Rancho Seco

Final Status Survey Summary Report

January 7, 2009

Cooling Tower Buffer (East)

Survey Unit F8080033

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FSS Engineer

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Dismantlement Superintendent, Radiological

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8080033, Cooling Tower Buffer (East)

Survey Unit Description:

Operating History: The cooling towers and basins were part of the condenser cooling water system. The paved area comprising the basins was not reported to have been used for the storage of radioactive material. Operating records and the HSA document one event with the potential for a release of radioactivity associated with this survey area.

Site Characterization: Direct measurements were made of the exterior surfaces of the structure which confirmed the presence of plant-derived radionuclides. Direct structure measurements showed a mean gross activity level of 4,952 dpm/100 cm2 and a maximum value of 6,289 dpm/100 cm2. Based on the classification procedure (DSIP-0020) and levels of gross activity reported, the area was determined to be a Class 2 area.

HSA Events: PDQ-930036.

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 determined using a random-start, fixed grid pattern and 1300 m^2 were scanned for approximately 20% coverage. 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:	F808	Cooling Tower Buffer (East)
Survey Unit:	0033	Open Land Area
Class:	2	LTP Table 5-4
SU Area (m^2)**:**	6481	
Evaluator:	Erin L. Brown	
DCGL Cs137 surrogate (pCi/g)**:**	51.2	
Area Factor:	N/A	Class 2
Design DCGLemc (pCi/g)**:**	N/A	Class 2
LBGR (pCi/g)**:**	25.6	Default = 50% DCGL
Design Sigma (pCi/g)**:**	0.92	LTP Table 5-4C, Rev. No. 1
Type I Error:	0.05	
Type II Error:	0.05	
Nuclide:	Cs137	
Sample Area (m^2)**:**	462.9	Class 2
Total Area Scanned (m^2)**:**	1300	
Scan Coverage (%):	20.1%	Class 2
$Z_{1-\alpha}$ **:**	1.645	
$Z_{1-\beta}$ **:**	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	27.8	
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:	21.5	Class 2

Survey Results:

A total of 16 direct measurements were made in F8080033. The results including mean, median, standard deviation and range are shown in Table 2. All of the direct measurements were less than the DCGL. All 46 ISOCS scans were less than or equal to the MDC values listed in Table 2-1.

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

Measurement ID	Cs137 MDA	Cs137 Activity	Uncertainty
Mean:		9.52E-01	
Median:		9.68E-01	
Standard Deviation:		3.63E-02	
Range:	8.84E-01 to 1.00E00		
F8080033 A0009GD	9.04E-01	< 9.04E-01	
F8080033 A0008GD	9.03E-01	< 9.03E-01	
F8080033 A0007GD	8.97E-01	< 8.97E-01	
F8080033 A0006GD	9.69E-01	< 9.69E-01	
F8080033 A0005GD	9.36E-01	< 9.36E-01	
F8080033 A0004GD	9.53E-01	< 9.53E-01	
F8080033 A0003GD	9.63E-01	< 9.63E-01	
F8080033 A0002GD	9.69E-01	< 9.69E-01	
F8080033 A0001GD	9.93E-01	< 9.93E-01	
F8080033 A0016GD	9.73E-01	< 9.73E-01	
F8080033 A0015GD	9.80E-01	< 9.80E-01	
F8080033 A0014GD	9.66E-01	< 9.66E-01	
F8080033 A0013GD	1.00E00	< 1.00E00	
F8080033 A0012GD	9.69E-01	< 9.69E-01	
F8080033 A0011GD	9.80E-01	< 9.80E-01	
F8080033 A0010GD	8.84E-01	< 8.84E-01	

Survey Unit Data Assessment:

The survey design required 16 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):	16	
Median (pCi/g)**:**	9.68E-01	
Mean (pCi/g)**:**	9.52E-01	
Standard Deviation (pCi/g)**:**	3.63E-02	
Maximum (pCi/g)**:**	1.00E00	
Sign Test Final N Value:	16	
S+ Value:	16	
Critical Value:	11	
Sufficient Samples Collected:	Yes	
Maximum Value < DCGL:	Yes	
Median Value < DCGL:	Yes	
Mean Value < DCGL:	Yes	
Maximum Value < DCGLemc:	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 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 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 F8080033 meets the release criteria of 10CFR20.1402.

