

Rancho Seco

Final Status Survey Summary Report

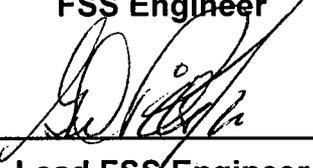
May 29, 2008

Aux. Bldg. Elev. #2 (Rm 129, 221, & 346)

Survey Unit F8132051

Prepared By: Dan A. Tallman  Date: May 29, 2008

FSS Engineer

Reviewed By:  Date: 5/29/08

Lead FSS Engineer

Approved By:  Date: 7-29-08

Dismantlement Superintendent, Radiological

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8132051, Aux. Bldg. Elev. #2 (Rm 129, 221, & 346)

Survey Unit Description:

Operating History: The Auxiliary Building is a reinforced concrete structure that contained the RadWaste processing and supporting systems. The building contained six main elevations. Residual radioactive material was known to be present on all levels of the interior 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 made of each of the interior elevation surfaces as well as the exterior surfaces of the structure. These measurements confirmed the presence of plant-derived radionuclides. Characterization scan measurements on the interior of the elevator shaft at grade elevation showed a maximum gross activity level of 5,070 dpm/100 cm². Based on the classification procedure (DSIP-0020) and levels of gross activity reported, the interior of the auxiliary building non-controlled elevator was determined to be a Class 3 area.

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 12 m² were scanned for approximately 6% 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	Aux. Bldg. Elev. #2 (Rm 129, 221, & 346)
Survey Unit:	2051	Structure Surface
Class:	3	LTP Table 5-4
SU Area (m²):	195.6	
Evaluator:	D.A. Tallman	
DCGL (dpm/100 cm²):	43000	Gross Activity DCGL
Area Factor:	N/A	Class 3
Design DCGL_{emc} (dpm/100 cm²):	N/A	Class 3
LBGR (dpm/100 cm²):	21500	Default = 50% DCGL
Design Sigma (dpm/100 cm²):	261	
Type I Error:	0.05	
Type II Error:	0.05	
Predominant Nuclide:	Cs-137	
Sample Area (m²):	N/A	Class 3
Scan Area (m²):	12	
Scan Coverage (%):	6%	Class 3
Z_{1-α}:	1.645	
Z_{1-β}:	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	82.3	
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 F8132051. The results including mean, median, standard deviation and range are shown in Table 2. All direct measurements were less than the DCGL. The scan measurement acquired using the ISOCS indicated no areas of elevated activity. The Scan activity observed was 338 dpm/100 cm² (Cs137). 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 cm²)
F8132051-C0001BD	1509
F8132051-C0002BD	1473
F8132051-C0003BD	1416
F8132051-C0004BD	1395
F8132051-C0005BD	1416
F8132051-C0006BD	1546
F8132051-C0007BD	1556
F8132051-C0008BD	1608
F8132051-C0009BD	856
F8132051-C0010BD	1447
F8132051-C0011BD	1634
F8132051-C0012BD	1406
F8132051-C0013BD	1613
F8132051-C0014BD	1012
Mean:	1421
Median:	1460
Standard Deviation:	224
Range:	856 - 1634

Table 3. Removable Surface Activity Results

Measurement ID	Surface Beta Activity (dpm/100 cm²)
F8132051C0001SM	-2.24
F8132051C0002SM	0.34
F8132051C0003SM	-3.53
F8132051C0004SM	-0.95
F8132051C0005SM	-2.24
F8132051C0006SM	-0.95
F8132051C0007SM	-3.53
F8132051C0008SM	-4.82
F8132051C0009SM	-4.82
F8132051C0010SM	-2.24
F8132051C0011SM	-4.82
F8132051C0012SM	0.34
F8132051C0013SM	-4.82
F8132051C0014SM	-4.82
Mean:	-2.79
Median:	-2.88
Standard Deviation:	1.94
Range:	-4.82 to 0.34

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):	1460		
Mean (dpm/100 cm ²):	1421		
Direct Measurement Standard Deviation (dpm/100 cm ²):	224		
Total Standard Deviation (dpm/100 cm ²):	224		Based on samples and backgrounds.
Maximum (dpm/100 cm ²):	1634		Background Subtract Not Applied
Material Type:	N/A		
Sign Test Final N Value:	14		Class 3
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_{mc}:	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		

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), 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.

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 F8132051 meets the release criteria of 10CFR20.1402.

