

Rancho Seco

Final Status Survey Summary Report

November 6, 2007

Waste Gas Decay Tank Room Upper Walls and Ceiling (Room 018)

Survey Unit F8130211

Prepared By: Michael Stein Date: 11/6/2007
FSS Engineer

Reviewed By: [Signature] Date: 11/6/07
Lead FSS Engineer

Approved By: [Signature] Date: 11-13-07
Dismantlement Superintendent, Radiological

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8130211, Waste Gas Decay Tank Room Upper Walls and Ceiling (Room 018)

Survey Unit Description:

Operating History: The Waste Gas Decay Tank Room is located on the -20' elevation of the Auxiliary Building. The Auxiliary Building is a reinforced concrete structure that, during power operations, contained the Radwaste processing and supporting systems. The building has six main elevations. Residual levels of surface radioactivity were detected on all interior elevations of the building. Operating records and the HSA document several events with the potential for a release of radioactivity inside this structure.

Site Characterization: Direct measurements were taken on each interior elevation of the Auxiliary Building. These measurements confirmed the presence of plant-derived radionuclides. Direct measurements taken on the -20' elevation, showed a mean gross activity level of 247,831 dpm/100 cm² and a maximum value of 10,080,000 dpm/100 cm². Based on the classification procedure (DSIP-0020) and levels of gross activity reported, the interior surfaces of the Auxiliary Building were determined primarily to be a Class 1 for the floors and lower walls (bottom 2 meters of the walls), and Class 2 for the upper walls and ceiling. Inside the Waste Gas Decay Tank Room the gross surface activity levels on the upper walls and ceiling were less than the DCGL prior to remediation. Therefore, a Class 2 final status survey was performed on the upper wall and ceiling surfaces of the room.

HSA Events: HSA Report pg. 63.

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 72 m² were scanned for approximately 35% coverage. Samples of removable contamination were collected at each direct measurement location. 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:	F813	Waste Gas Decay Tank Room (Room 018)
Survey Unit:	0211	Structure Surface
Class:	2	LTP Table 5-4
SU Area (m ²):	204	
Evaluator:	Michael Stein	
DCGL (dpm/100 cm ²):	43000	Gross Activity DCGL
Area Factor:	N/A	Class 2
Design DCGL _{emc} (dpm/100 cm ²):	N/A	Class 2
LBGR (dpm/100 cm ²):	21500	Default = 50% DCGL
Design Sigma (dpm/100 cm ²):	12035	
Type I Error:	0.05	
Type II Error:	0.05	
Predominant Nuclide:	Cs-137	
Sample Area (m ²):	12	Class 2
Scan Area (m ²):	72	
Scan Coverage (%):	35%	Class 2
Z _{1-α} :	1.645	
Z _{1-β} :	1.645	
Sign P:	0.955435	
Calculated Relative Shift:	1.7	
Relative Shift Used:	1.7	Uses 3.0 if Relative Shift is >3
N-Value:	14	
Design N-Value + 20%:	17	NUREG-1575 Table 5-5
Design Min Samples N:	17	Class 2
Grid Spacing L:	3.5	Class 2

Survey Results:

A total of 20 direct measurements were made in F8130211. The results including mean, median, standard deviation and range are shown in Table 2. All direct measurements were less than the DCGL. None of the scan measurements indicated areas of elevated activity. Scan activity ranged from 3,132 to 28,207 dpm/100 cm², based on a surveyor efficiency of 0.5 and no background subtracted. Samples for removable surface activity were all less than 10% of the DCGL as shown in Table 3. Removable surface activity samples were counted for alpha activity and none was detected at the MDC shown in Table 2-1 of Attachment 2.