Attachment 1

Maps

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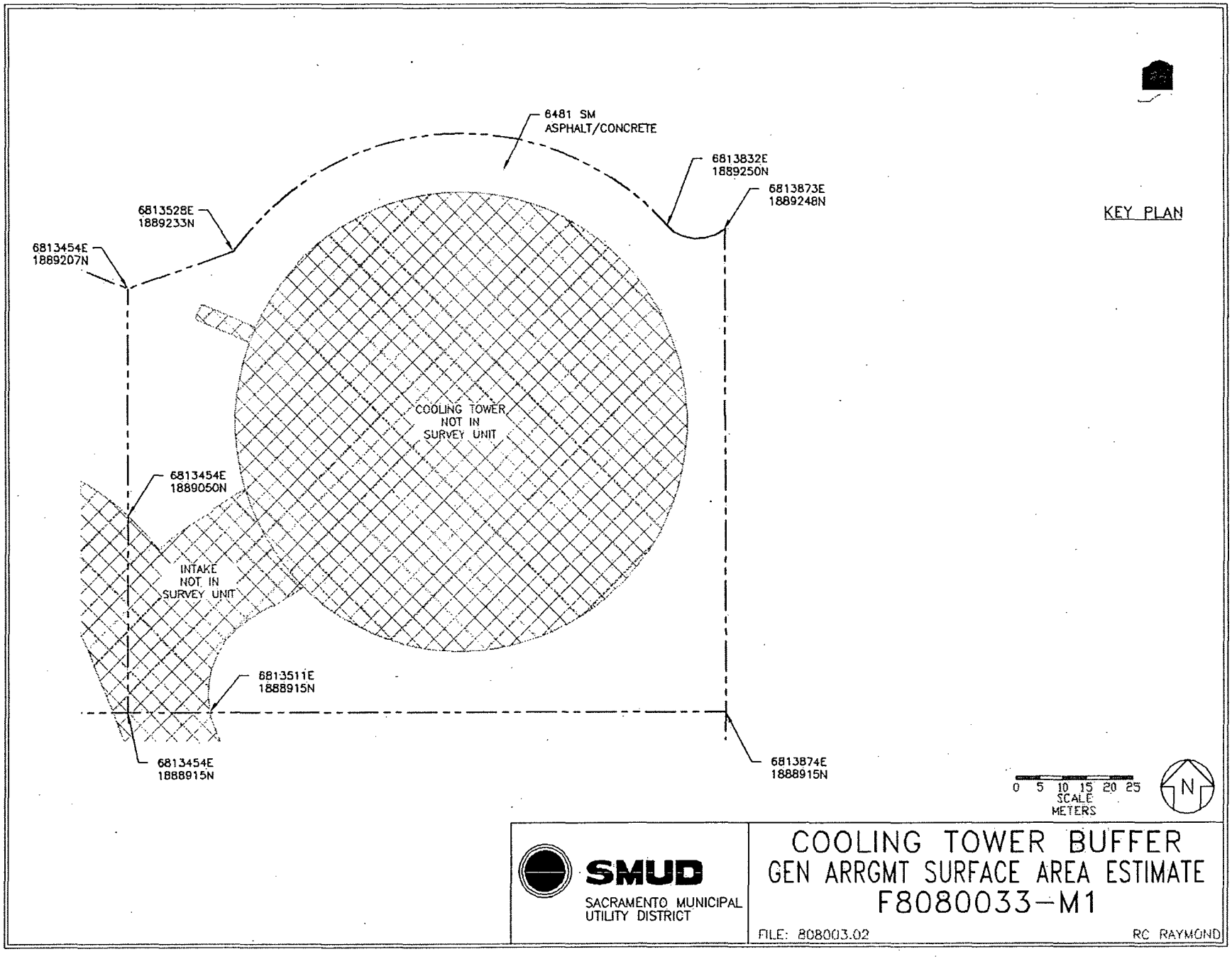
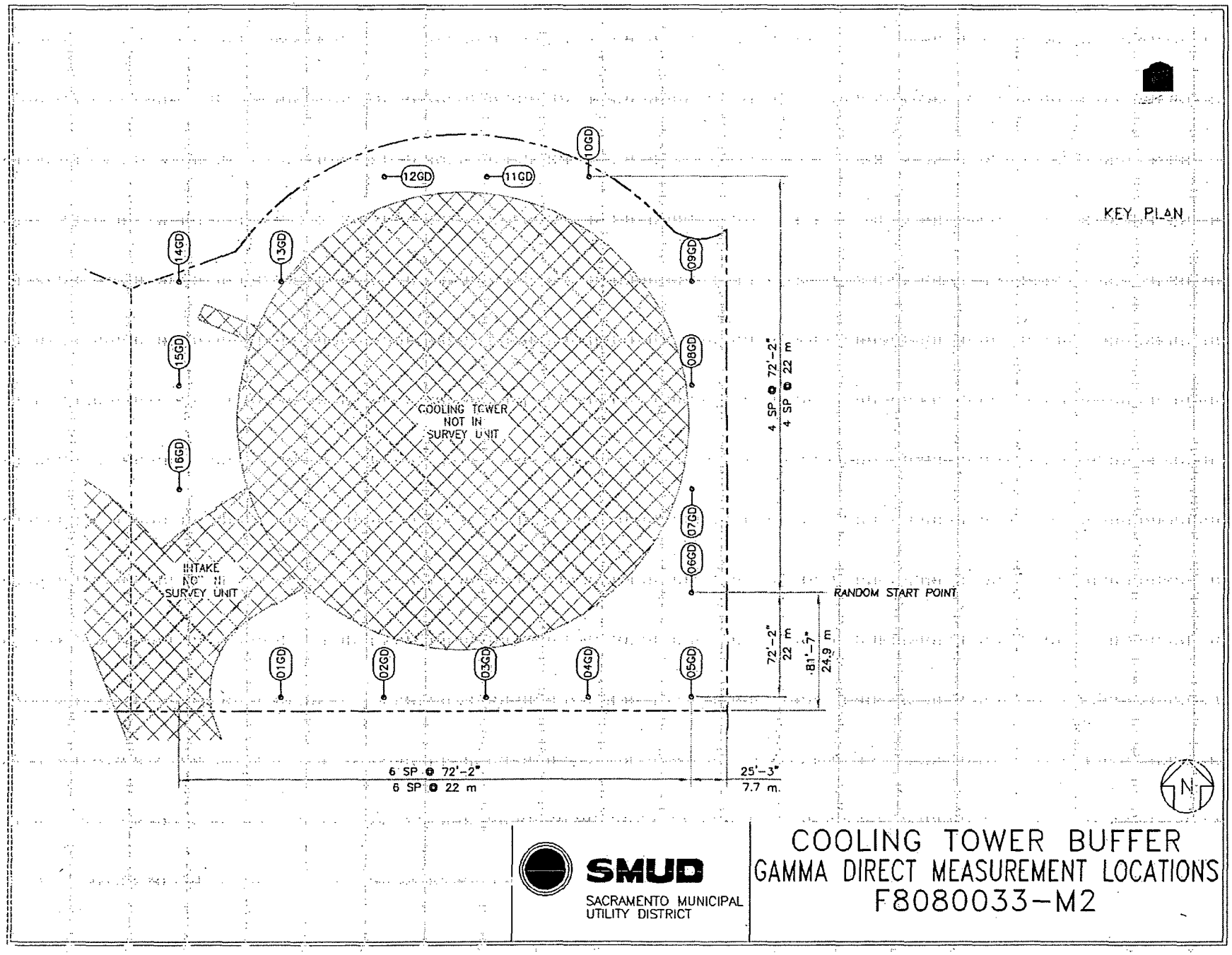