Attachment 1

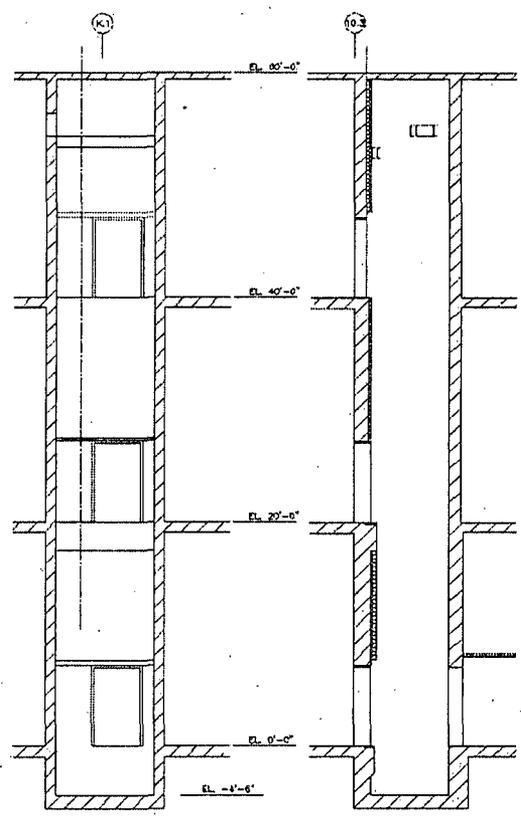
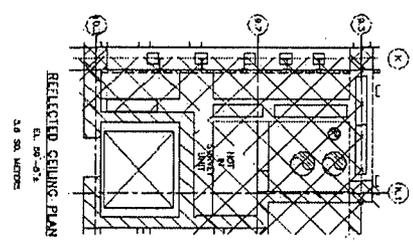
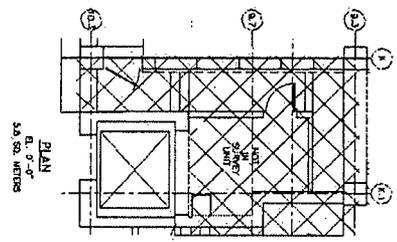
Maps

May 29, 2008

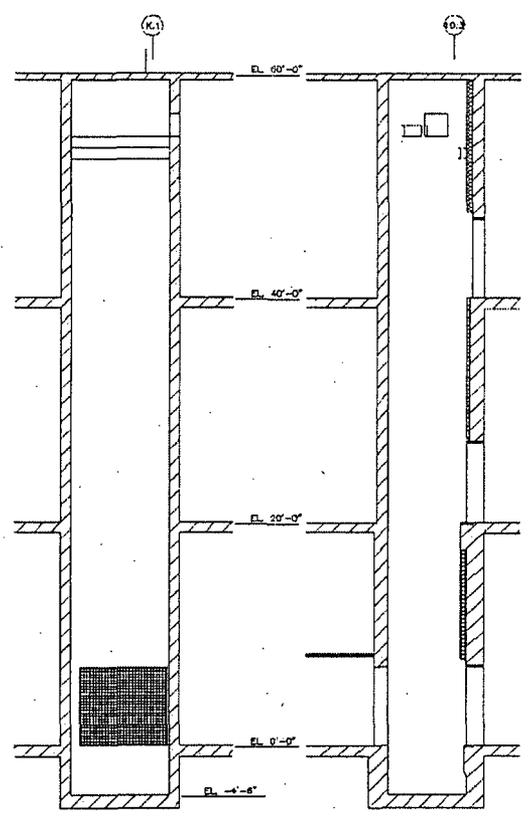

SAUD
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 UTILITY DISTRICT

AUXILIARY BUILDING - ELEVATOR #2
 RM 129, 221 & 346 WALL ELEVATIONS
 SURFACE AREA
 ESTIMATE
F8132051-M1

FILE: 813000.035G.T
 SHEET 1 of 1
 RC RAYMOND/
 DA TALLMAN



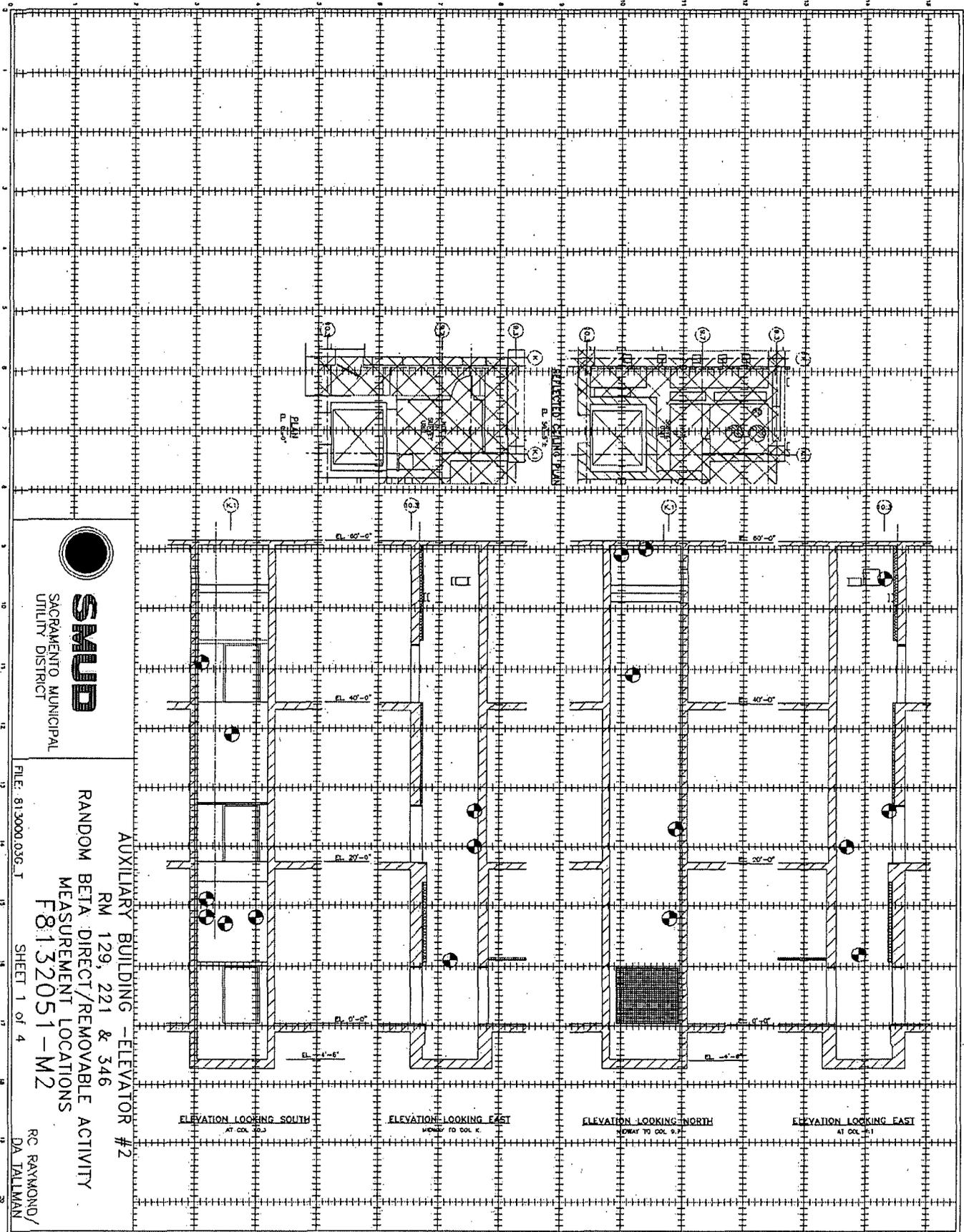
ELEVATION LOOKING SOUTH
 AT COL. 10.3
 36.3 SQ. METERS



