Rancho Seco

Final Status Survey Summary Report

December 10, 2008

Containment Interior Walls, (+) 25' El. to (+) 75' El.

Survey Unit F8110112

Prepared By: D Anderson **Date:** 12/10/2008
FSS Engineer

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Dismantlement Superintendent, Radiological

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8110112, Containment Interior Walls, (+) 25' El. to (+) 75' El.

Survey Unit Description:

Operating History: The reinforced concrete structure contained the reactor and supporting systems. The building contained four 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. No events documenting exterior contamination were found.

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. Direct measurements on the –27' elevation showed a mean gross activity level of 1,535,383 dpm/100 cm² and a maximum value of 8,134,000 dpm/100 cm². Direct measurements on the grade elevation showed a mean gross activity level of 201,670 dpm/100 cm² and a maximum value of 370,000 dpm/100 cm². Direct measurements on the +40' elevation showed a mean gross activity level of 51,521 dpm/100 cm² and a maximum value of 99,150 dpm/100 cm². Direct measurements on the +60' elevation showed a mean gross activity level of 20,110 dpm/100 cm² and a maximum value of 46,660 dpm/100 cm². Direct measurements on the exterior roof showed a mean gross activity level of 1,364 dpm/100 cm² and a maximum value of 1,571 dpm/100 cm². Based on the classification procedure (DSIP-0020) and levels of gross activity reported, the interior of the reactor building was determined to be a Class 1 area and the exterior was a Class 3.

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 fixed grid pattern and 1,966 m² were scanned for 100% coverage. Samples of removable contamination were collected. 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:	F811	Containment Interior Walls, (+) 25' El. to (+) 75' El.
Survey Unit:	0112	Structure Surface
Class:	1	LTP Table 5-4
SU Area (m^2)**:**	1,966	
Evaluator:	D. Anderson	
DCGL (dpm/100 cm^2)**:**	43,000	Gross Activity DCGL
Area Factor:	14.9	Class 1
Design DCGLemc (dpm/100 cm^2)**:**	640,700	Class 1
LBGR (dpm/100 cm^2)**:**	21,500	Default = 50% DCGL
Design Sigma (dpm/100 cm^2)**:**	33,040	
Type I Error:	0.05	
Type II Error:	0.05	
Predominant Nuclide:	Cs-137	
Sample Area (m^2)**:**	19.6	Class 1
Scan Area (m^2)**:**	1,966	
Scan Coverage (%):	100%	Class 1
$Z_{1-\alpha}$ **:**	1.645	
$Z_{1-\beta}$ **:**	1.645	
Sign P:	0.725747	
Calculated Relative Shift:	0.6	
Relative Shift Used:	0.6	Uses 3.0 if Relative Shift is >3
N-Value:	54	
Design N-Value + 20%:	65	NUREG-1575 Table 5-5
Design Min Samples N:	180	Class 1
Grid Spacing L:	N/A	Class 1

Survey Results:

A total of 180 direct measurements were made in F8110112. 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 ISOCS gamma measurements on the interior wall surfaces indicated areas of elevated activity. Co-60 was not identified above the MDC. Beta scan activity on the penetrations and horizontal surfaces ranged from 959 to 208,743 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 cm²)	Uncertainty (dpm/100 cm²)
F8110112-M0001GS	5,902	1,014
F8110112-M0002GS	2,760	607
F8110112-M0003GS	1,616	453
F8110112-M0004GS	1,571	465
F8110112-M0005GS	2,212	538
F8110112-M0006GS	3,821	754
F8110112-M0007GS	3,306	694
F8110112-M0008GS	3,844	757
F8110112-M0009GS	4,553	845
F8110112-M0010GS	9,289	1,432
F8110112-M0011GS	10,529	1,586
F8110112-M0012GS	10,214	1,543
F8110112-M0013GS	3,520	712
F8110112-M0014GS	5,540	967
F8110112-M0015GS	8,385	1,318
F8110112-M0016GS	2,592	585
F8110112-M0017GS	1,881	492
F8110112-M0018GS	4,335	817
F8110112-M0019GS	4,497	834
F8110112-M0020GS	4,628	849
F8110112-M0021GS	5,522	955
F8110112-M0022GS	11,959	1,760
F8110112-M0023GS	14,472	2,058
F8110112-M0024GS	7,556	1,217
F8110112-M0025GS	8,340	1,318
F8110112-M0026GS	4,676	853
F8110112-M0027GS	9,922	1,506
F8110112-M0028GS	7,008	1,155
F8110112-M0029GS	3,838	754
F8110112-M0030GS	1,696	487
F8110112-M0031GS	1,143	383
F8110112-M0032GS	1,440	424
F8110112-M0033GS	1,257	396
F8110112-M0034GS	1,042	355
F8110112-M0035GS	1,310	411

