

Rancho Seco

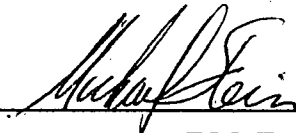
Final Status Survey Summary Report

October 31, 2007

Diesel Generator Building Interior Surfaces

Survey Unit F8170011

Prepared By:

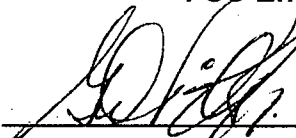


FSS Engineer

Date:

10/31/2007

Reviewed By:

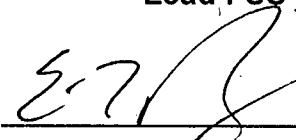


Lead FSS Engineer

Date:

10/31/07

Approved By:



Dismantlement Superintendent, Radiological

Date:

11-13-07

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8170011, Diesel Generator Building Interior Surfaces

Survey Unit Description:

Operating History: This concrete structure contained the emergency diesel generators. This area was used for the storage of radioactive material, namely the fuel transfer cask and associated equipment. Operating records and the HSA document no release of radioactivity associated with this survey area.

Site Characterization: Direct measurements were made of the interior and exterior surfaces of the structure that confirmed the absence of plant-derived radionuclides. Direct measurements showed a mean gross activity level of 2,343 dpm/100 cm² and a maximum value of 4,066 dpm/100 cm². Based on the classification procedure (DSIP-0020) and levels of gross activity reported, 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 352 m² were scanned for approximately 11% 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:	F817	Diesel Generator Building
Survey Unit:	0011	Interior Surfaces
Class:	3	Structure Surface
SU Area (m²):	3267	LTP Table 5-4
Evaluator:	Michael Stein	
DCGL (dpm/100 cm²):	43000	Gross Activity DCGL
Area Factor:	N/A	Class 3
Design DCGL_{mc}	N/A	Class 3
(dpm/100 cm²):		
LBGR (dpm/100 cm²):	21500	Default = 50% DCGL
Design Sigma (dpm/100 cm²):	647	
Type I Error:	0.05	
Type II Error:	0.05	
Predominant Nuclide:	Cs-137	
Sample Area (m²):	N/A	Class 3
Scan Area (m²):	352	
Scan Coverage (%):	11%	Class 3
Z_{1-α} :	1.645	
Z_{1-β} :	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	33.2	
Relative Shift Used:	3	Uses 3.0 if Relative Shift is >3
N-Value:	11	
Design N-Value + 20%:	14	NUREG-1575 Table 5-5
Design Min Samples N:	14	Class 3
Grid Spacing L:	N/A	Class 3

Survey Results:

A total of 14 direct measurements were made in F8170011. 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 2,568 dpm/100 cm² to 17,746 dpm/100 cm², based on a surveyor efficiency of 0.5 with 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)
F8170011-C0001BD	2246
F8170011-C0002BD	2267
F8170011-C0003BD	1634
F8170011-C0004BD	1198
F8170011-C0005BD	1312
F8170011-C0006BD	980
F8170011-C0007BD	1203
F8170011-C0008BD	1110
F8170011-C0009BD	1432
F8170011-C0010BD	1691
F8170011-C0011BD	1935
F8170011-C0012BD	2111
F8170011-C0013BD	2308
F8170011-C0014BD	2469
Mean:	1707
Median:	1663
Standard Deviation:	511
Range:	980 - 2469

Table 3. Removable Surface Activity Results

Measurement ID	Surface Beta Activity (dpm/100 cm²)
F8170011C0001SM	1.01
F8170011C0002SM	-0.27
F8170011C0003SM	-1.55
F8170011C0004SM	-1.55
F8170011C0005SM	-0.27
F8170011C0006SM	-1.55
F8170011C0007SM	3.58
F8170011C0008SM	1.01
F8170011C0009SM	3.58
F8170011C0010SM	4.86
F8170011C0011SM	1.01
F8170011C0012SM	-1.55
F8170011C0013SM	4.86
F8170011C0014SM	4.86
Mean:	1.29
Median:	1.01
Standard Deviation:	2.57
Range:	-1.55 to 4.86

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 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	Average Ambient BKG = 0.
Ambient Background Used (dpm/100 cm ²):	N/A	
Actual Direct Measurements (N):	14	
Median (dpm/100 cm ²):	1663	
Mean (dpm/100 cm ²):	1707	
Direct Measurement Standard Deviation (dpm/100 cm ²):	511	Based on samples and backgrounds.
Total Standard Deviation (dpm/100 cm ²):	511	
Maximum (dpm/100 cm ²):	2469	
Material Type:	N/A	
Sign Test Final N Value:	14	
S+ Value:	14	Background Subtract Not Applied
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	
Total Standard Deviation <= Sigma:	Yes	
Pass the Sign Test?	Yes	
Reject the Null Hypothesis?	Yes	
Does the Survey Unit Pass All Criteria?	Yes	Class 3

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 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 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. 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.

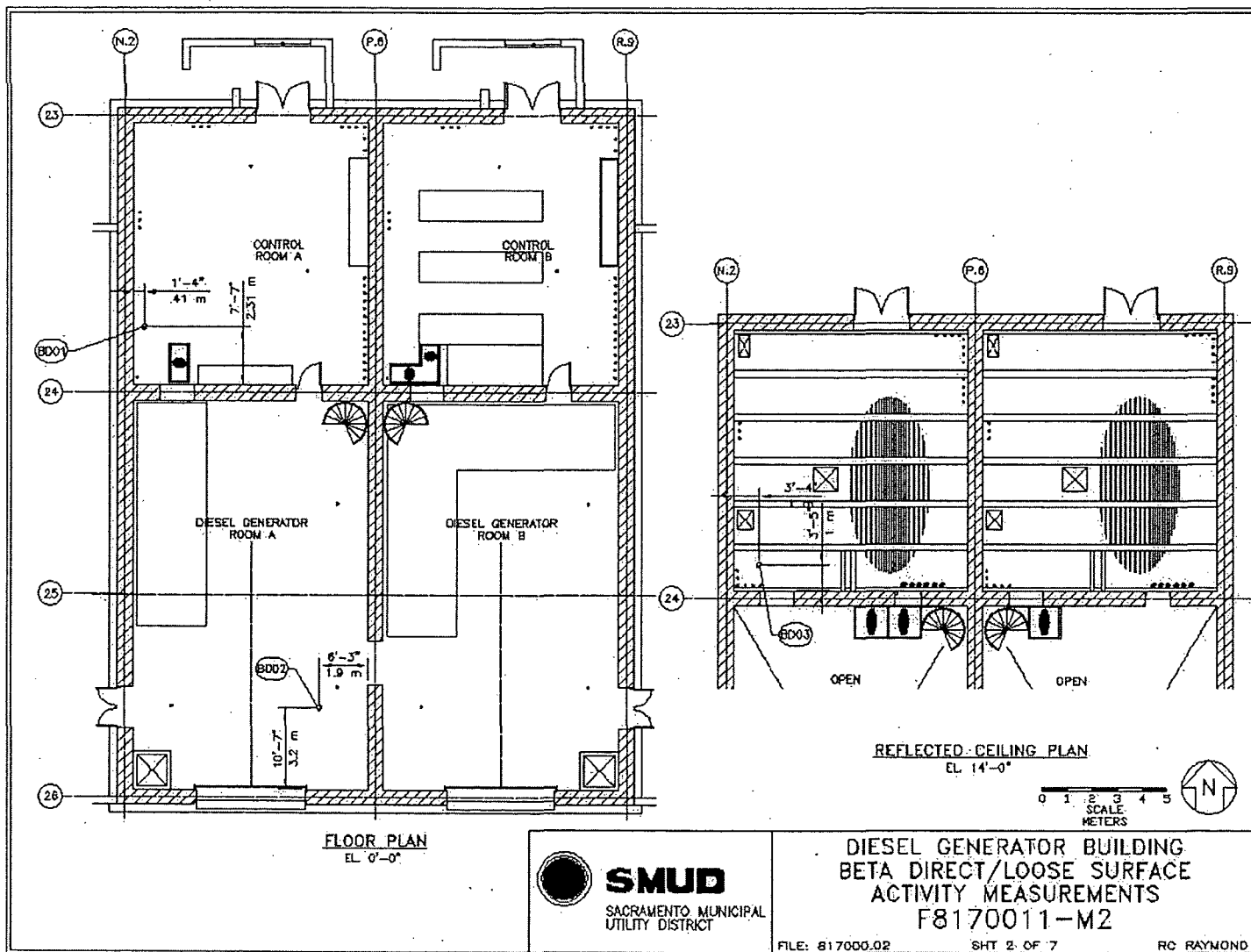
It is concluded that survey unit F8170011 meets the release criteria of 10CFR20.1402.