ELEVATION LOOKING NORTH
 MENWAY TO COL. 9.7
 41.8 SQ. METERS

ELEVATION LOOKING EAST
 MENWAY TO COL. 8

ELEVATION LOOKING EAST
 AT COL. 7.1
 50.3 SQ. METERS

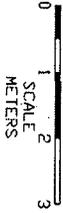


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FILE: 813000.03G.T
SHEET 1 of 4
RC RAYMOND/
DA TALLMAN

AUXILIARY BUILDING - ELEVATOR #2
RM 129, 221 & 346
RANDOM BETA DIRECT/REMOVABLE ACTIVITY
MEASUREMENT LOCATIONS
F8132051-M2

NOTES:
 1. AT TIME OF FSS MAP DEVELOPMENT
 ELEVATOR EQUIPMENT, PIPING, LIGHTS,
 AND CONDUIT REMAINED IN PLACE.
 SCAN MEASUREMENT LOCATIONS MAY
 NEED TO BE ADJUSTED IN THE FIELD TO
 ACCOMMODATE INSITU EQUIPMENT.

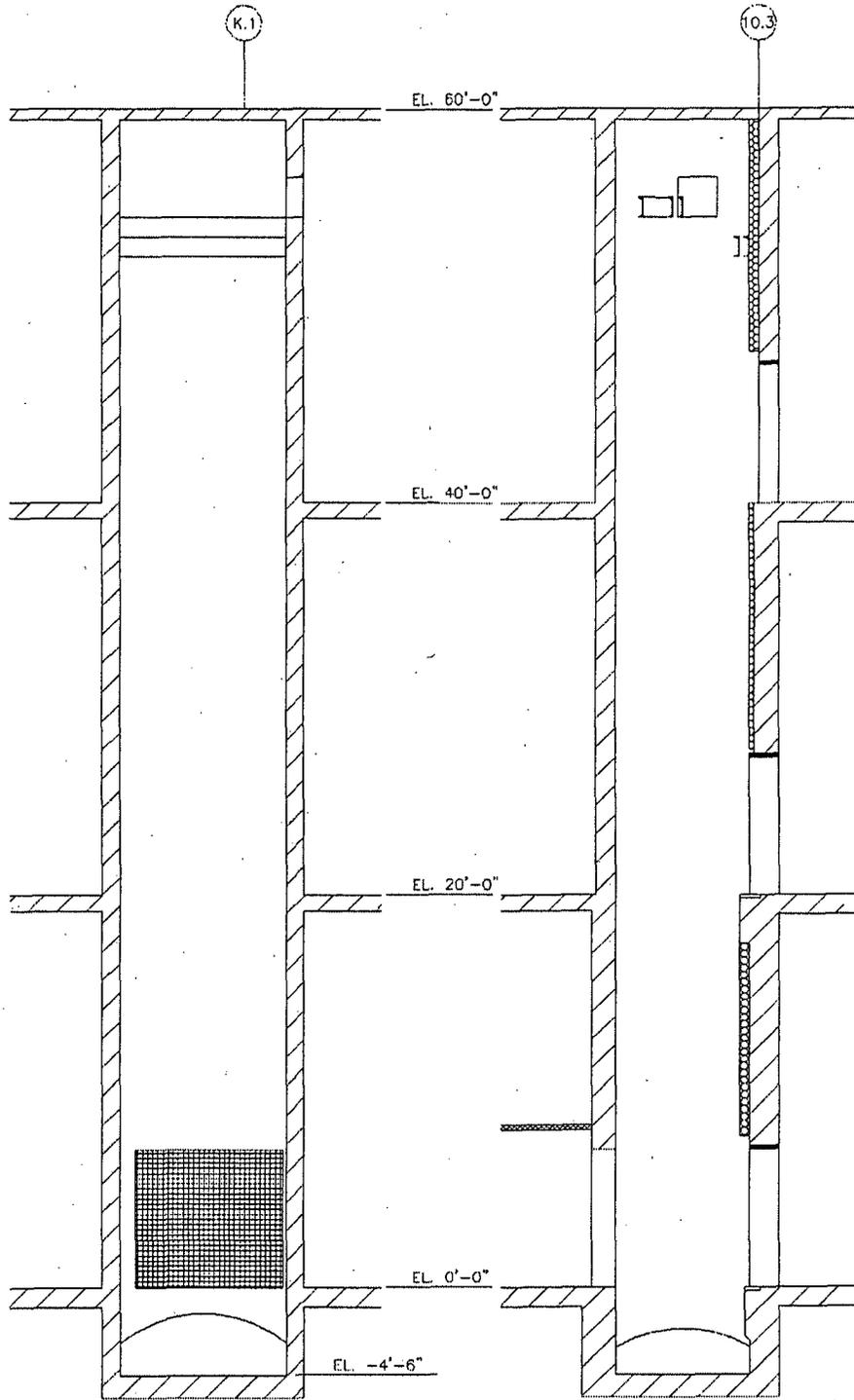