Measurement ID	Gross Activity (dpm/100 cm^2)	Uncertainty (dpm/100 cm^2)
F8110112-M0036GS	3,155	660
F8110112-M0037GS	5,134	914
F8110112-M0038GS	2,474	578
F8110112-M0039GS	813	347
F8110112-M0040GS	1,179	384
F8110112-M0041GS	1,719	479
F8110112-M0042GS	1,719	471
F8110112-M0043GS	1,652	463
F8110112-M0044GS	2,537	586
F8110112-M0045GS	3,855	760
F8110112-M0046GS	9,113	1,410
F8110112-M0047GS	6,039	1,031
F8110112-M0048GS	5,558	978
F8110112-M0049GS	4,068	779
F8110112-M0050GS	4,659	858
F8110112-M0051GS	5,109	912
F8110112-M0052GS	2,299	553
F8110112-M0053GS	1,794	480
F8110112-M0054GS	3,623	720
F8110112-M0055GS	3,874	759
F8110112-M0056GS	4,896	895
F8110112-M0057GS	3,123	667
F8110112-M0058GS	6,117	1,041
F8110112-M0059GS	5,625	975
F8110112-M0060GS	3,349	6,663
F8110112-M0061GS	4,203	802
F8110112-M0062GS	3,218	666
F8110112-M0063GS	6,294	1,056
F8110112-M0064GS	4,821	878
F8110112-M0065GS	2,389	559
F8110112-M0066GS	2,362	570
F8110112-M0067GS	2,558	587
F8110112-M0068GS	1,620	465
F8110112-M0069GS	1,264	436
F8110112-M0070GS	1,444	446
F8110112-M0071GS	1,935	519
F8110112-M0072GS	3,226	682
F8110112-M0073GS	5,515	971
F8110112-M0074GS	3,136	670
F8110112-M0075GS	< 777	
F8110112-M0076GS	< 777	
F8110112-M0077GS	< 759	
F8110112-M0078GS	735	338
F8110112-M0079GS	817	322
F8110112-M0080GS	1,123	393
F8110112-M0081GS	1,450	426
F8110112-M0082GS	2,851	612
F8110112-M0083GS	2,861	615
F8110112-M0084GS	2,835	630
F8110112-M0085GS	3,389	693
F8110112-M0086GS	4,425	824
F8110112-M0087GS	5,885	1,009

