

Rancho Seco

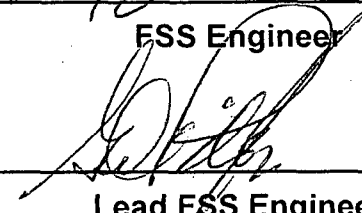
Final Status Survey Summary Report

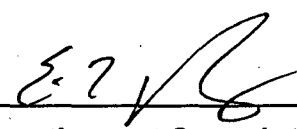
April 2, 2008

Misc. Waste Concentrate Tank Room, (Room 024)

Survey Unit F8130321

Prepared By:  Date: 4/2/2008
FSS Engineer

Reviewed By:  Date: 4/3/08
Lead FSS Engineer

Approved By:  Date: 5-12-08
Dismantlement Superintendent, Radiological

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8130321, Misc. Waste Concentrate Tank Room, (Room 024)

Survey Unit Description:

Operating History: The Misc. Waste Concentrate 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 Misc. Waste Concentrate Tank Room there were a number of areas on the floor, lower and upper walls, and ceiling where the gross surface activity levels were higher than the DCGL prior to remediation. Therefore, a Class 1 final status survey was performed on the floor, 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 153 m² were scanned for 100% 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	Misc. Waste Concentrate Tank Room, (Room 024)
Survey Unit:	0321	Structure Surface
Class:	1	LTP Table 5-4
SU Area (m ²):	153	
Evaluator:	Michael Stein	
DCGL (dpm/100 cm ²):	43000	Gross Activity DCGL
Area Factor:	3.5	Class 1
Design DCGL _{emc} (dpm/100 cm ²):	150500	Class 1
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):	7	Class 1
Scan Area (m ²):	153	
Scan Coverage (%):	100%	Class 1
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:	22	Class 1
Grid Spacing L:	2.6	Class 1

Survey Results:

A total of 29 direct measurements were made in F8130321. 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 3,551 to 126,491 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)
F8130321-C0001BD	2282
F8130321-C0002BD	2428
F8130321-C0003BD	7812
F8130321-C0004BD	1790
F8130321-C0005BD	6671
F8130321-C0006BD	6323
F8130321-C0007BD	1950
F8130321-C0008BD	1463
F8130321-C0009BD	1608
F8130321-C0010BD	1873
F8130321-C0011BD	2205
F8130321-C0012BD	1546
F8130321-C0013BD	1634
F8130321-C0014BD	2018
F8130321-C0015BD	2070
F8130321-C0016BD	1349
F8130321-C0017BD	1385
F8130321-C0018BD	1758
F8130321-C0019BD	1660
F8130321-C0020BD	1738
F8130321-C0021BD	1629
F8130321-C0022BD	1722
F8130321-C0023BD	1629
F8130321-C0024BD	1582
F8130321-C0025BD	2075
F8130321-C0026BD	2101
F8130321-C0027BD	1556
F8130321-C0028BD	2044
F8130321-C0029BD	3092
Mean:	2379
Median:	1790
Standard Deviation:	1628
Range:	1349 - 7812

Table 3. Removable Surface Activity Results

Measurement ID	Surface Beta Activity (dpm/100 cm²)
F8130321C0001SM	7.42
F8130321C0002SM	12.55
F8130321C0003SM	7.42
F8130321C0004SM	20.24
F8130321C0005SM	20.24
F8130321C0006SM	52.29
F8130321C0007SM	13.83
F8130321C0008SM	6.14
F8130321C0009SM	6.14
F8130321C0010SM	20.24
F8130321C0011SM	18.96
F8130321C0012SM	18.96
F8130321C0013SM	2.29
F8130321C0014SM	11.27
F8130321C0015SM	6.14
F8130321C0016SM	12.55
F8130321C0017SM	12.55
F8130321C0018SM	18.96
F8130321C0019SM	40.75
F8130321C0020SM	7.42
F8130321C0021SM	16.39
F8130321C0022SM	9.98
F8130321C0023SM	53.57
F8130321C0024SM	76.64
F8130321C0025SM	15.11
F8130321C0026SM	12.55
F8130321C0027SM	67.67
F8130321C0028SM	11.27
F8130321C0029SM	81.77
Mean:	22.8
Median:	13.83
Standard Deviation:	22.03
Range:	2.29 to 81.77

Survey Unit Data Assessment:

The survey design required 22 direct measurements for the Sign Test. In actuality 29 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):	29	
Median (dpm/100 cm ²):	1790	
Mean (dpm/100 cm ²):	2379	
Direct Measurement Standard Deviation	1628	
(dpm/100 cm ²):		
Total Standard Deviation (dpm/100 cm ²):	1628	Based on samples and backgrounds.
Maximum (dpm/100 cm ²):	7812	
Material Type:	N/A	Background Subtract Not Applied
Sign Test Final N Value:	29	
S+ Value:	29	
Critical Value:	19	
Sufficient Samples Collected:	Yes	
Maximum Value < DCGL:	Yes	
Median Value < DCGL:	Yes	
Mean Value < DCGL:	Yes	
Maximum Value < DCGL_{mc}:	Yes	Class 1
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 1 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. No potential areas of elevated activity were detected.

Conclusion:

The FSS of this survey unit was properly designed as a Class 1 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.

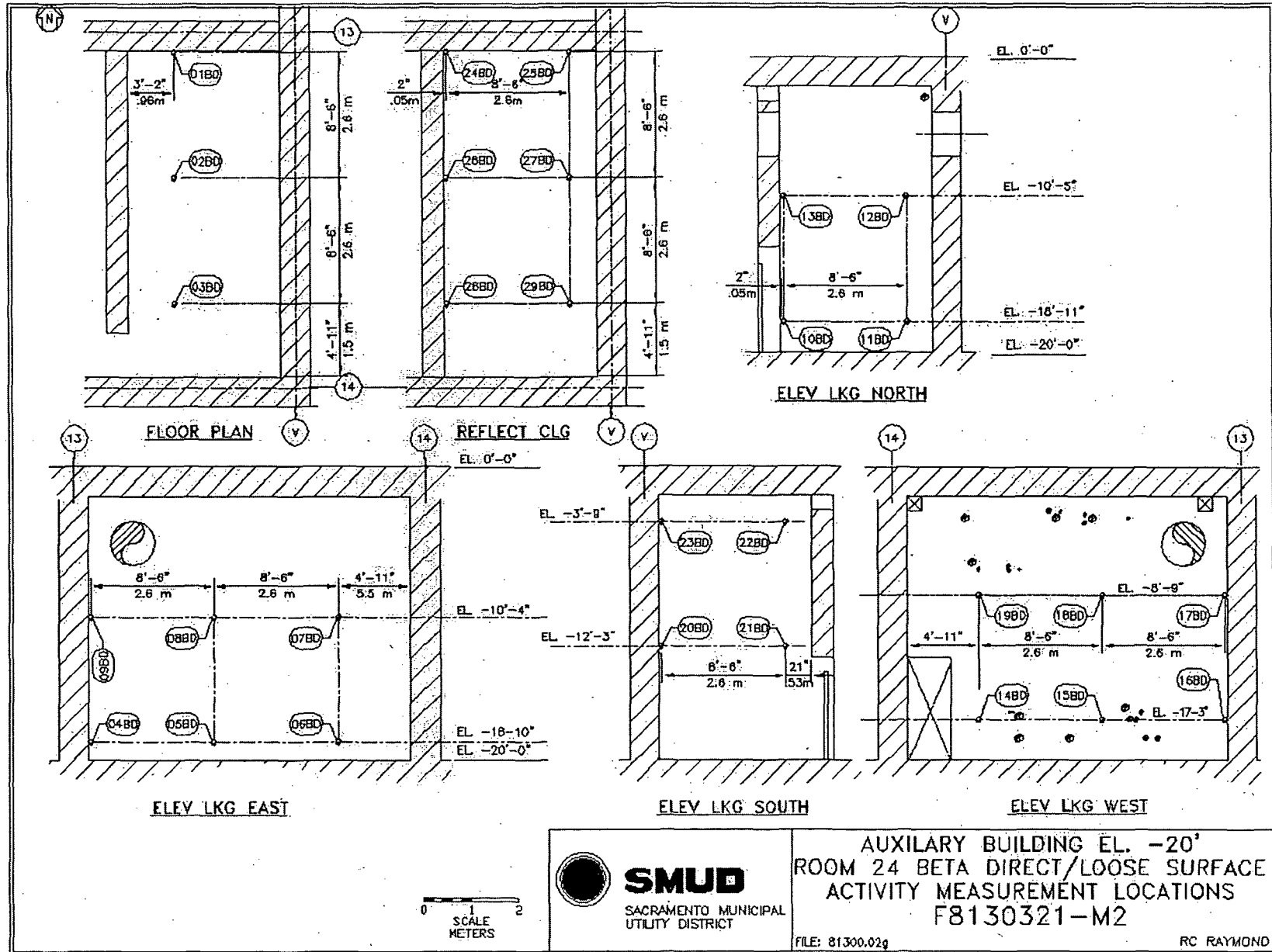
It is concluded that survey unit F8130321 meets the release criteria of 10CFR20.1402.