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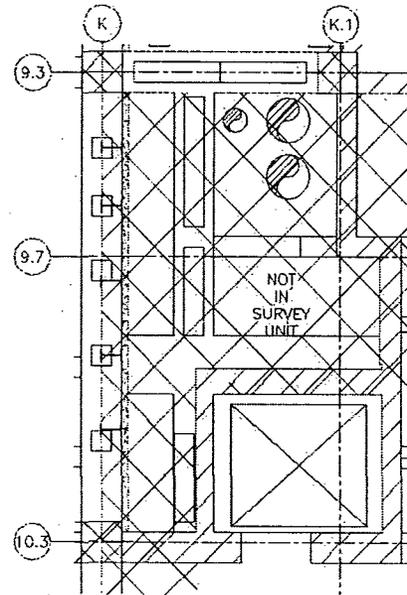
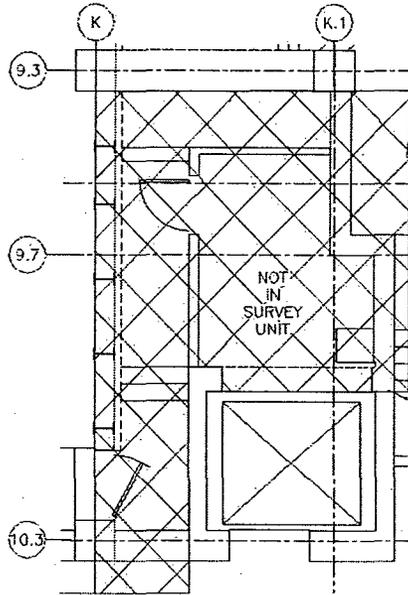
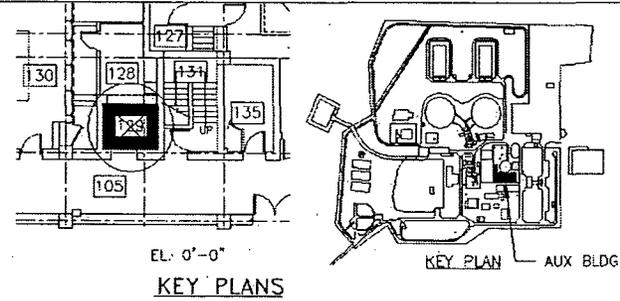
AUXILIARY BUILDING - ELEVATOR #2
 RM 129, 221 & 346 WALL ELEVATIONS
 GAMMA SCAN
 MEASUREMENT LOCATIONS
 F8132051-M2

RC RAYMOND/
 DA TALLMAN



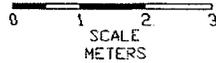
ELEVATION LOOKING NORTH
 MIDWAY TO COL. 9.7

ELEVATION LOOKING EAST
 AT COL. K.1



NOTES:

1. AT TIME OF FSS MAP DEVELOPMENT
ELEVATOR EQUIPMENT, PIPING, LIGHTS,
AND CONDUIT REMAINED IN PLACE.
SCAN MEASUREMENT LOCATIONS MAY
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ACCOMMODATE INSITU EQUIPMENT.