Measurement ID	Gross Activity (dpm/100 cm^2)	Uncertainty (dpm/100 cm^2)
F8110112-M0088GS	4,716	864
F8110112-M0089GS	1,629	477
F8110112-M0090GS	4,493	834
F8110112-M0091GS	3,630	722
F8110112-M0092GS	2,995	650
F8110112-M0093GS	2,414	576
F8110112-M0094GS	2,588	583
F8110112-M0095GS	2,501	581
F8110112-M0096GS	< 807	
F8110112-M0097GS	1,382	414
F8110112-M0098GS	2,535	571
F8110112-M0099GS	3,019	648
F8110112-M0100GS	2,050	530
F8110112-M0101GS	1,371	416
F8110112-M0102GS	900	349
F8110112-M0103GS	1,000	383
F8110112-M0104GS	576	323
F8110112-M0105GS	< 771	
F8110112-M0106GS	1,417	435
F8110112-M0107GS	1,259	397
F8110112-M0108GS	3,327	691
F8110112-M0109GS	5,452	968
F8110112-M0110GS	2,961	649
F8110112-M0111GS	705	325
F8110112-M0112GS	< 771	
F8110112-M0113GS	< 726	
F8110112-M0114GS	488	297
F8110112-M0115GS	941	360
F8110112-M0116GS	< 901	
F8110112-M0117GS	1,150	384
F8110112-M0118GS	3,217	671
F8110112-M0119GS	2,250	542
F8110112-M0120GS	1,957	498
F8110112-M0121GS	3,272	685
F8110112-M0122GS	2,985	655
F8110112-M0123GS	3,075	658
F8110112-M0124GS	2,786	610
F8110112-M0125GS	1,282	416
F8110112-M0126GS	2,663	603
F8110112-M0127GS	2,180	530
F8110112-M0128GS	1,882	497
F8110112-M0129GS	2,085	523
F8110112-M0130GS	4,057	782
F8110112-M0131GS	2,189	534
F8110112-M0132GS	< 693	
F8110112-M0133GS	1,948	510
F8110112-M0134GS	2,174	522
F8110112-M0135GS	2,397	567
F8110112-M0136GS	1,848	492
F8110112-M0137GS	1,102	384
F8110112-M0138GS	890	338
F8110112-M0139GS	999	362

Measurement ID	Gross Activity (dpm/100 cm^2)	Uncertainty (dpm/100 cm^2)
F8110112-M0140GS	783	306
F8110112-M0141GS	1,246	409
F8110112-M0142GS	1,748	481
F8110112-M0143GS	1,551	446
F8110112-M0144GS	2,527	591
F8110112-M0145GS	3,598	729
F8110112-M0146GS	2,897	640
F8110112-M0147GS	< 801	
F8110112-M0148GS	< 627	
F8110112-M0149GS	389	255
F8110112-M0150GS	< 771	
F8110112-M0151GS	< 765	
F8110112-M0152GS	801	315
F8110112-M0153GS	< 807	
F8110112-M0154GS	1,882	485
F8110112-M0155GS	1,856	488
F8110112-M0156GS	1,136	385
F8110112-M0157GS	1,781	487
F8110112-M0158GS	1,679	455
F8110112-M0159GS	1,344	428
F8110112-M0160GS	< 765	
F8110112-M0161GS	1,305	404
F8110112-M0162GS	2,754	608
F8110112-M0163GS	2,398	565
F8110112-M0164GS	1,378	414
F8110112-M0165GS	1,941	496
F8110112-M0166GS	4,386	821
F8110112-M0167GS	3,043	645
F8110112-M0168GS	401	259
F8110112-M0169GS	1,371	420
F8110112-M0170GS	1,861	488
F8110112-M0171GS	3,364	684
F8110112-M0172GS	2,038	513
F8110112-M0173GS	1,054	369
F8110112-M0174GS	< 672	
F8110112-M0175GS	1,013	359
F8110112-M0176GS	337	230
F8110112-M0177GS	683	308
F8110112-M0178GS	1,096	369
F8110112-M0179GS	713	330
F8110112-M0180GS	2,133	543
Mean:	2,852	
Median:	2,201	
Standard Deviation:	2,329	
Range:	337 – 14,472	