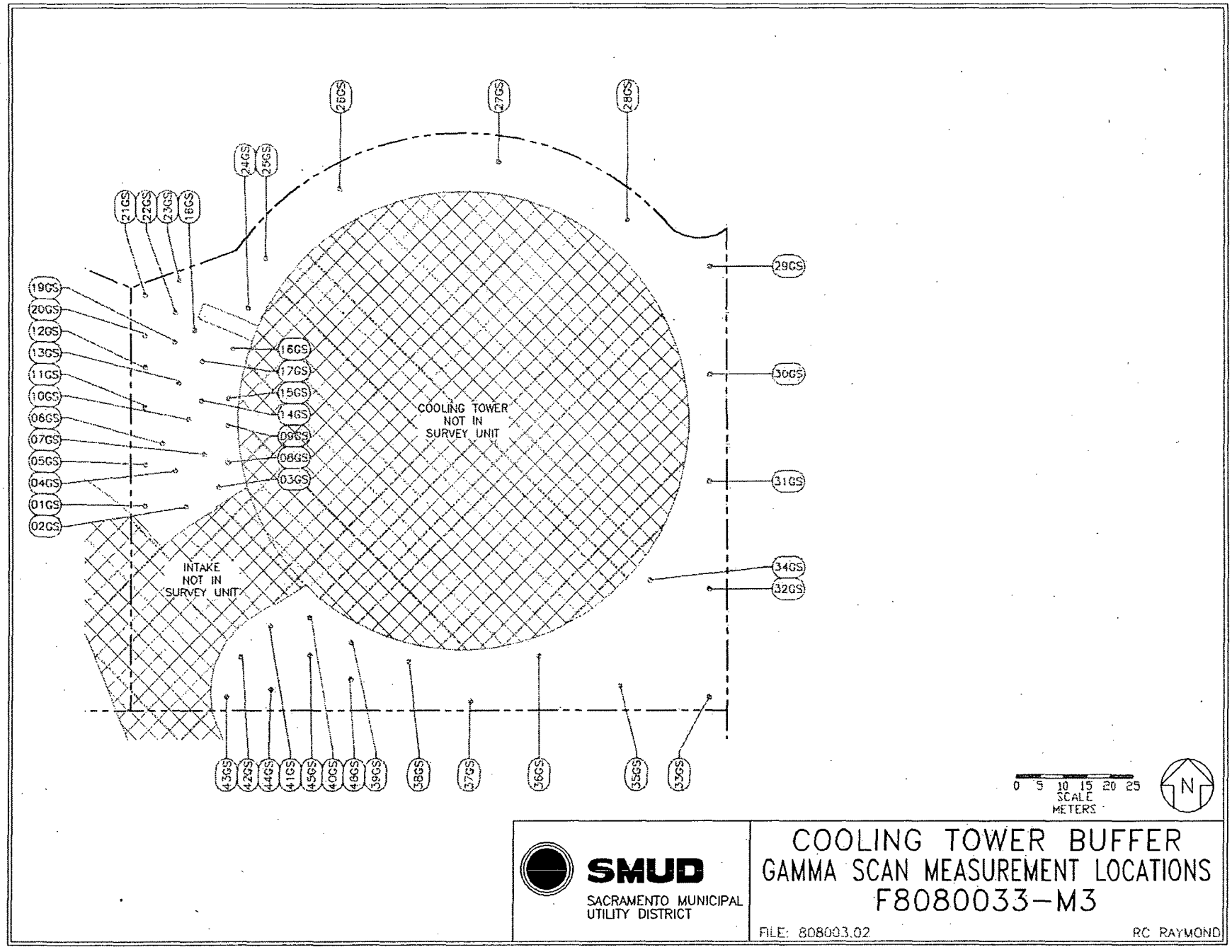
Survey Unit F8080033