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AUXILIARY BUILDING -ELEVATOR #2
RM 129, 221 & 346 WALL ELEVATIONS
BETA DIRECT/REMOVABLE ACTIVITY
MEASUREMENT LOCATIONS
F8132051-M2

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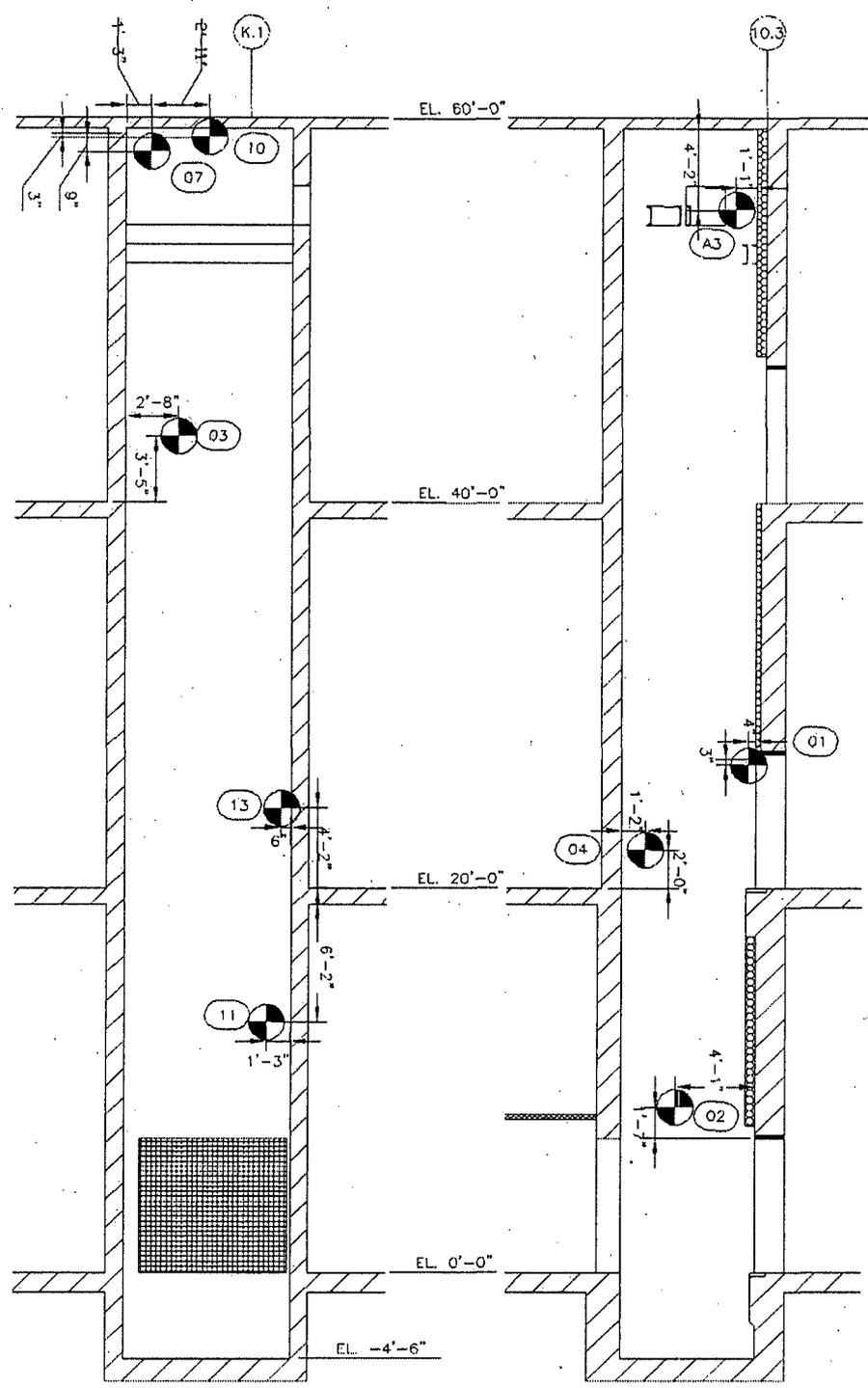
SHEET 2 of 4

RC RAYMOND/
DA TALLMAN

NOTES:
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AUXILIARY BUILDING - ELEVATOR #2
 RM. 129, 221 & 346 WALL ELEVATIONS
 BETA DIRECT/REMOVABLE ACTIVITY
 MEASUREMENT LOCATIONS
 F8132051-M2
 FILE: 813000.03G_1
 SHEET 3 of 4
 RC RAYMOND/
 DA TALLMAN