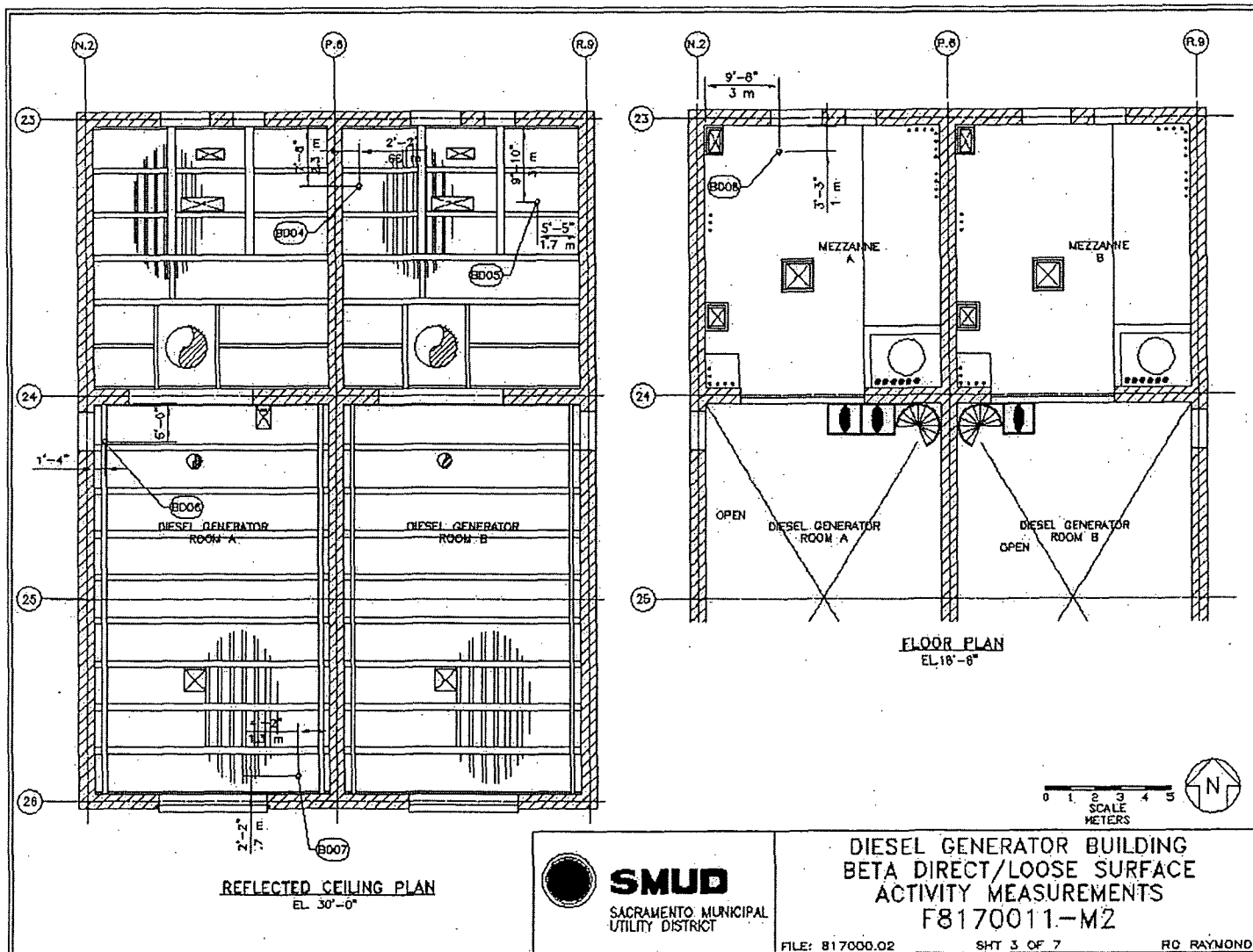
Attachment 1

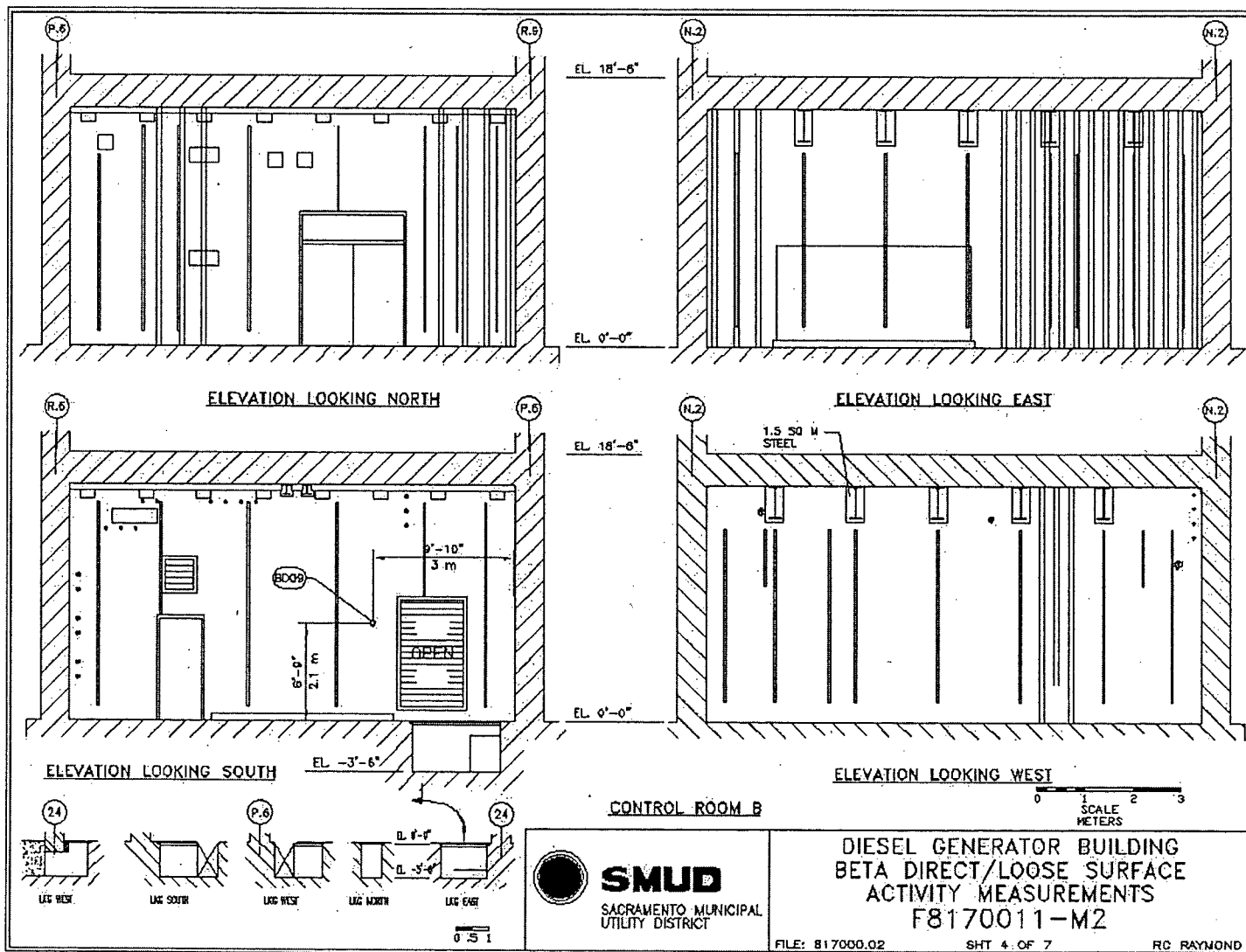
Maps

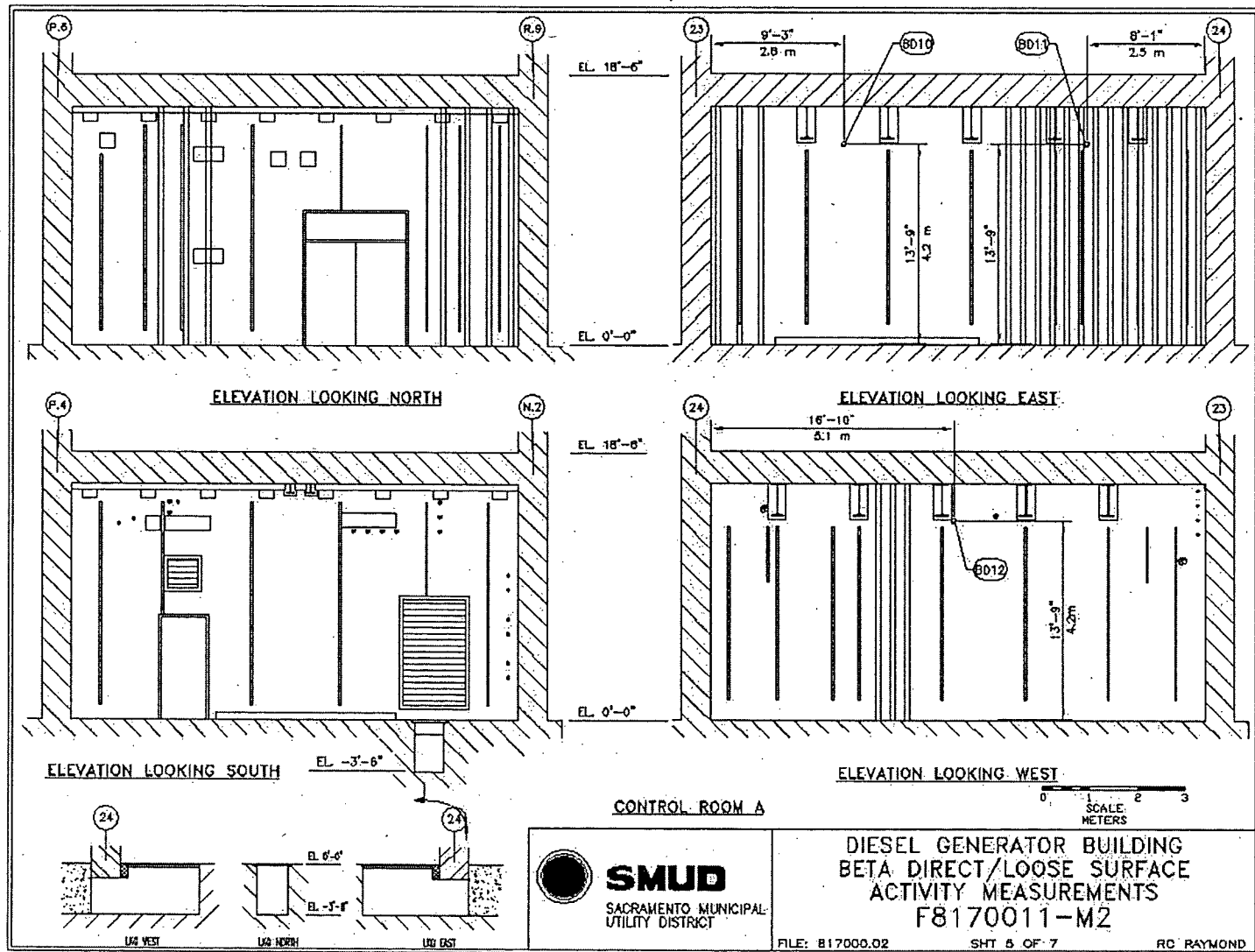