Table 3. Removable Surface Activity Results

Measurement ID	Surface Beta Activity (dpm/100 cm^2)
F8110112M0001SM	627.35
F8110112M0002SM	233.46
F8110112M0003SM	24.24
F8110112M0004SM	93.98
F8110112M0005SM	7.46
F8110112M0006SM	29.41
F8110112M0007SM	4.87
F8110112M0008SM	10.04
F8110112M0009SM	12.62
F8110112M0010SM	16.5
F8110112M0011SM	47.49
F8110112M0012SM	30.7
F8110112M0013SM	16.5
F8110112M0014SM	22.95
F8110112M0015SM	21.66
F8110112M0016SM	43.62
F8110112M0017SM	72.03
F8110112M0018SM	15.2
F8110112M0019SM	62.99
F8110112M0020SM	157.26
F8110112M0021SM	93.98
F8110112M0022SM	20.37
F8110112M0023SM	161.14
F8110112M0024SM	24.24
F8110112M0025SM	277.37
F8110112M0026SM	31.99
F8110112M0027SM	126.27
F8110112M0028SM	96.57
F8110112M0029SM	203.76
F8110112M0030SM	118.52
F8110112M0031SM	113.35
F8110112M0032SM	43.62
F8110112M0033SM	223.13
F8110112M0034SM	16.5
F8110112M0035SM	149.52
F8110112M0036SM	73.32
F8110112M0037SM	188.26
F8110112M0038SM	78.49
F8110112M0039SM	1315.69
F8110112M0040SM	55.24
F8110112M0041SM	34.58
F8110112M0042SM	65.57
F8110112M0043SM	33.28
F8110112M0044SM	30.7
F8110112M0045SM	34.58
F8110112M0046SM	57.82
F8110112M0047SM	22.95
F8110112M0048SM	31.99

Measurement ID	Surface Beta Activity (dpm/100 cm^2)
F8110112M0049SM	38.45
F8110112M0050SM	20.37
F8110112M0051SM	39.74
F8110112M0052SM	6.16
F8110112M0053SM	145.64
F8110112M0054SM	31.99
F8110112M0055SM	236.04
F8110112M0056SM	224.42
F8110112M0057SM	34.58
F8110112M0058SM	12.62
F8110112M0059SM	47.49
F8110112M0060SM	20.37
F8110112M0061SM	131.43
F8110112M0062SM	22.95
F8110112M0063SM	22.95
F8110112M0064SM	25.54
F8110112M0065SM	8.75
F8110112M0066SM	28.12
F8110112M0067SM	38.45
F8110112M0068SM	60.41
F8110112M0069SM	29.41
F8110112M0070SM	16.5
F8110112M0071SM	90.11
F8110112M0072SM	103.02
Mean:	93.18
Median:	38.45
Standard Deviation:	173.27
Range:	4.87 to 1315.69

Survey Unit Data Assessment:

The survey design required 180 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 cm²):	N/A	
Ambient Background Used (dpm/100 cm²):	N/A	Average Ambient BKG = 0
Actual Direct Measurements (N):	180	
Median (dpm/100 cm²):	2,201	
Mean (dpm/100 cm²):	2,852	
Direct Measurement Standard Deviation (dpm/100 cm²):	2,329	
Total Standard Deviation (dpm/100 cm²):	2,329	Based on samples and backgrounds.
Maximum (dpm/100 cm²):	14,472	
Material Type:	N/A	Background Subtract Not Applied
Sign Test Final N Value:	180	
S+ Value:	180	
Critical Value:	101	
Sufficient Samples Collected:	Yes	
Maximum Value < DCGL:	Yes	
Median Value < DCGL:	Yes	
Mean Value < DCGL:	Yes	
Maximum Value < DCGLemc:	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:

Forty-two investigations (scan grids 33-36, 39, 43-45, 47, 53-56, 58-60, 79, 85-86, 92, 94, 97-99, 102-104, 137-143, 147, 160, 208, 233, 238, 243, 247, and P087) were required for the scan measurements and the results are reported in Attachment 3. The EMC unity rule was not exceeded as shown in Table 3-1.

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. Forty-two potential areas of elevated activity were detected and evaluated as shown in Attachment 3. Therefore the EMC criterion was met.

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 43,000 dpm/100 cm^2 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.