ELEVATION LOOKING NORTH
 MIDWAY TO COL. 9.7

ELEVATION LOOKING EAST
 AT COL. K.1

NOTES:
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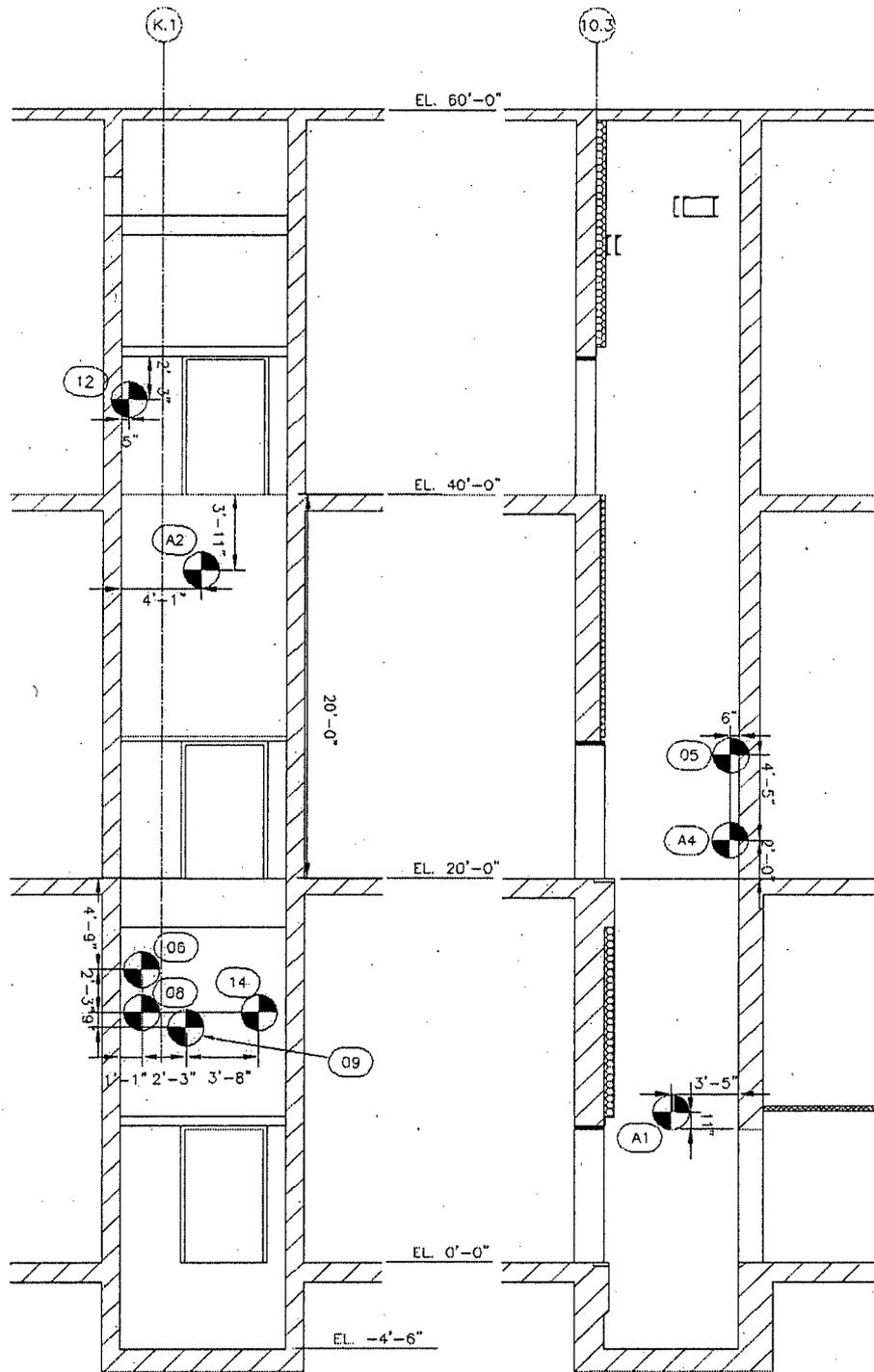
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FILE: 81-3000.030G.T

SHEET 4 of 4

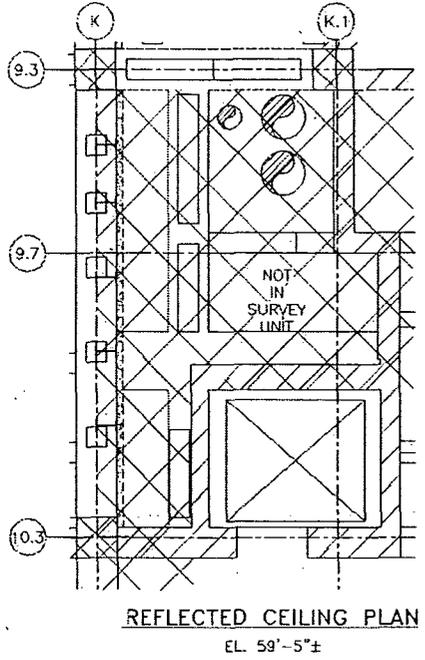
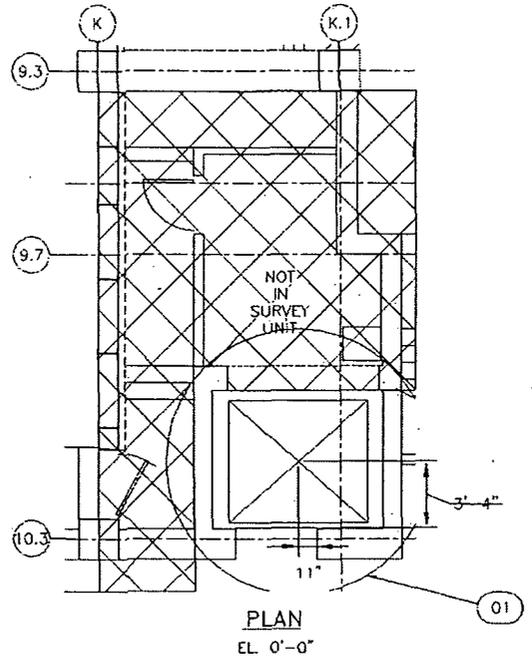
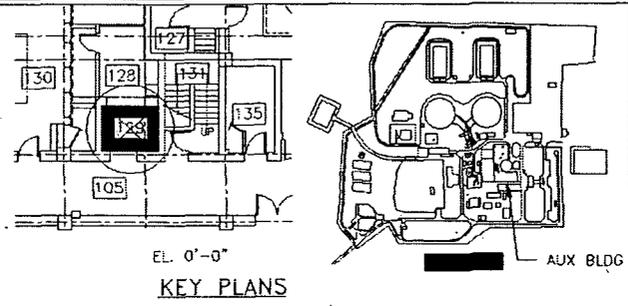
RC RAYMOND/
 DA TALLMAN