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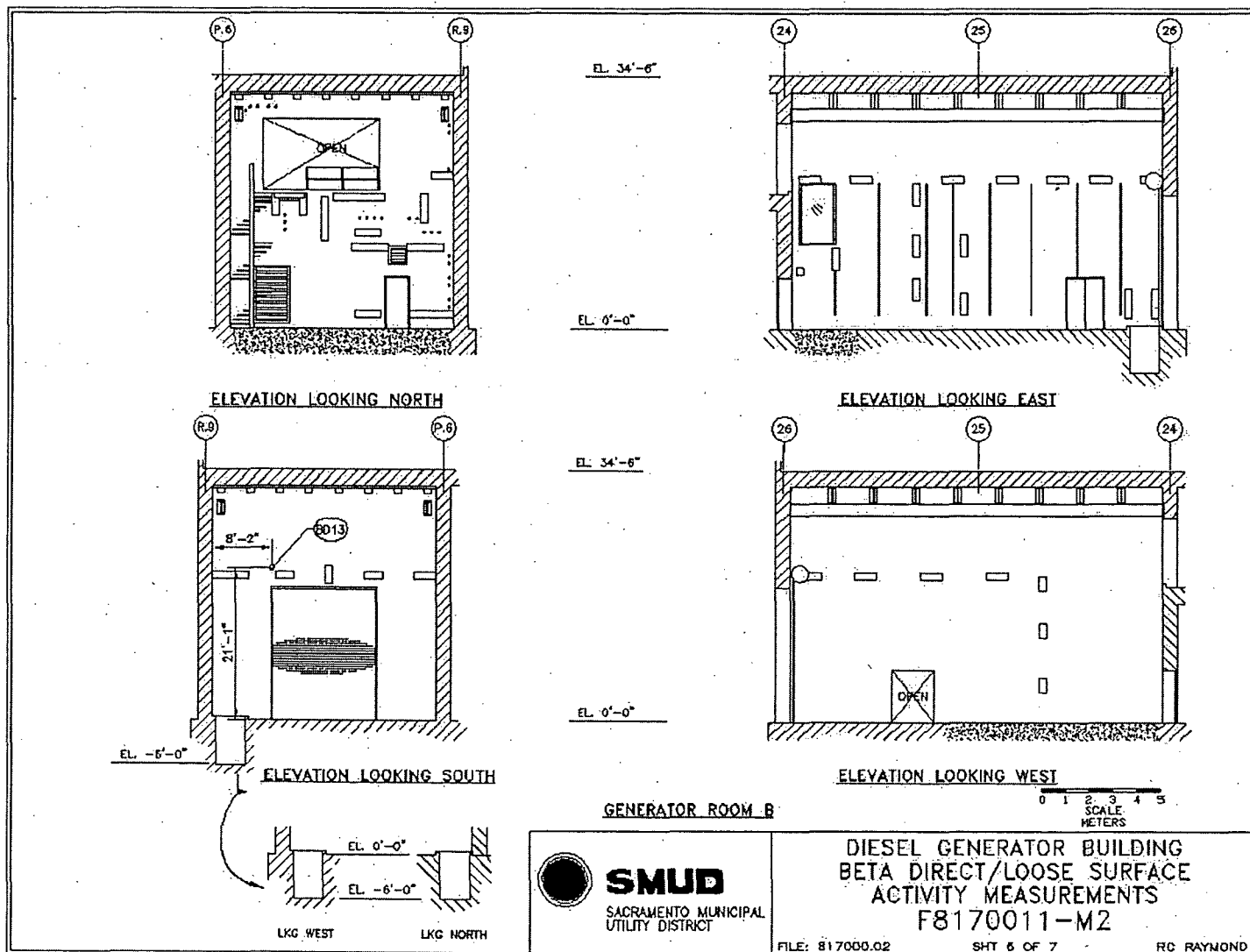
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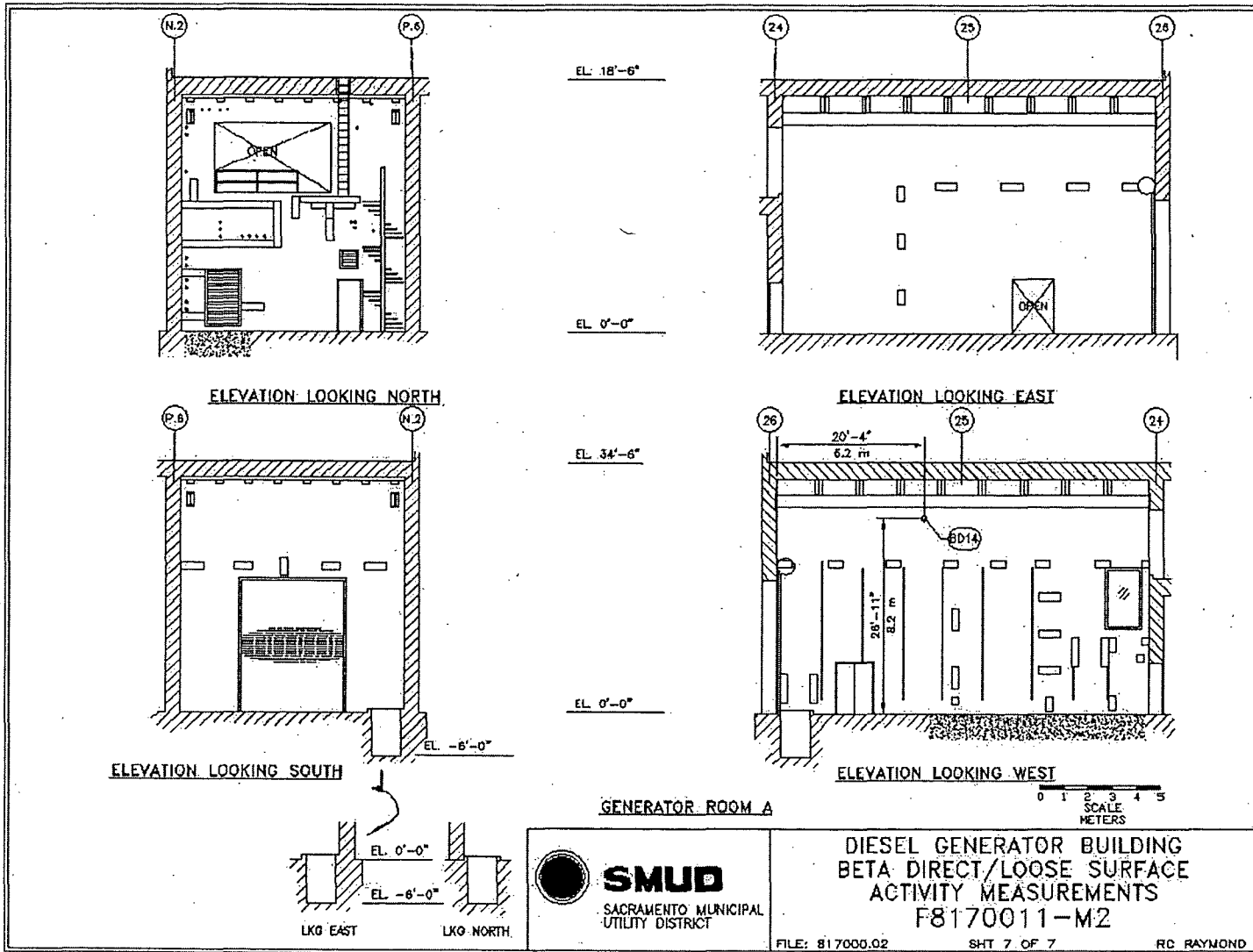