Table 2. Direct Measurement Results

Measurement ID	Gross Activity (dpm/100 cm ²)
F8130211-C0001BD	1478
F8130211-C0002BD	1675
F8130211-C0003BD	1447
F8130211-C0004BD	1390
F8130211-C0005BD	1390
F8130211-C0006BD	1468
F8130211-C0007BD	1447
F8130211-C0008BD	1546
F8130211-C0009BD	1375
F8130211-C0010BD	1463
F8130211-C0011BD	1447
F8130211-C0012BD	1442
F8130211-C0013BD	1592
F8130211-C0014BD	1592
F8130211-C0015BD	1473
F8130211-C0016BD	1489
F8130211-C0017BD	1644
F8130211-C0018BD	1551
F8130211-C0019BD	1644
F8130211-C0020BD	1463
Mean:	1501
Median:	1471
Standard Deviation:	89
Range:	1375 - 1675

Table 3. Removable Surface Activity Results

Measurement ID	Surface Beta Activity (dpm/100 cm²)
F8130211C0001SM	8.7
F8130211C0002SM	7.42
F8130211C0003SM	4.86
F8130211C0004SM	9.98
F8130211C0005SM	6.14
F8130211C0006SM	1.01
F8130211C0007SM	1.01
F8130211C0008SM	1.01
F8130211C0010SM	2.29
F8130211C0011SM	7.42
F8130211C0012SM	1.01
F8130211C0013SM	3.58
F8130211C0014SM	3.58
F8130211C0015SM	3.58
F8130211C0016SM	-0.27
F8130211C0017SM	9.98
F8130211C0018SM	-1.55
F8130211C0019SM	-1.55
F8130211C0019SM	2.29
F8130211C0020SM	6.14
Mean:	3.83
Median:	3.58
Standard Deviation:	3.62
Range:	-1.55 to 9.98

Survey Unit Data Assessment:

The survey design required 17 direct measurements for the Sign Test. In actuality, 20 direct measurements were obtained. The critical value and the results of the Sign Test are presented in Table 4. 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 4. Data Assessment Results

Survey Results Parameter	Value	Comment
Material Background Used (dpm/100 cm ²):	N/A	
Ambient Background Used (dpm/100 cm ²):	N/A	Average Ambient BKG = 0
Actual Direct Measurements (N):	20	
Median (dpm/100 cm ²):	1471	
Mean (dpm/100 cm ²):	1501	
Direct Measurement Standard Deviation	89	
(dpm/100 cm ²):		
Total Standard Deviation (dpm/100 cm ²):	89	Based on samples and backgrounds.
Maximum (dpm/100 cm ²):	1675	
Material Type:	N/A	Background Subtract Not Applied
Sign Test Final N Value:	20	
S+ Value:	20	
Critical Value:	14	
Sufficient Samples Collected:	Yes	
Maximum Value < DCGL:	Yes	
Median Value < DCGL:	Yes	
Mean Value < DCGL:	Yes	
Maximum Value < DCGL_{mc}:	N/A	Class 2
Total Standard Deviation <= Sigma:	Yes	
Pass the Sign Test?	Yes	
Reject the Null Hypothesis?	Yes	
Does the Survey Unit Pass All Criteria?	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 structure 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.

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. No direct measurements exceeded the DCGL of 43000 dpm/100 cm² and none of the removable surface activity measurements exceeded 10% of 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.