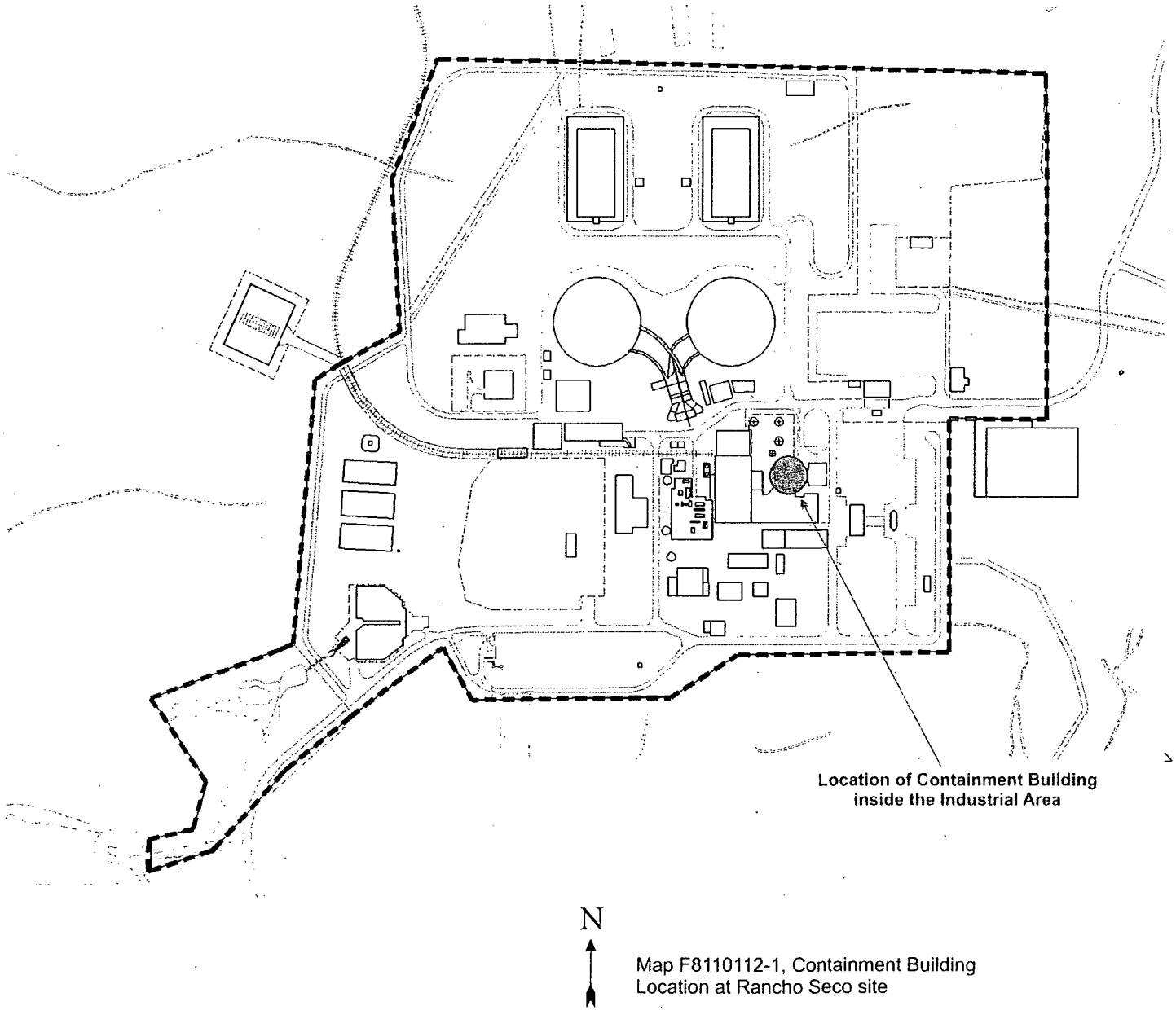
It is concluded that survey unit F8110112 meets the release criteria of 10CFR20.1402.