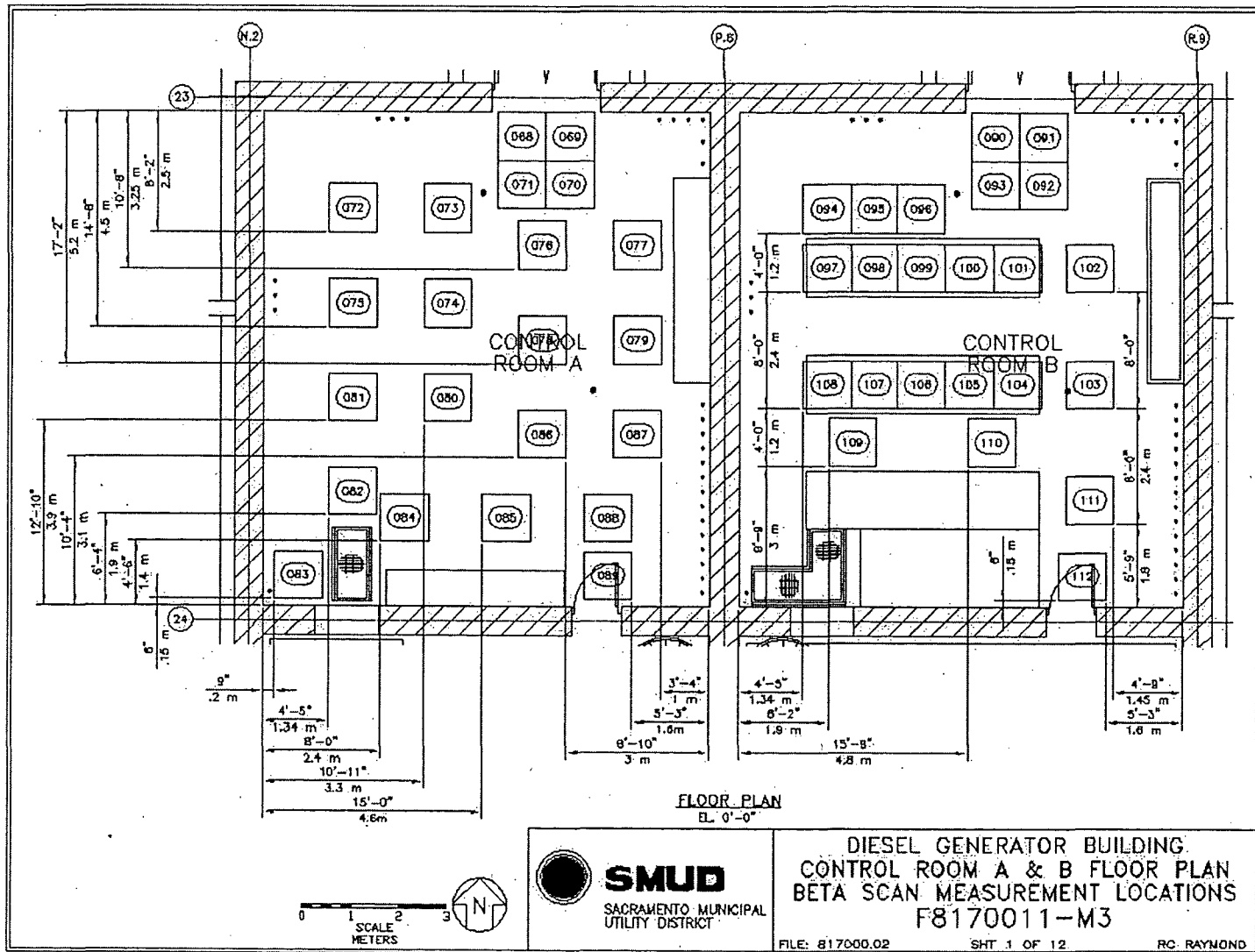


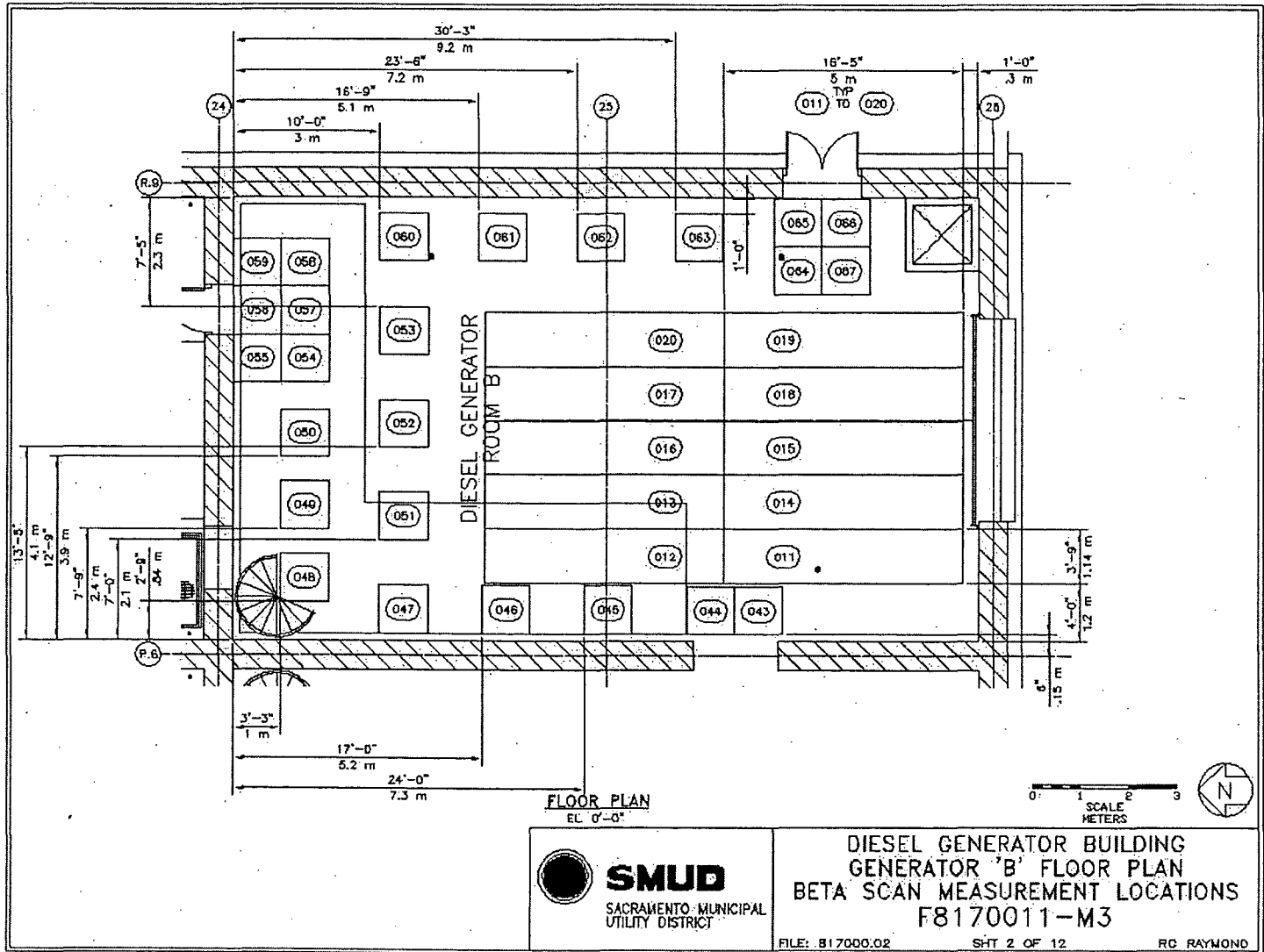


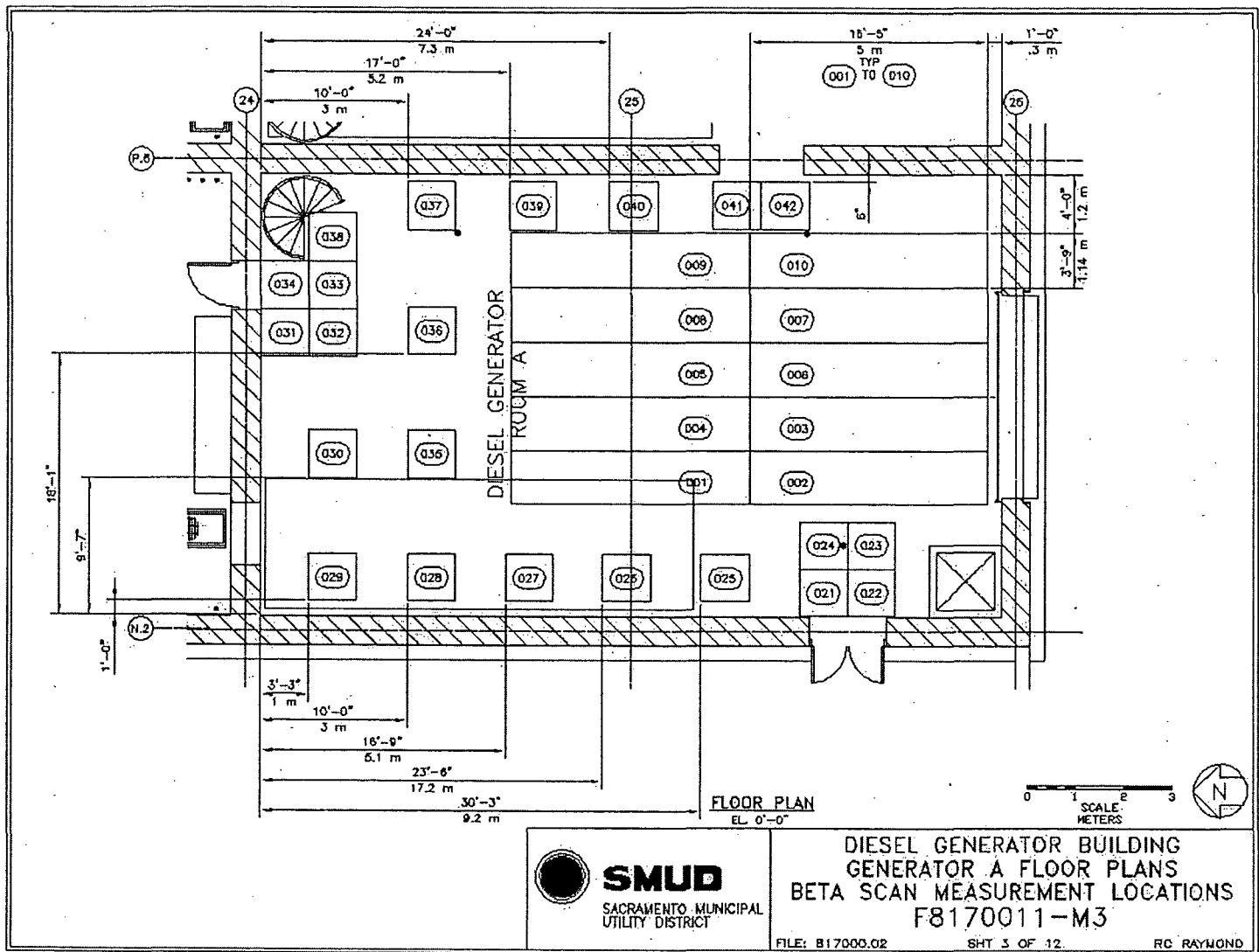


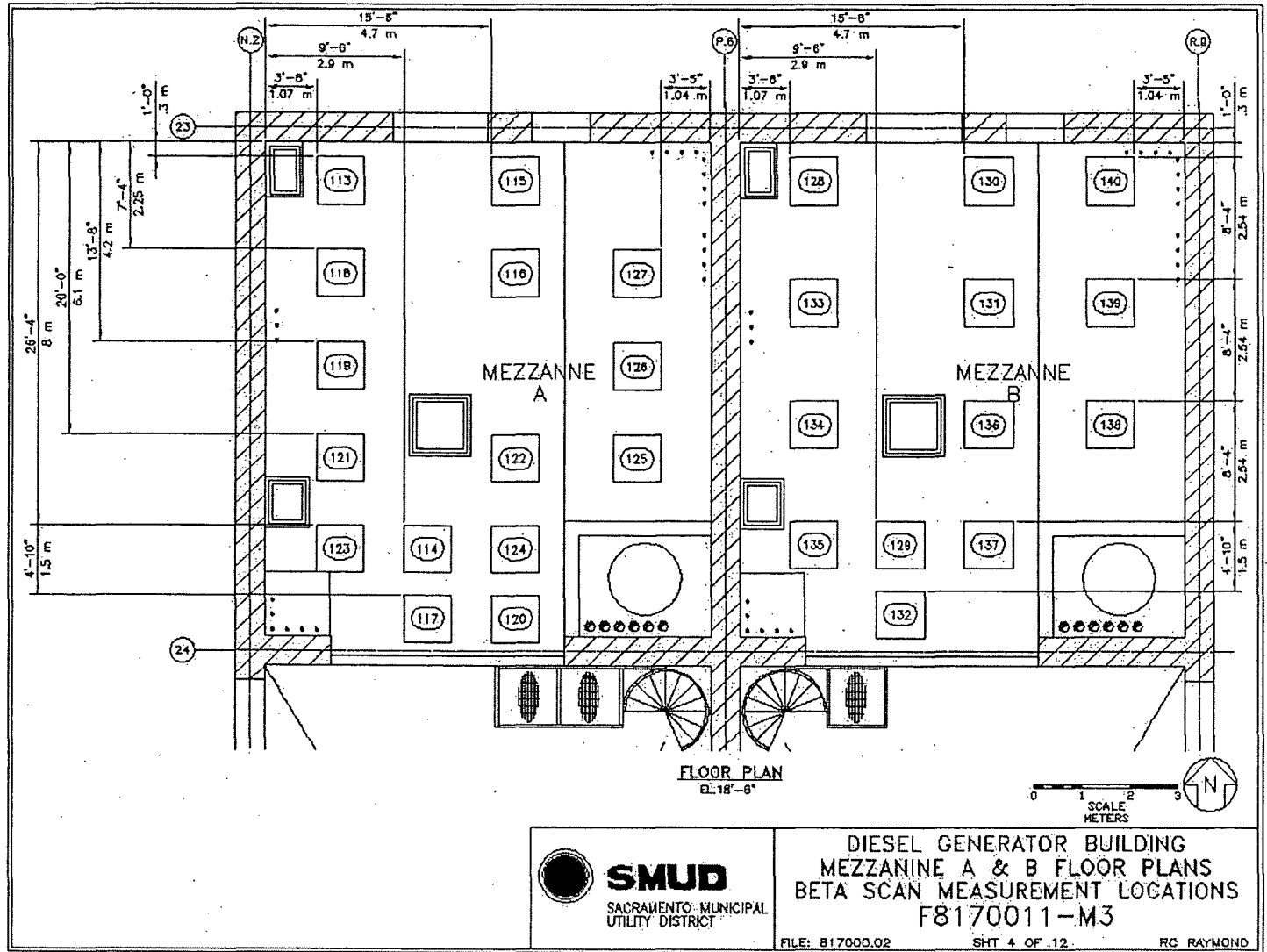


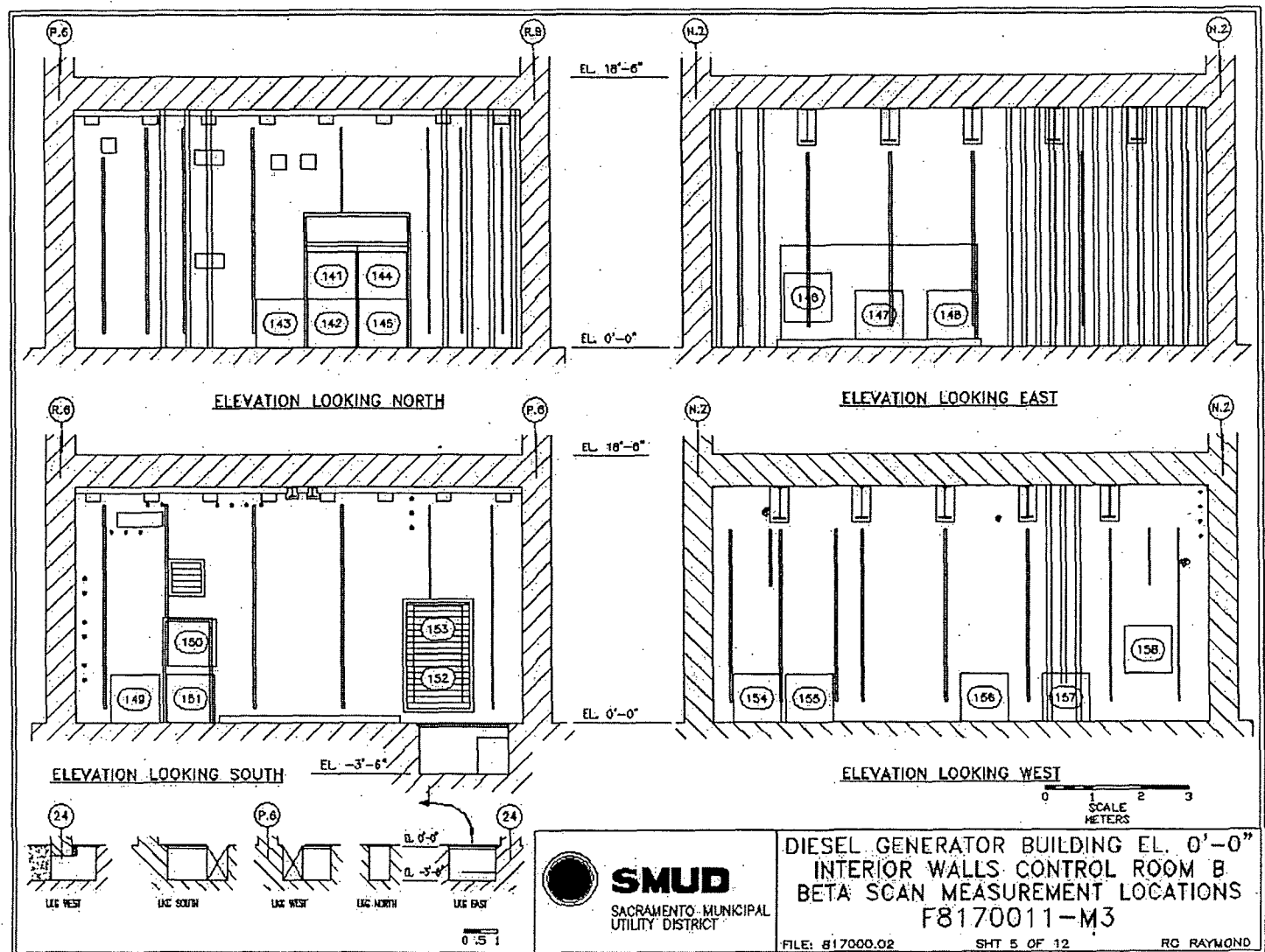


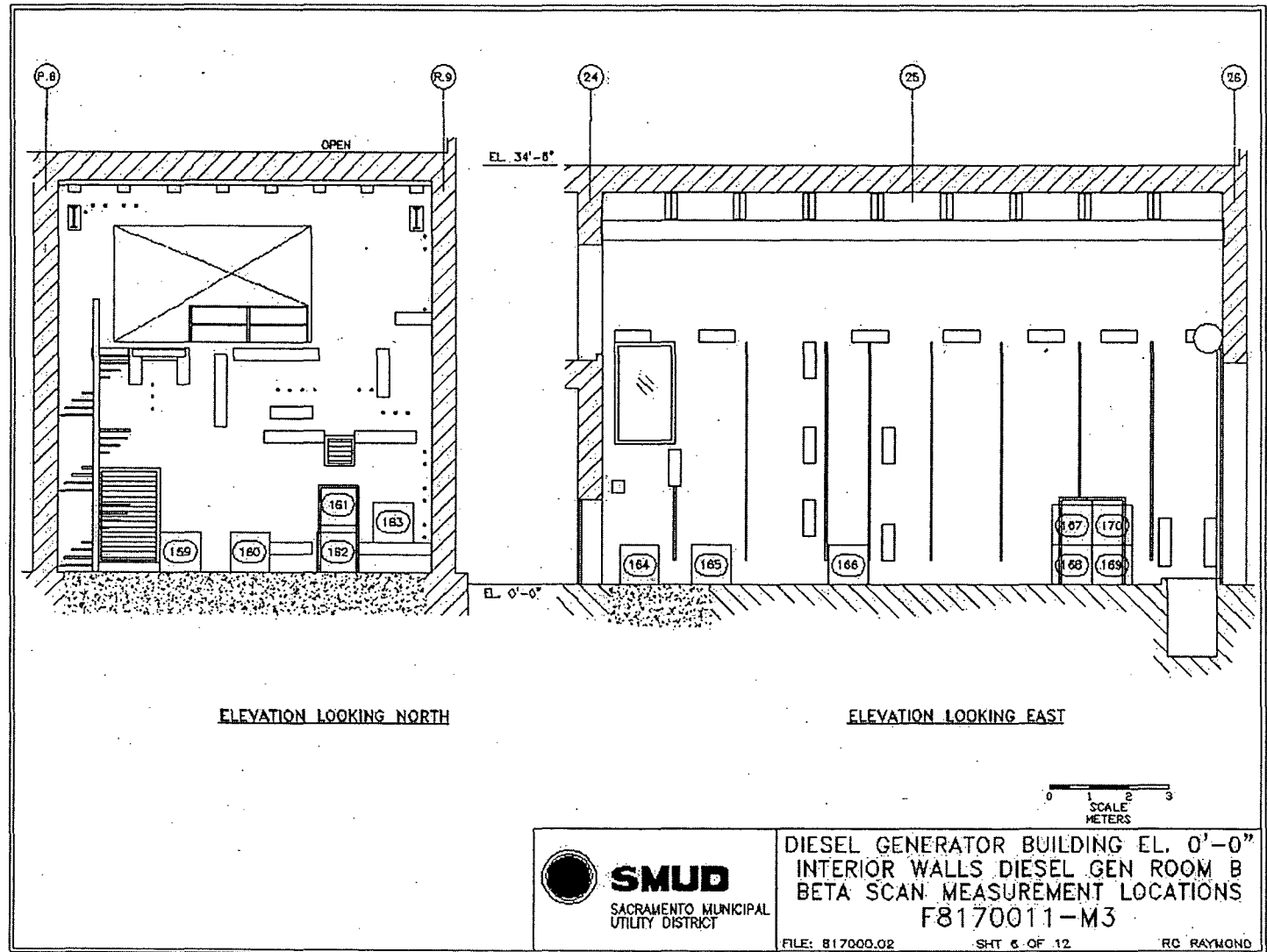