AUXILIARY BUILDING - ELEVATOR #2
 RM 129, 221 & 346 WALL ELEVATIONS
 BETA DIRECT/REMOVABLE ACTIVITY
 MEASUREMENT LOCATIONS
 F8132051-M2



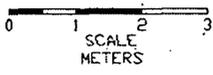
ELEVATION LOOKING SOUTH
 AT COL 10.3

ELEVATION LOOKING EAST
 MIDWAY TO COL K



NOTES:

1. AT TIME OF FSS MAP DEVELOPMENT ELEVATOR EQUIPMENT, PIPING, LIGHTS, AND CONDUIT REMAINED IN PLACE. SCAN MEASUREMENT LOCATIONS MAY NEED TO BE ADJUSTED IN THE FIELD TO ACCOMMODATE INSITU EQUIPMENT.



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AUXILIARY BUILDING -ELEVATOR #2
RM 129, 221 & 346 WALL ELEVATIONS
GAMMA SCAN
MEASUREMENT LOCATION
F8132051-M3
SHEET 1 of 3

RC RAYMOND/
DA TALLMAN

FILE: 813000.03G_T

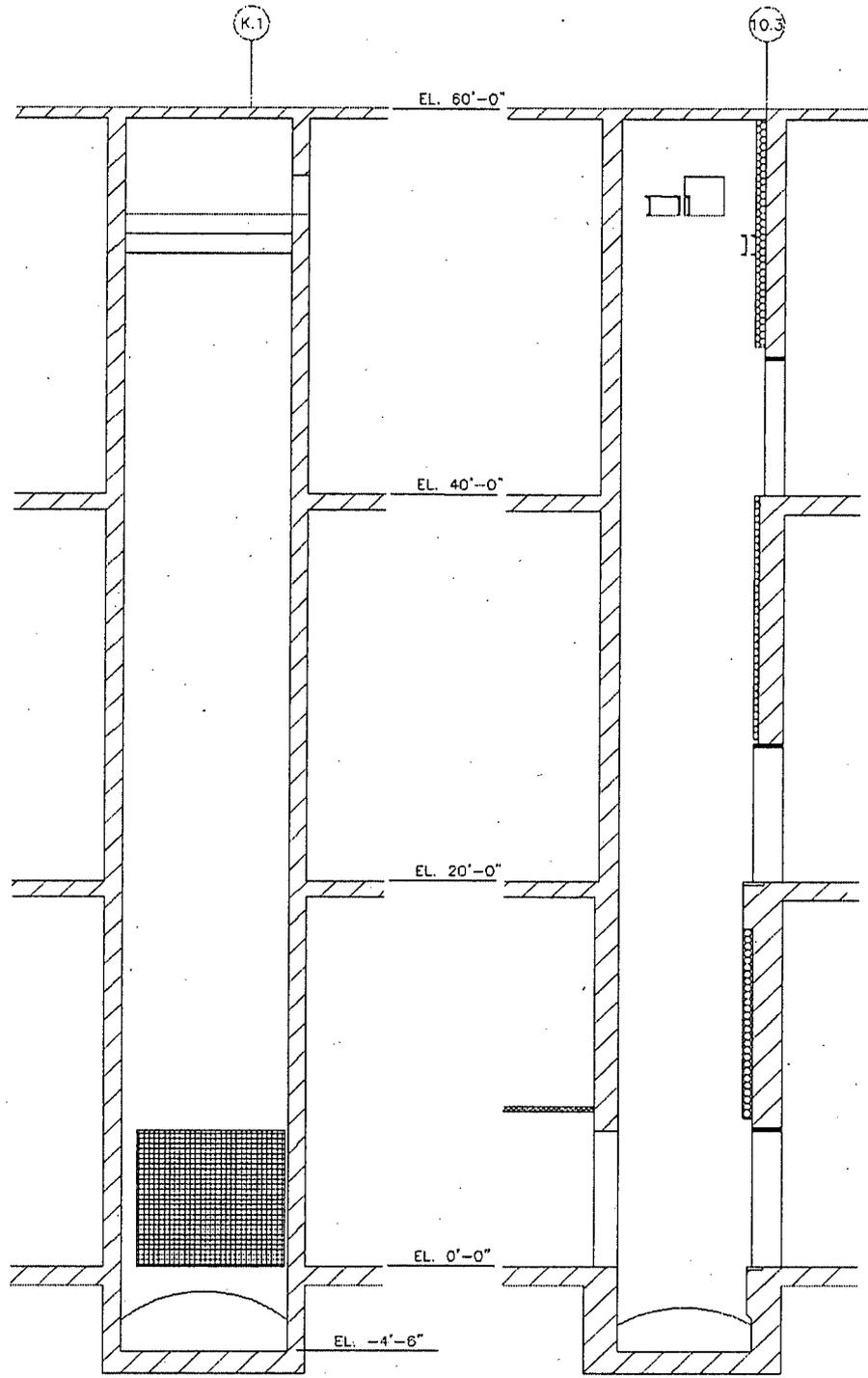
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AUXILIARY BUILDING - ELEVATOR #2
 RM 129, 221 & 346 WALL ELEVATIONS
 GAMMA SCAN
 MEASUREMENT LOCATIONS
 F8132051-M3
 RC RAYMOND/
 DA TALLMAN