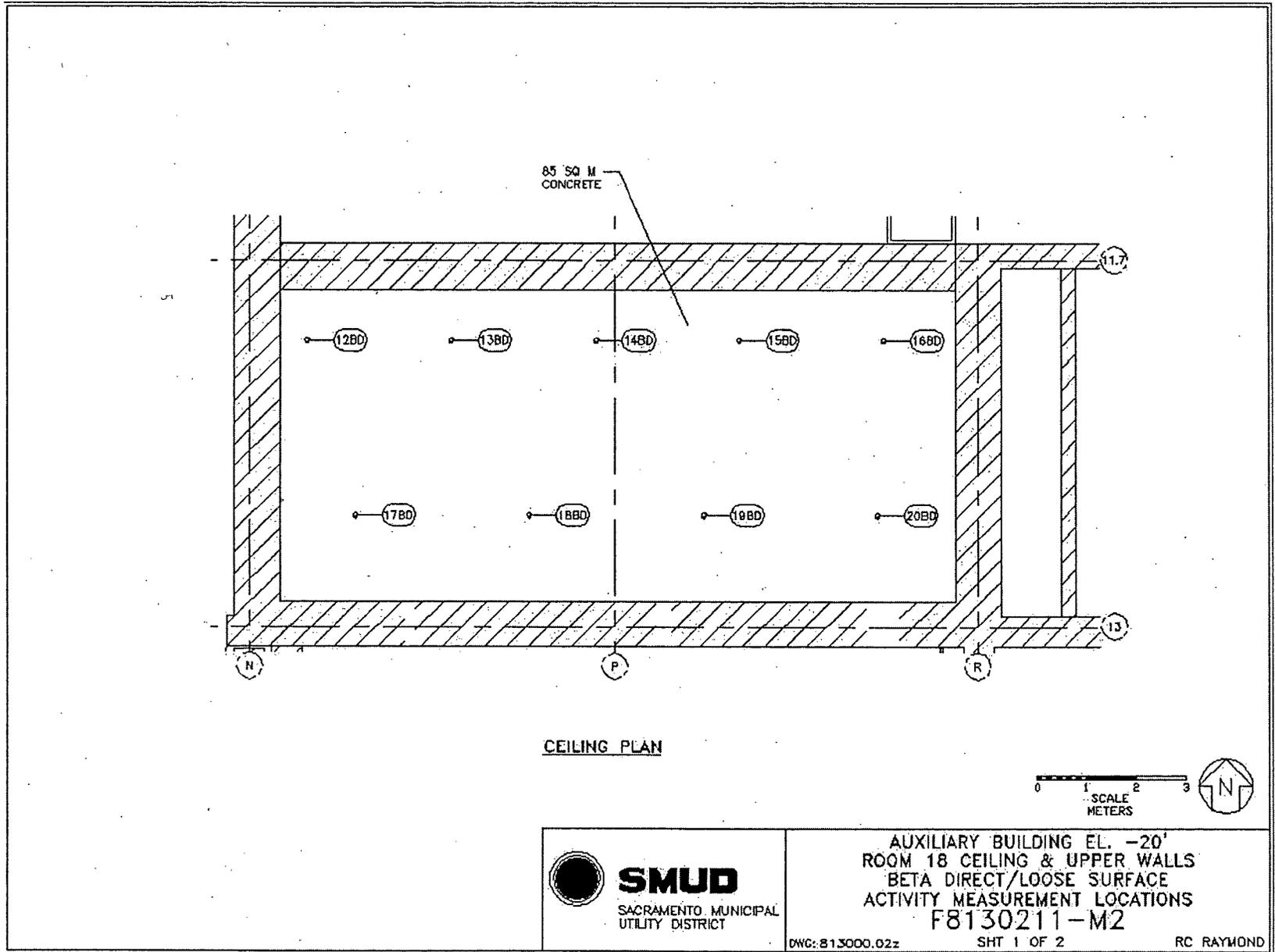
It is concluded that survey unit F8130211 meets the release criteria of 10CFR20.1402.