6481 SM
ASPHALT/CONCRETE
6813832E
1889250N
6813873E
1889248N
6813528E
1889233N
6813454E
1889207N
COOLING TOWER
NOT IN
SURVEY UNIT
6813454E
1889050N
INTAKE
NOT IN
SURVEY UNIT
6813511E
1888915N
6813454E
1888915N
6813874E
1888915N
KEY PLAN
0 5 10 15 20 25
SCALE
METERS
N
SMUD
SACRAMENTO MUNICIPAL
UTILITY DISTRICT
COOLING TOWER BUFFER
GEN ARRGMT SURFACE AREA ESTIMATE
F8080033-M1
FILE: 808003.02
RC RAYMOND


KEY PLAN
10GD
11GD
12GD
13GD
14GD
15GD
16GD
09GD
08GD
07GD
06GD
05GD
01GD
02GD
03GD
04GD
COOLING TOWER
NOT IN
SURVEY UNIT
INTAKE
NOT IN
SURVEY UNIT
4 SP @ 72'-2"
4 SP @ 22 m
RANDOM START POINT
72'-2"
22 m
81'-7"
24.9 m
6 SP @ 72'-2"
6 SP @ 22 m
25'-3"
7.7 m
N
SMUD
SACRAMENTO MUNICIPAL
UTILITY DISTRICT
COOLING TOWER BUFFER
GAMMA DIRECT MEASUREMENT LOCATIONS
F8080033-M2


26GS
27GS
28GS
24GS
25GS
21GS
22GS
23GS
18GS
29GS
19GS
20GS
12GS
13GS
11GS
10GS
06GS
07GS
05GS
04GS
01GS
02GS
16GS
17GS
15GS
14GS
09GS
08GS
03GS
30GS
31GS
34GS
32GS
COOLING TOWER
NOT IN
SURVEY UNIT
INTAKE
NOT IN
SURVEY UNIT
43GS
42GS
44GS
41GS
45GS
40GS
46GS
39GS
38GS
37GS
36GS
35GS
33GS
0 5 10 15 20 25
SCALE
METERS
N
SMUD
SACRAMENTO MUNICIPAL
UTILITY DISTRICT
COOLING TOWER BUFFER
GAMMA SCAN MEASUREMENT LOCATIONS
F8080033-M3
FILE: 808003.02
RC RAYMOND

Attachment 2

Instrumentation

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Survey Unit F8080033

Table 2-1. Survey Unit Instrumentation

Instrument	Detector Model No.	Detector Serial No.	MDC
Inspector	N/A	08051294	1.00E00 pCi/g Cs-137 1.01E00 pCi/g Co-60
ISOCS	N/A	1983920	3.61E-01 pCi/g Cs-137 2.65E-01 pCi/g Co-60
ISOCS	N/A	2983947	3.37E-01 pCi/g Cs-137 2.50E-01 pCi/g Co-60

Table 2-2. Investigation Criteria and DCGL

Instrument	Parameter	Value
ISOCS	Investigation Criteria - Scan	23 Cs-137
All	$DCGL_W$	51.2 Cs-137 12.6 Co-60
All	$DCGL_{EMC}$	N/A