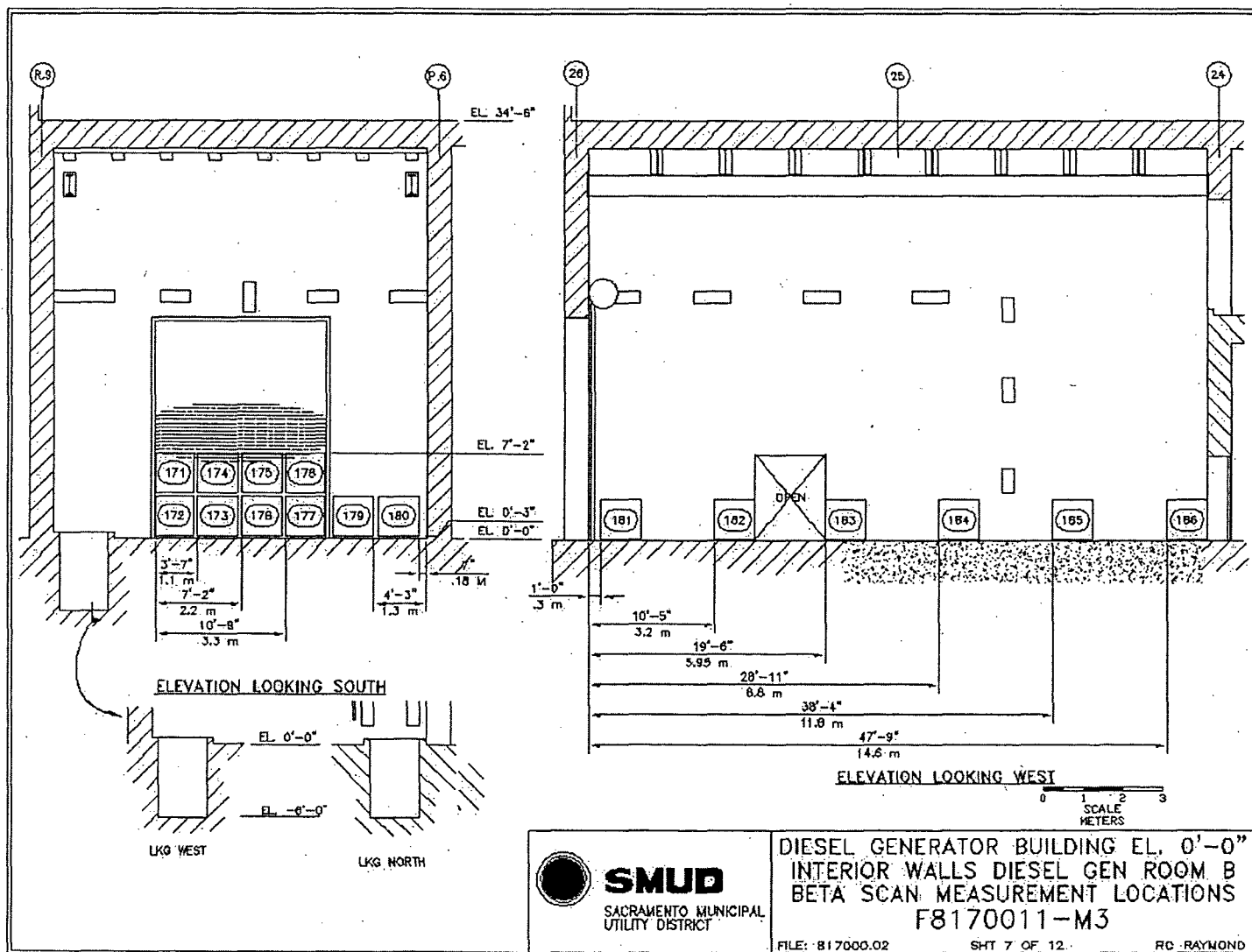


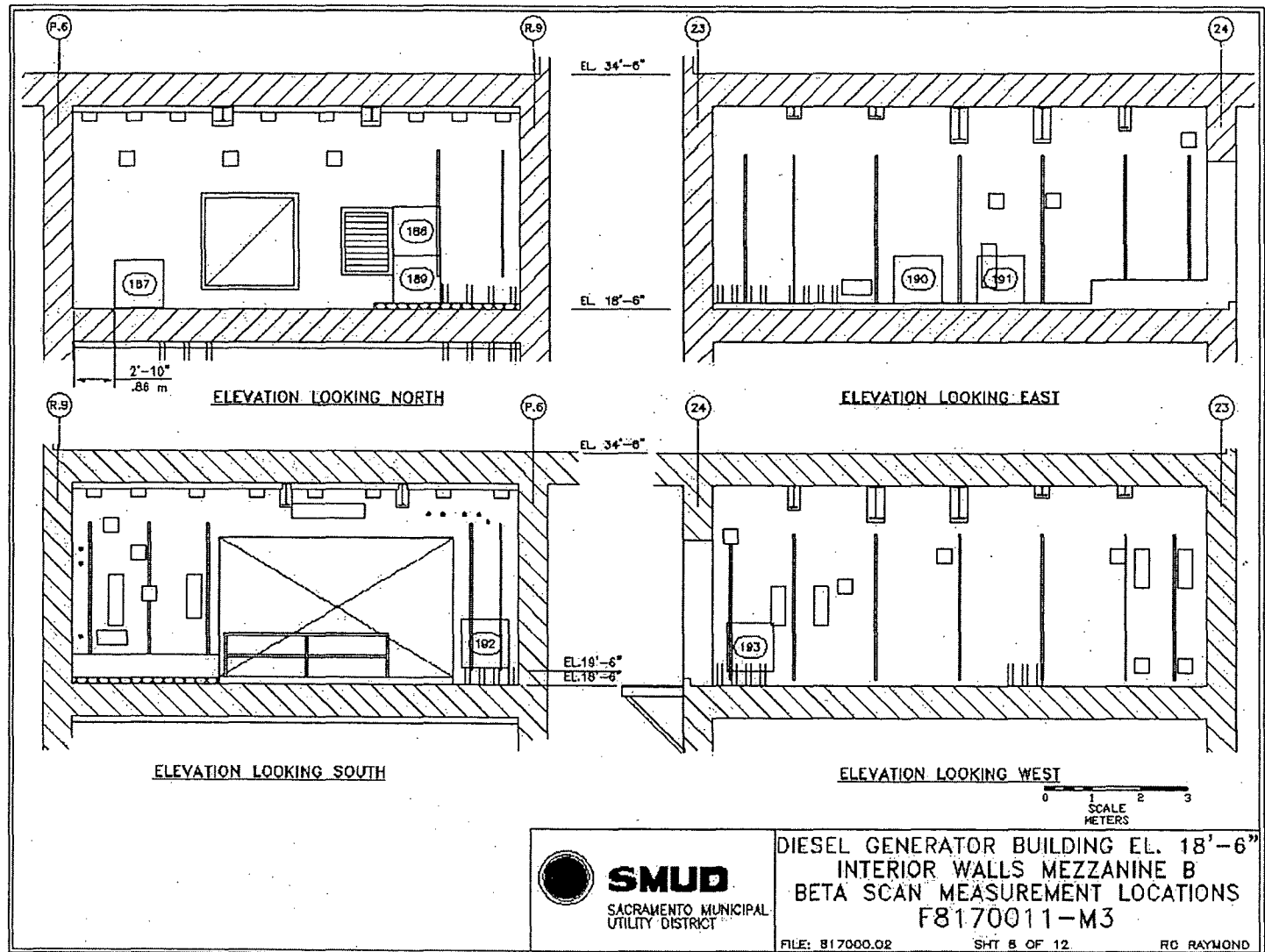


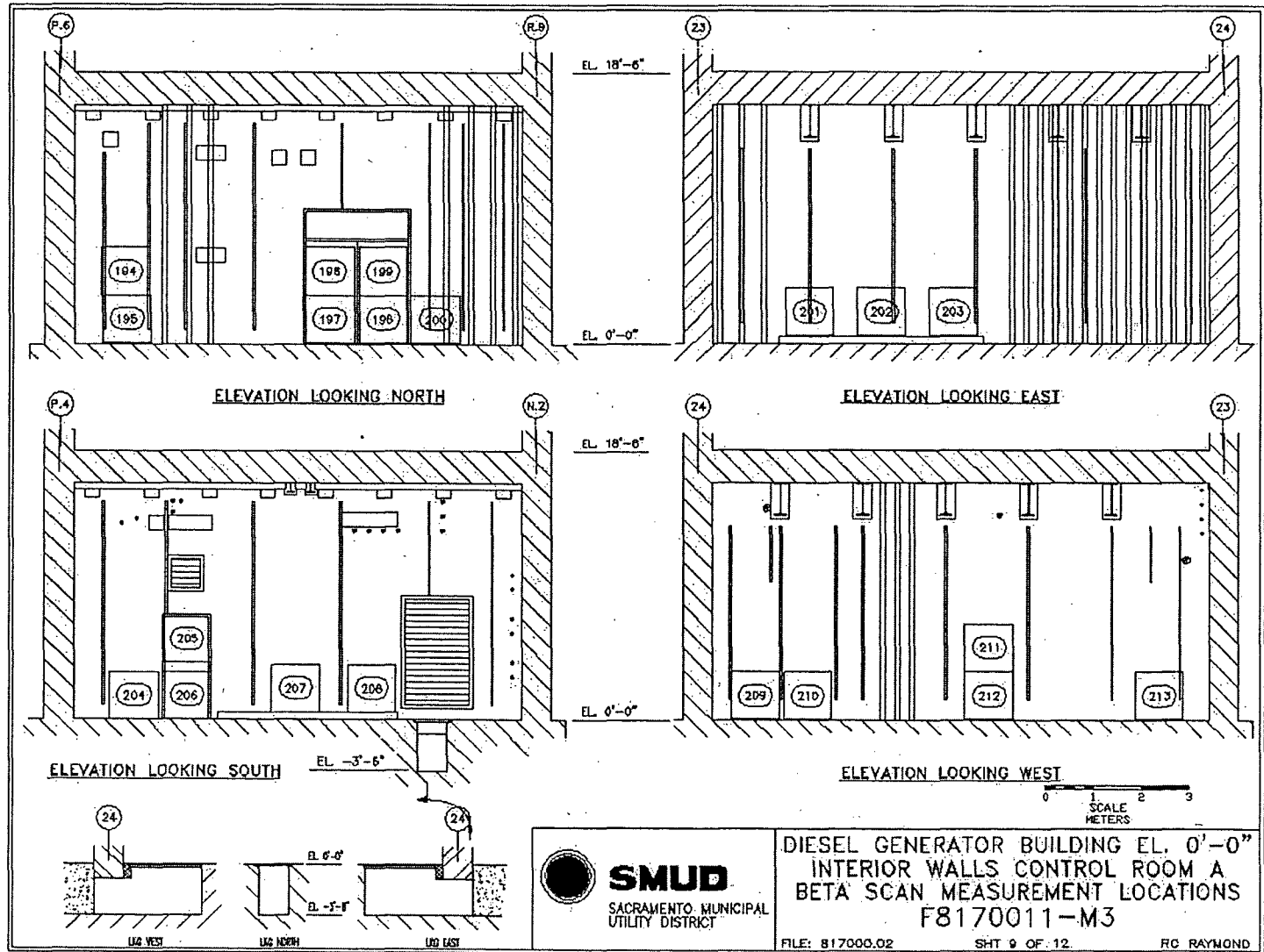


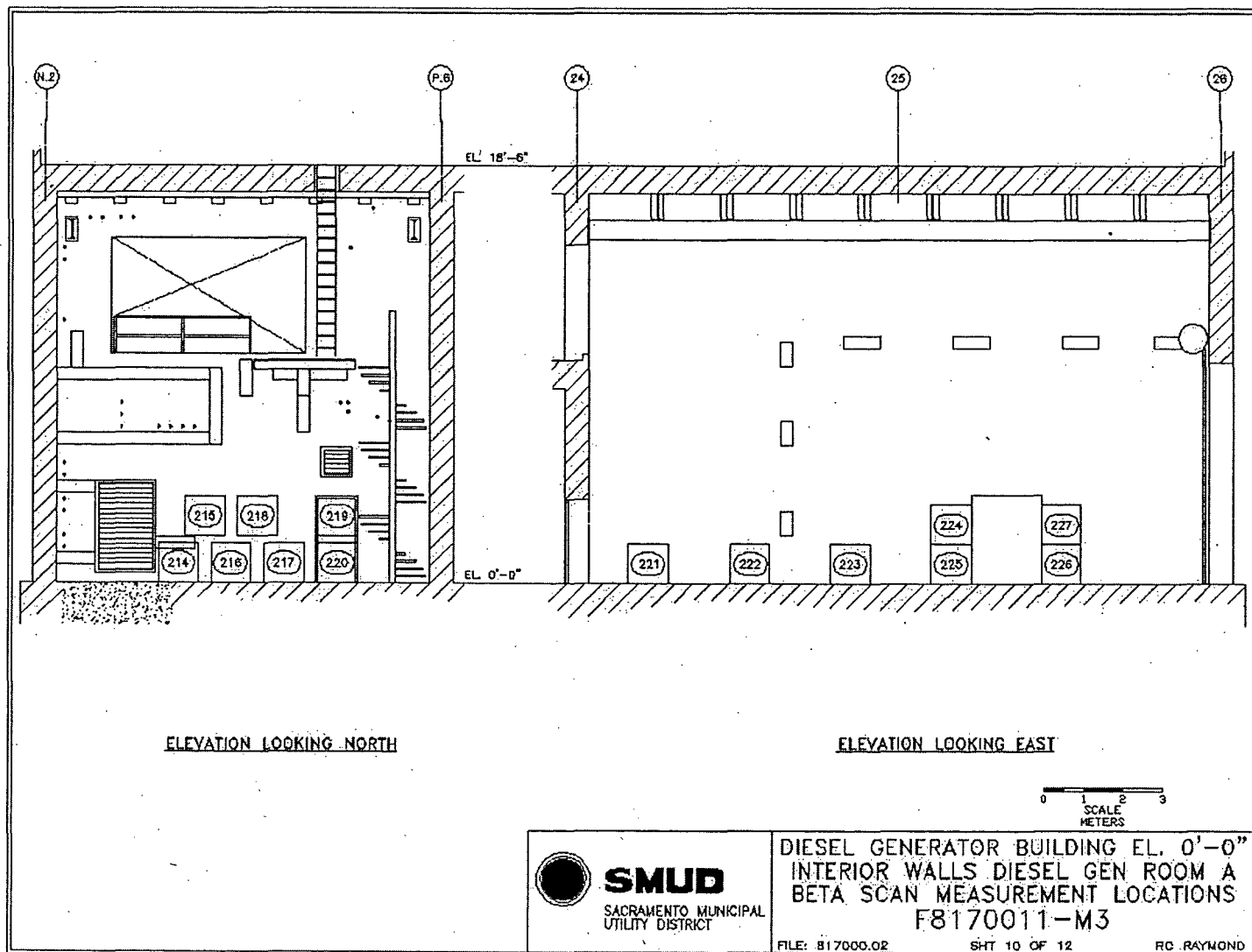


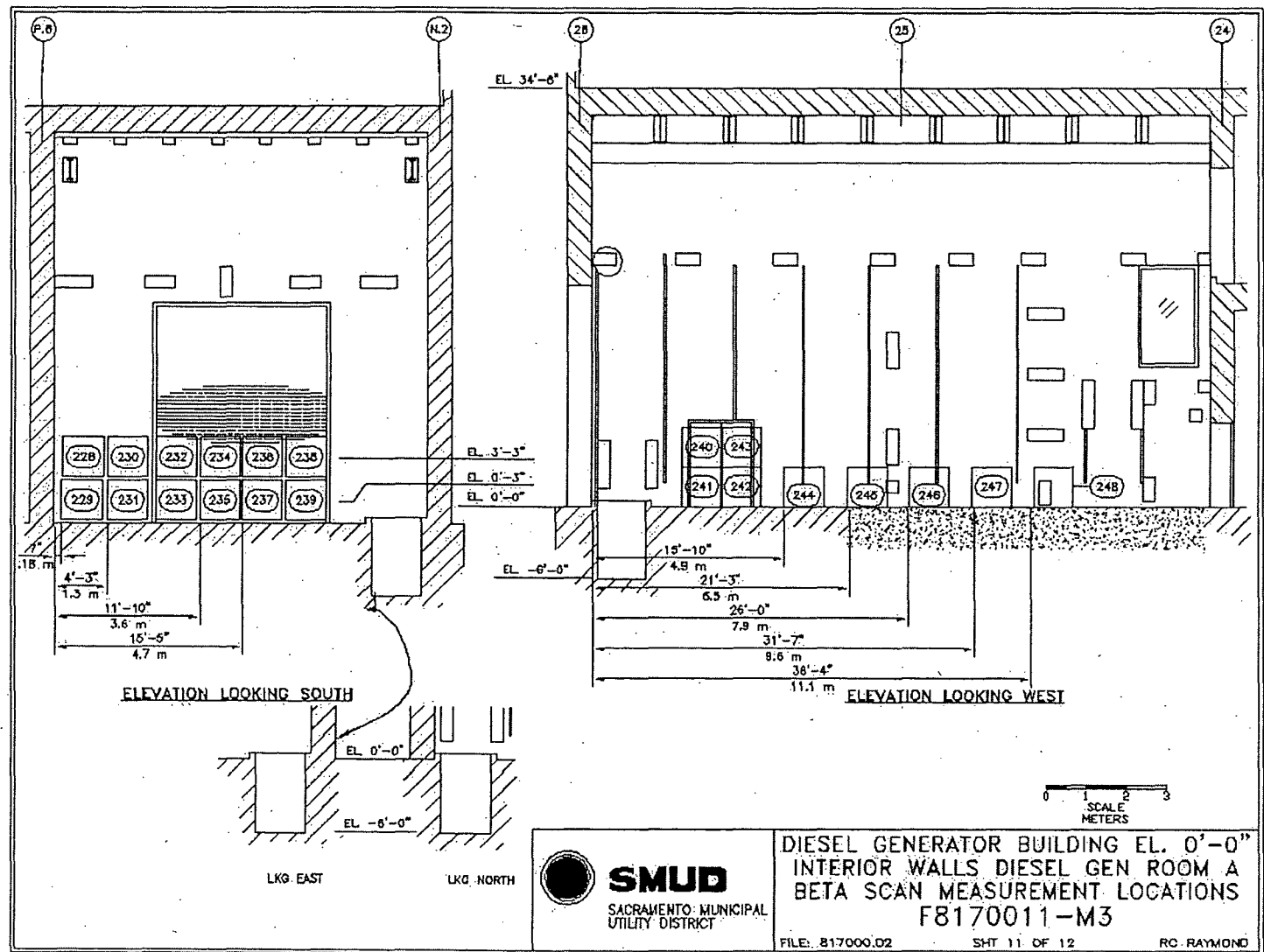


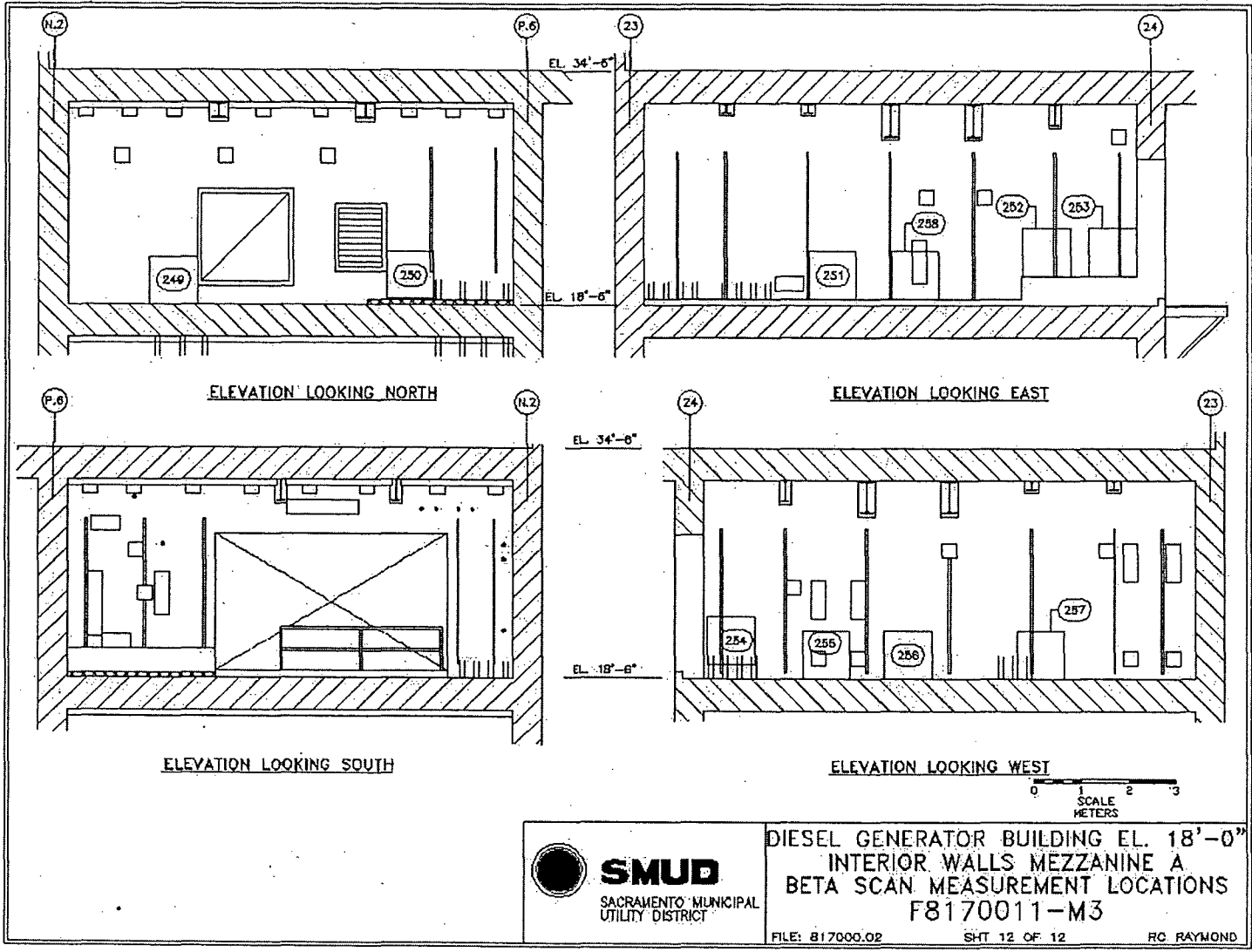












Attachment 2

Instrumentation

October 31, 2007

Survey Unit F8170011

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; 193700	43-68B; 190294	433	1033
M2350; 203482	43-68B; 178511	433	1033
M2350; 180733	43-68B; 161406	433	1033
M2350; 149789	43-68B; 161397	433	1033
M2350; 142507	43-68B; 160781	433	1033
M2350; 193715	43-68B; 160703	433	1033
M2350; 142499	43-37; 148502	198	616
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	21500
Investigation Criteria - Scan	43000
DCGL _w	43000
DCGL _{EMC}	N/A

Attachment 3

Investigation

October 31, 2007

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(none required)

Attachment 4

Data Assessment

October 31, 2007

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