Attachment 1

Maps

November 6, 2007

Survey Unit F8130211



CEILING PLAN



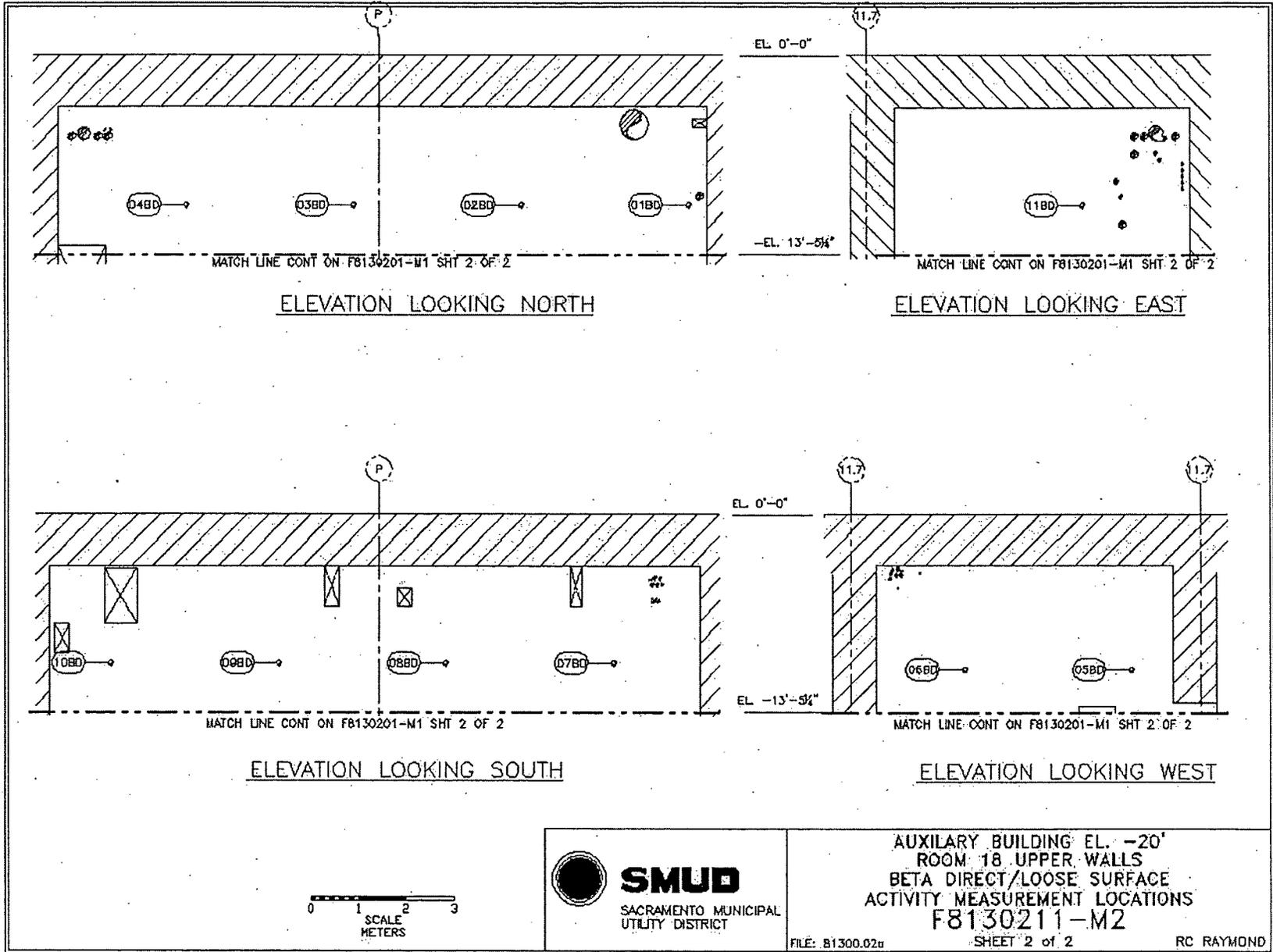
SMUD
SACRAMENTO MUNICIPAL
UTILITY DISTRICT