Attachment 3

Investigation

January 7, 2009

Survey Unit F8080033

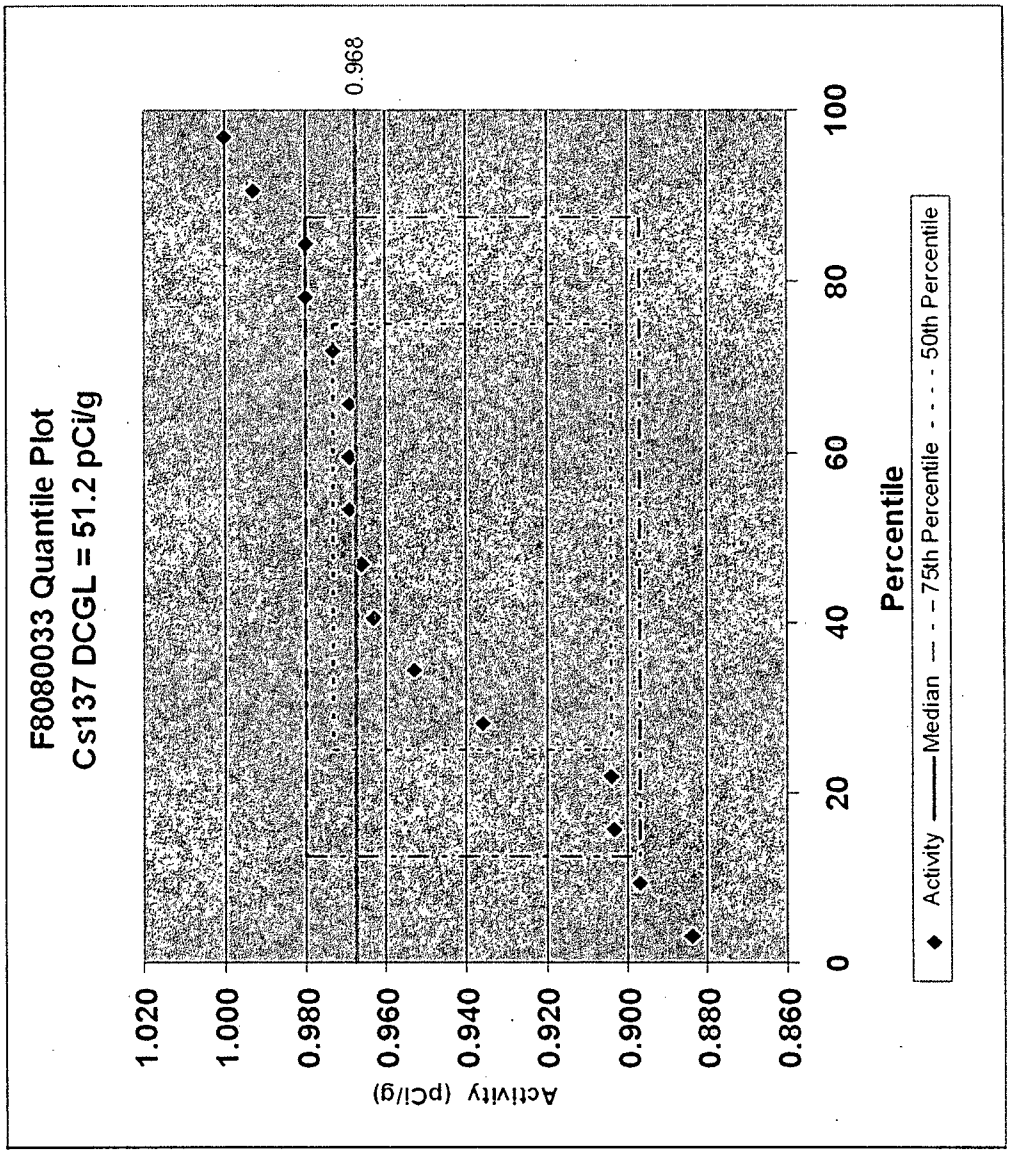
(none required)