FILE: 813006.039-1
 SHEET 2 of 3



ELEVATION LOOKING NORTH
 MIDWAY TO COL 9.7

ELEVATION LOOKING EAST
 AT COL K.1

NOTES:
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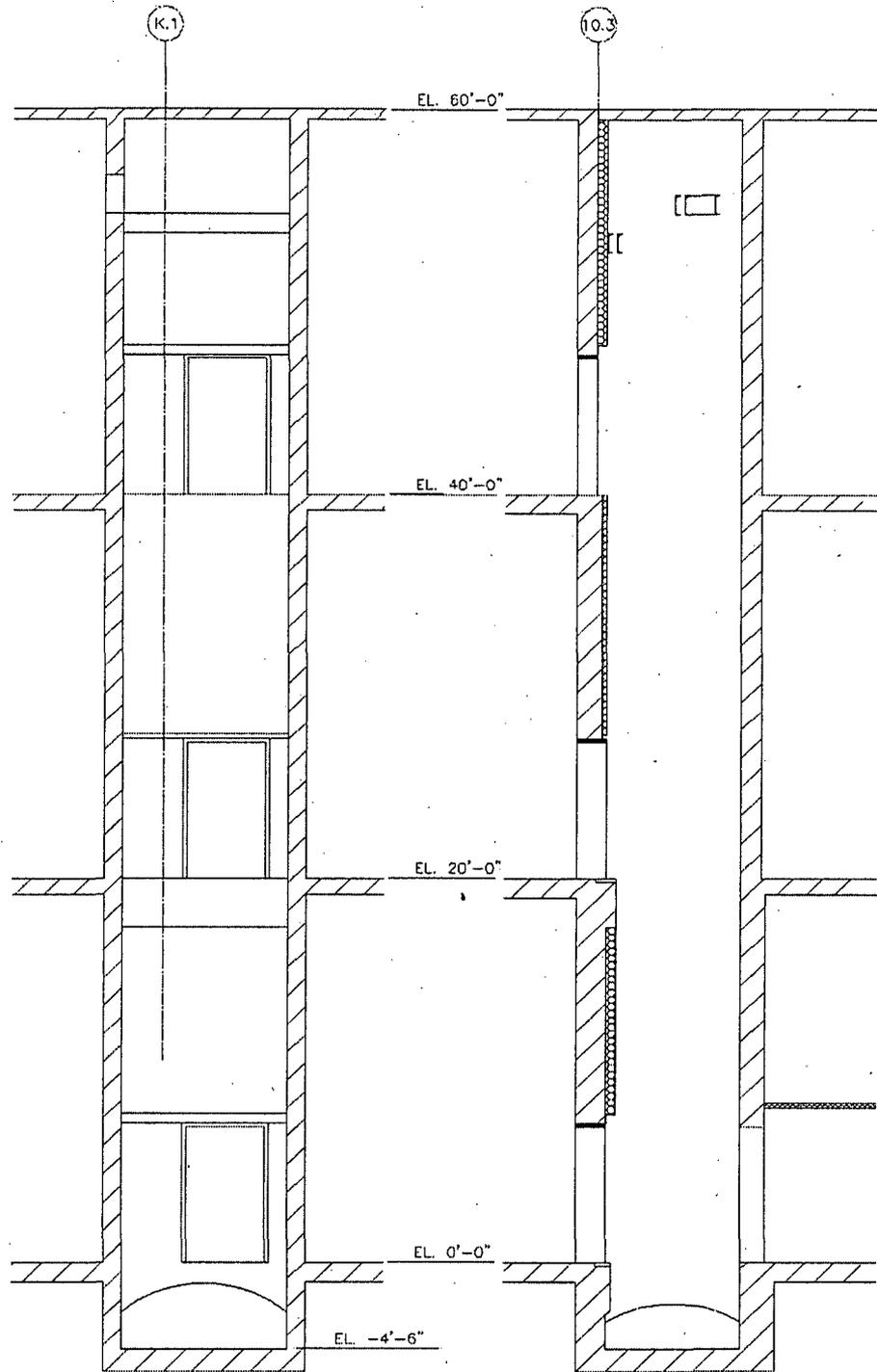
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FILE: 81 3000 036 J

SHEET 3 of 3

RC RAYMOND/
 DA TALLMAN

AUXILIARY BUILDING - ELEVATOR #2
 RM 129, 221 & 346 WALL ELEVATIONS
 GAMMA SCAN
 MEASUREMENT LOCATIONS
 F8132051-M3



ELEVATION LOOKING SOUTH
 AT COL. 10.3

ELEVATION LOOKING EAST
 MIDWAY TO COL. K

Attachment 2

Instrumentation

May 29, 2008

Survey Unit F8132051

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; 142509	43-68B; 160699	433	1033
ISOCS	1983920	NA	180 (Cs137) 140 (Co60)
Tennelec; 0401171	N/A	6 dpm α , 12 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

May 29, 2008

Survey Unit F8132051

(none required)

Attachment 4

Data Assessment

May 29, 2008

Survey Unit F8132051