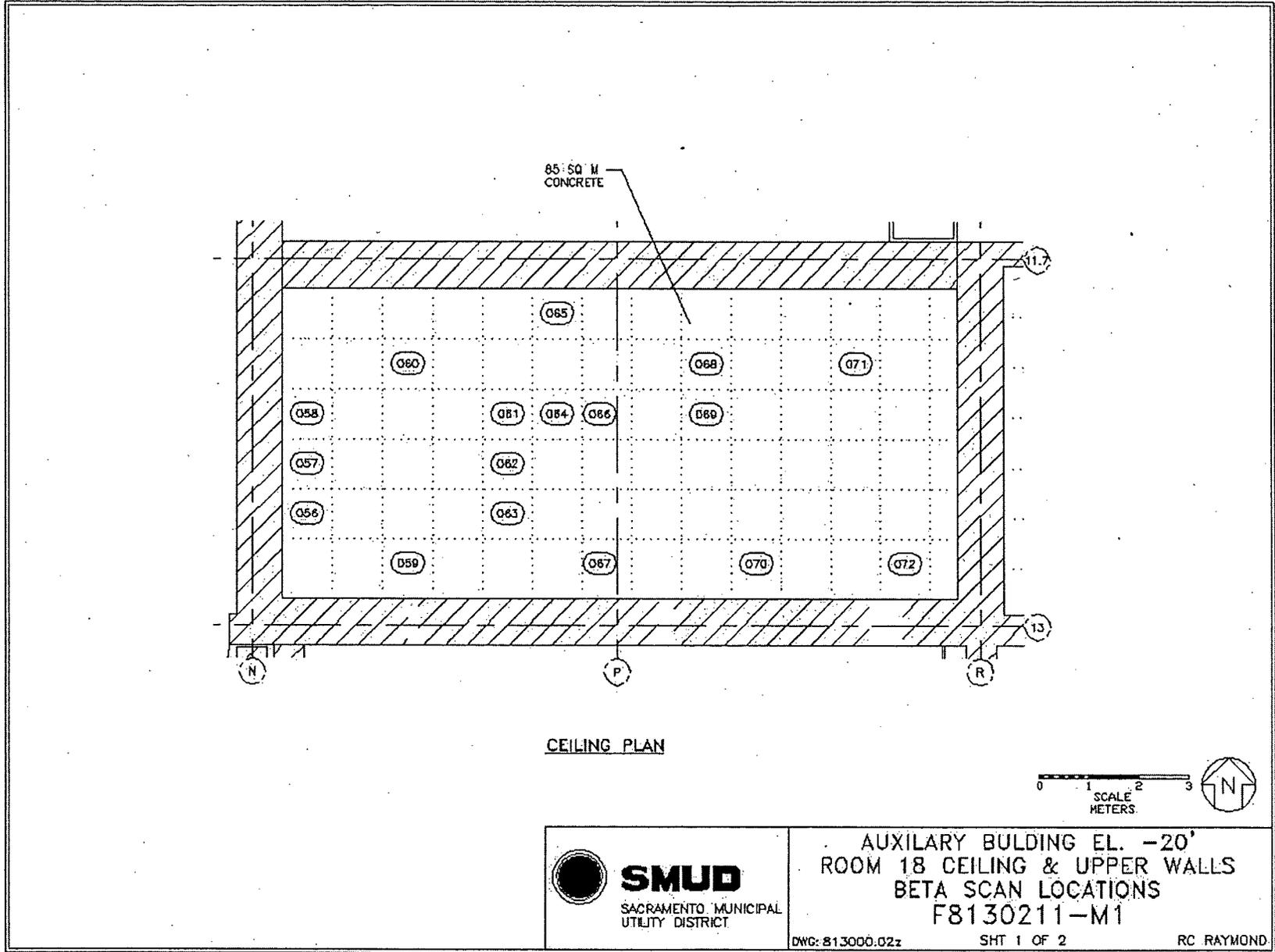
AUXILIARY BUILDING EL. -20'
ROOM 18 CEILING & UPPER WALLS
BETA DIRECT/LOOSE SURFACE
ACTIVITY MEASUREMENT LOCATIONS
F8130211-M2