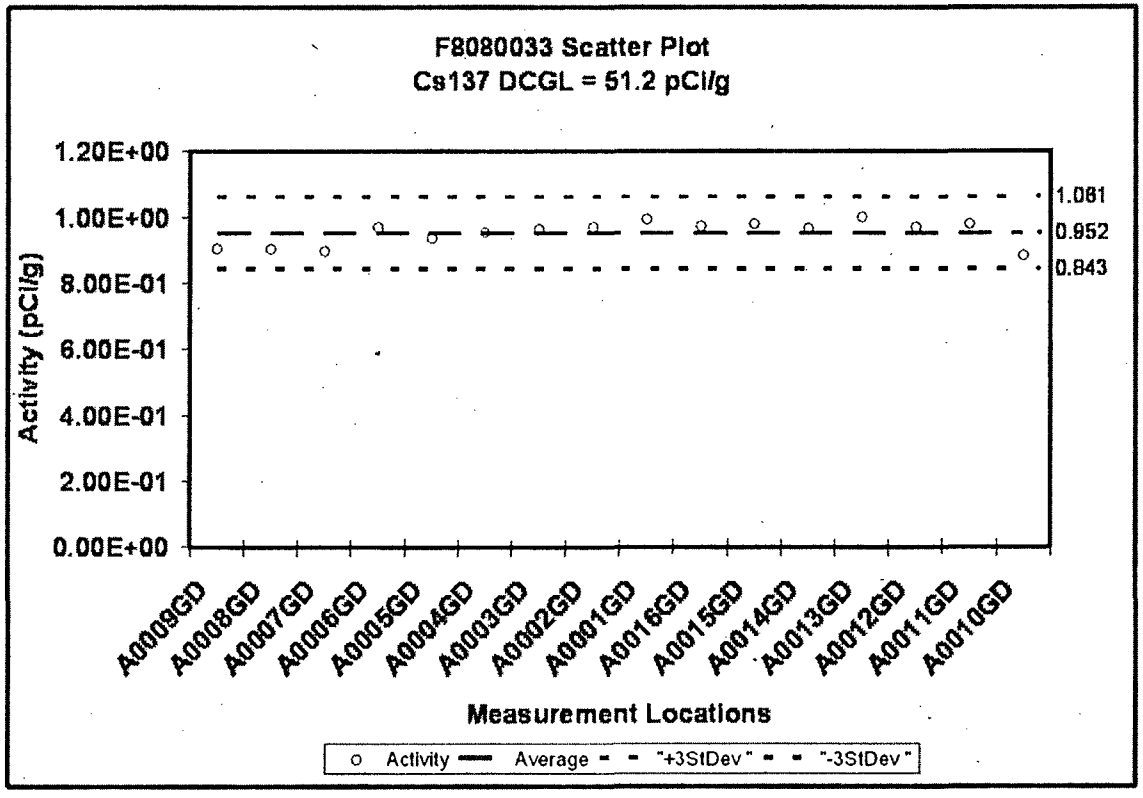
Attachment 4

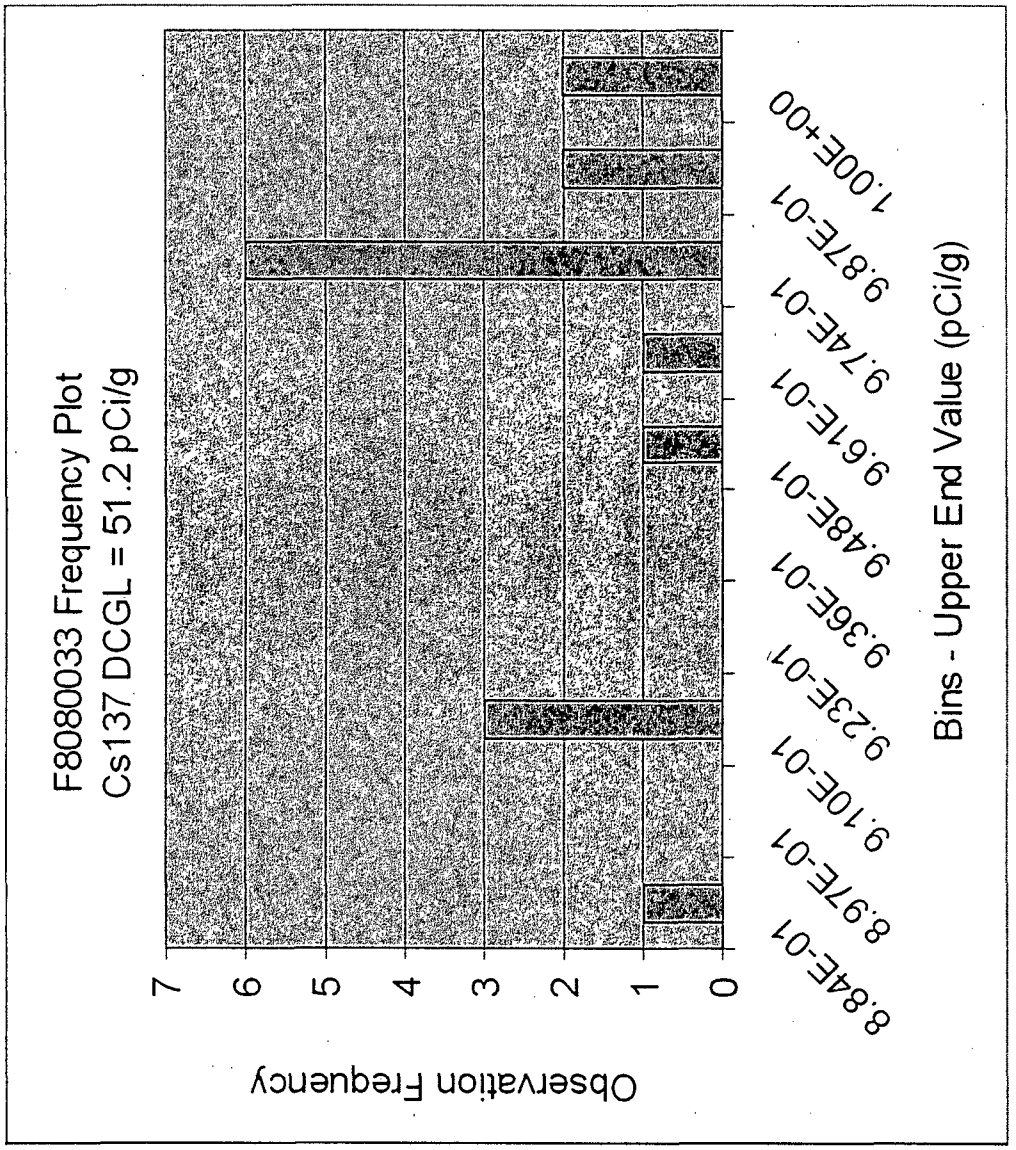
Data Assessment

January 7, 2009

Survey Unit F8080033


F8080033 Quantile Plot
Cs137 DCGL = 51.2 pCi/g
0.968
1.020
1.000
0.980
0.960
0.940
0.920
0.900
0.880
0.860
Activity (pCi/g)
0
20
40
60
80
100
Percentile
Activity
Median
75th Percentile
50th Percentile


F8080033 Scatter Plot
Cs137 DCGL = 51.2 pCi/g
1.20E+00
1.00E+00
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
Activity (pCi/g)
1.081
0.952
0.843
A0009GD
A0008GD
A0007GD
A0006GD
A0005GD
A0004GD
A0003GD
A0002GD
A0001GD
A0016GD
A0015GD
A0014GD
A0013GD
A0012GD
A0011GD
A0010GD
Measurement Locations
Activity
Average
"+3StDev"
"-3StDev"


F8080033 Frequency Plot
Cs137 DCGL = 51.2 pCi/g
Observation Frequency
0
1
2
3
4
5
6
7
8.84E-01
8.97E-01
9.10E-01
9.23E-01
9.36E-01
9.48E-01
9.61E-01
9.74E-01
9.87E-01
1.00E+00
Bins - Upper End Value (pCi/g)