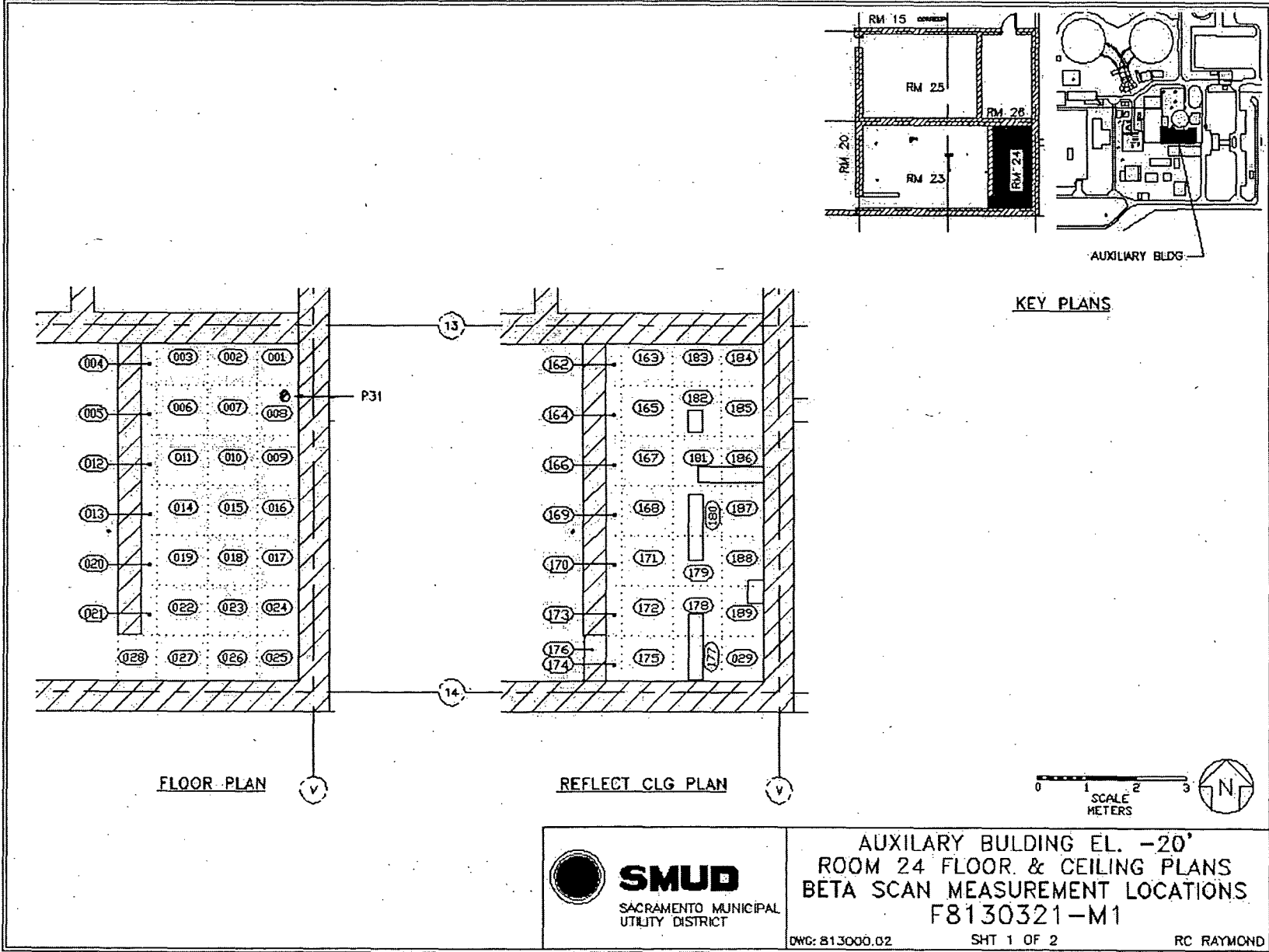
Attachment 1

Maps

April 2, 2008

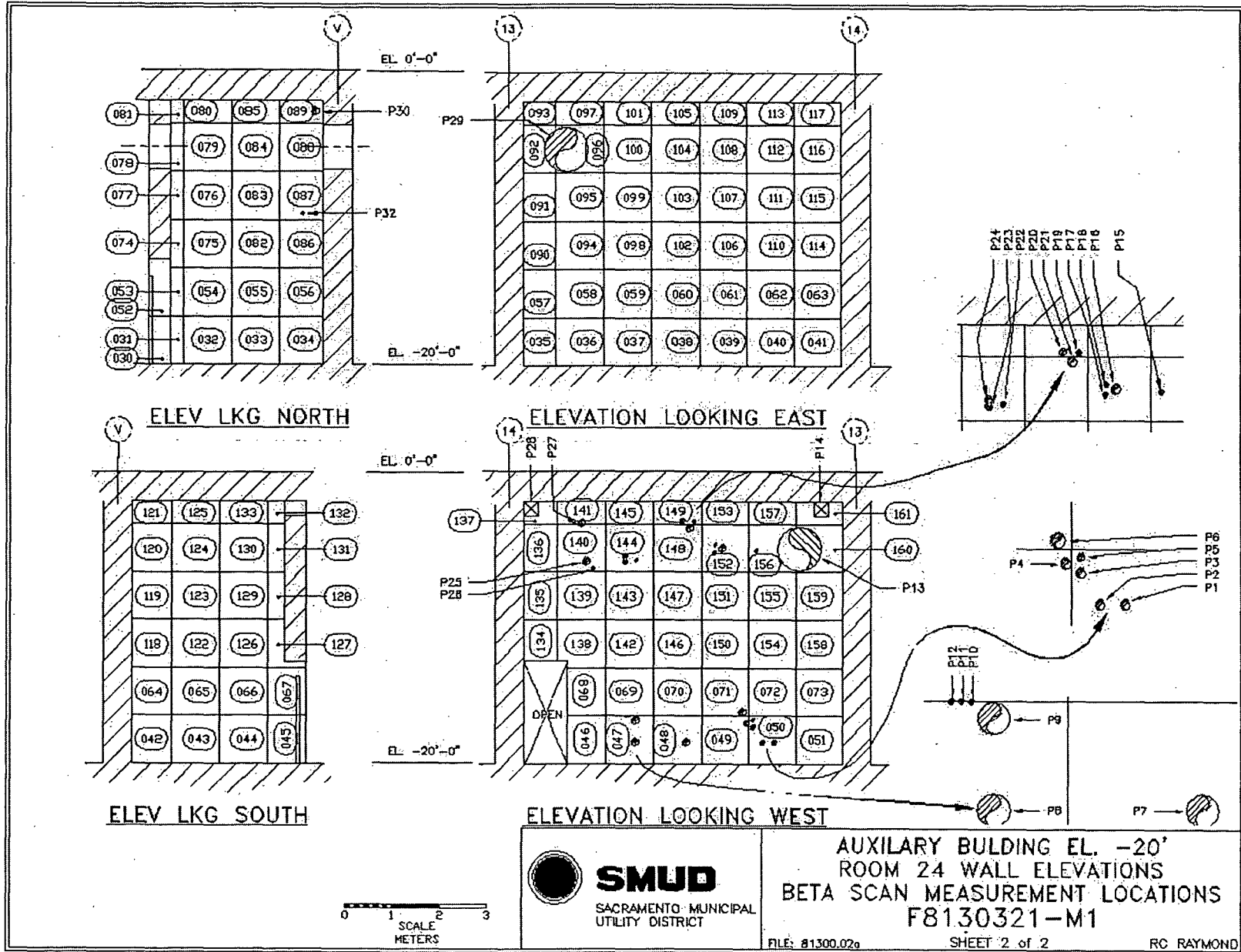
Survey Unit F8130321

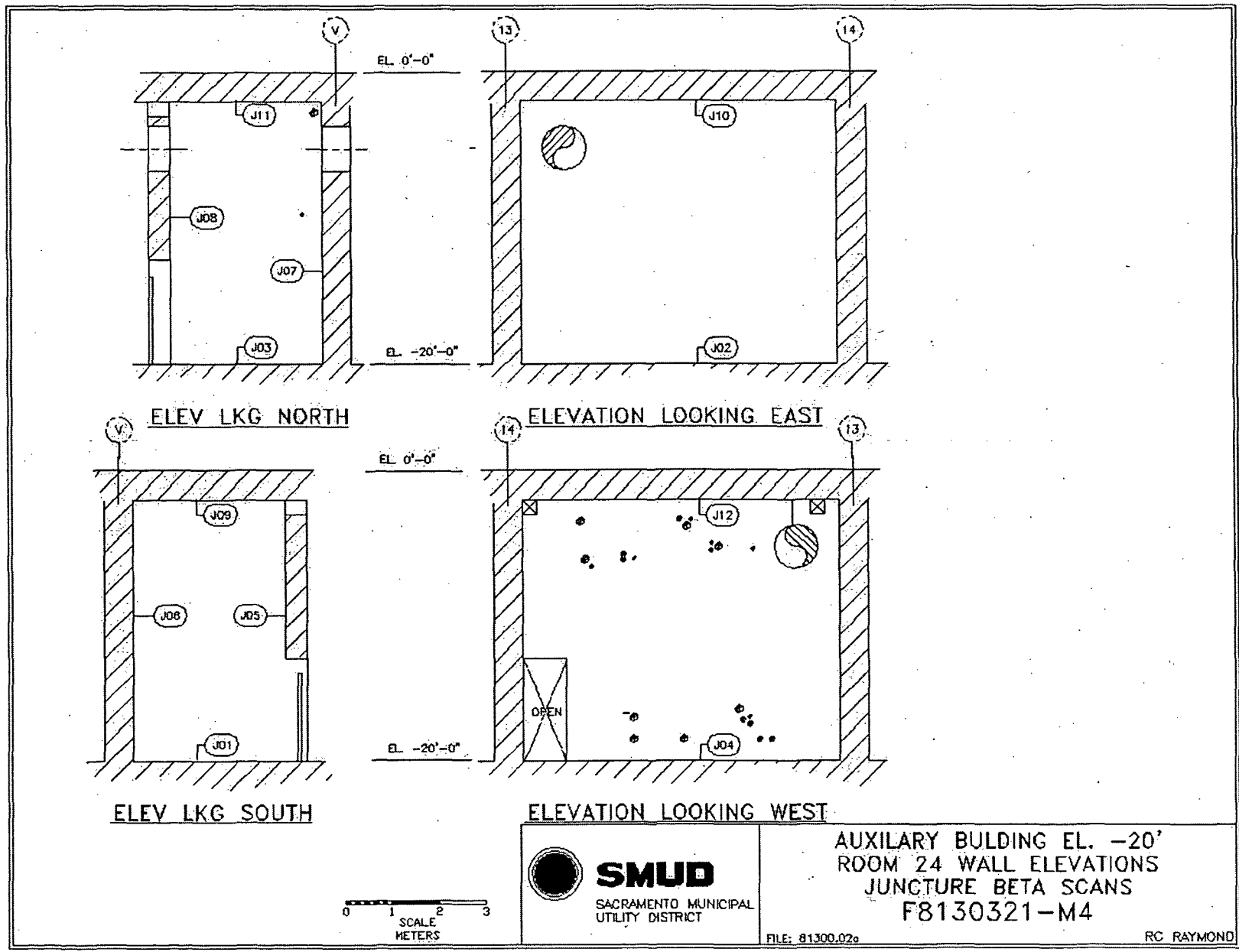




SMUD
SACRAMENTO MUNICIPAL
UTILITY DISTRICT

AUXILIARY BUILDING EL. -20'
ROOM 24 FLOOR. & CEILING PLANS
BETA SCAN MEASUREMENT LOCATIONS
F8130321-M1





Attachment 2

Instrumentation

April 2, 2008

Survey Unit F8130321

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	1400	2520
M2350; 180733	43-94; 148620	590	1030
M2350; 193700	43-68B; 190294	433	1033
M2350; 142515	43-68B; 148453	433	1033
M2350; 149794	43-68/5B; 149103	433	1033
M2350; 193700	43-116-1B; 216072	796	3258
M2350; 142515	43-116-1B; 190173	796	3258
Tennelec; 0401171	N/A	5.2 dpm α , 8.1 dpm β	N/A

Table 2-2. Investigation Criteria and DCGL

Parameter	Value (dpm/100 cm²)
Investigation Criteria - Direct	150500
Investigation Criteria - Scan	150500
DCGL _w	43000
DCGL _{EMC}	150500

Attachment 3

Investigation

April 2, 2008

Survey Unit F8130321

(none required)

Attachment 4

Data Assessment

April 2, 2008

Survey Unit F8130321