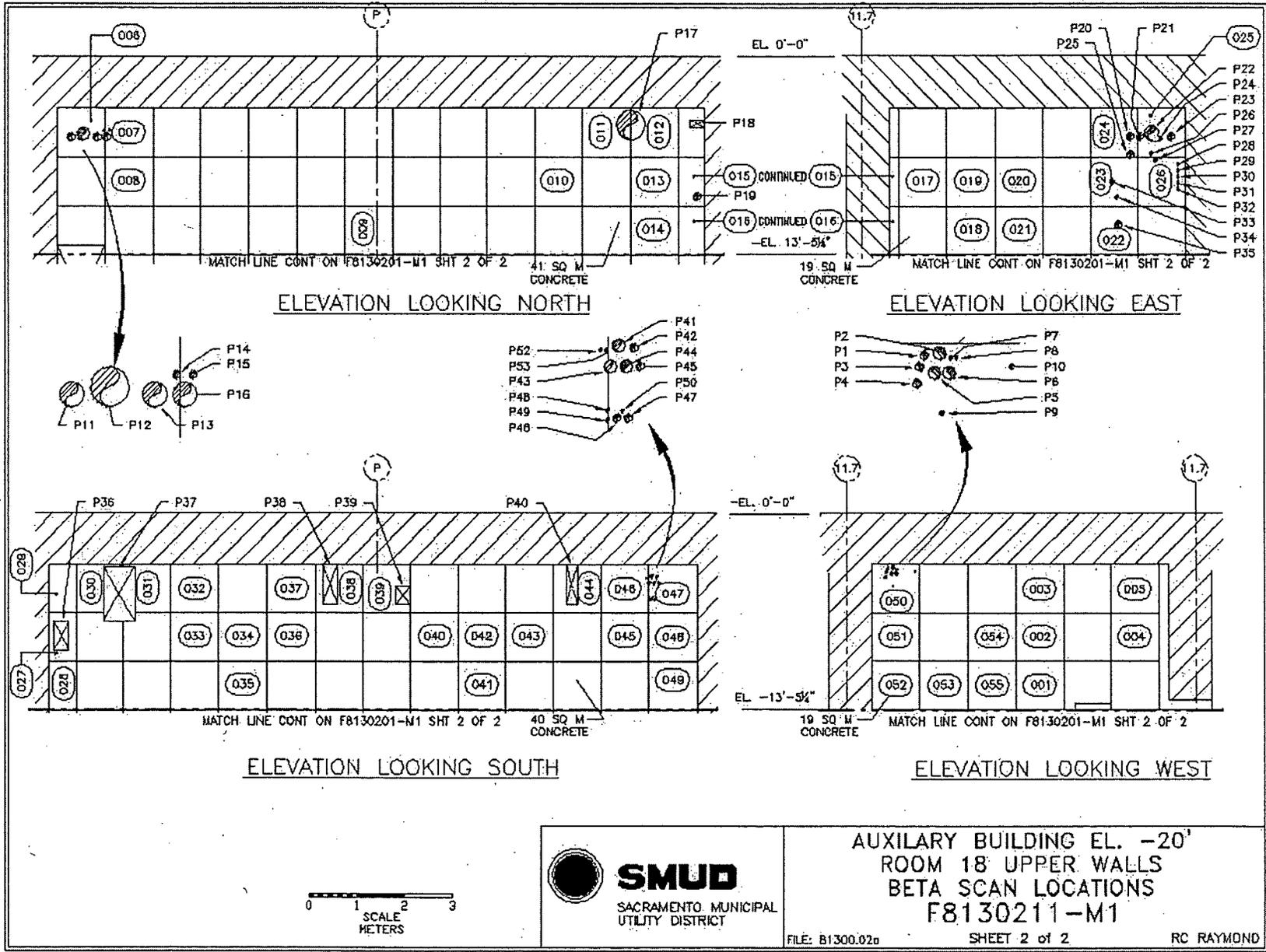
DWG: 813000.02z

SHT 1 OF 2

RC RAYMOND







Attachment 2
Instrumentation
November 6, 2007
Survey Unit F8130211

Table 2-1. Survey Unit Instrumentation

Instrument Model; Serial No.	Detector Model; Serial No.	MDC Static (dpm/100 cm²)	MDC Scan (dpm/100 cm²)
M2350; 180733	43-98B; 148638	820	1490
M2350; 180733	43-94; 148620	1610	2800
M2350; 175834	43-68B; 148634	433	1033
M2350; 149802	43-68B; 148453	433	1033
M2350; 149802	43-116-1B; 190173	796	5895
M2350; 180733	43-111; 148641	3880	7020
Tennelec; 0401171	N/A	5 dpm α , 11 dpm β	N/A

Table 2-2. Investigation Criteria and DCGL

Parameter	Value (dpm/100 cm²)
Investigation Criteria - Direct	43000
Investigation Criteria - Scan	43000
DCGL _w	43000
DCGL _{EMC}	N/A

Attachment 3

Investigation

November 6, 2007

Survey Unit F8130211

(none required)

Attachment 4

Data Assessment

November 6, 2007

Survey Unit F8130211

