 12.6 Co-60

¹ Positive identification of Plant derived radionuclides will be investigated.

Attachment 3

Investigation

April 1, 2008

Survey Unit F5010031

(none required)

Attachment 4

Data Assessment

April 1, 2008

Survey Unit F5010031