Attachment 1

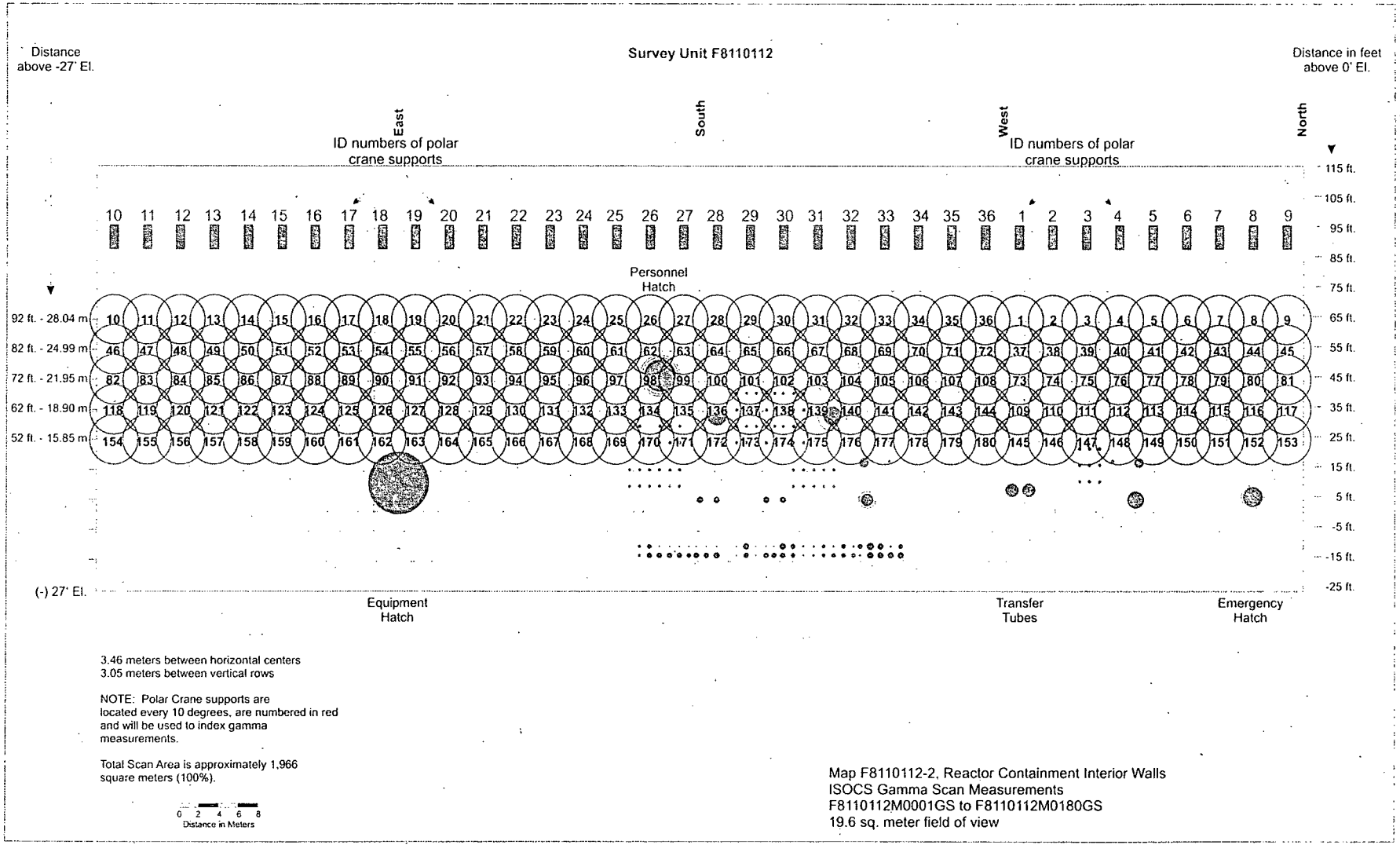
Maps

December 10, 2008

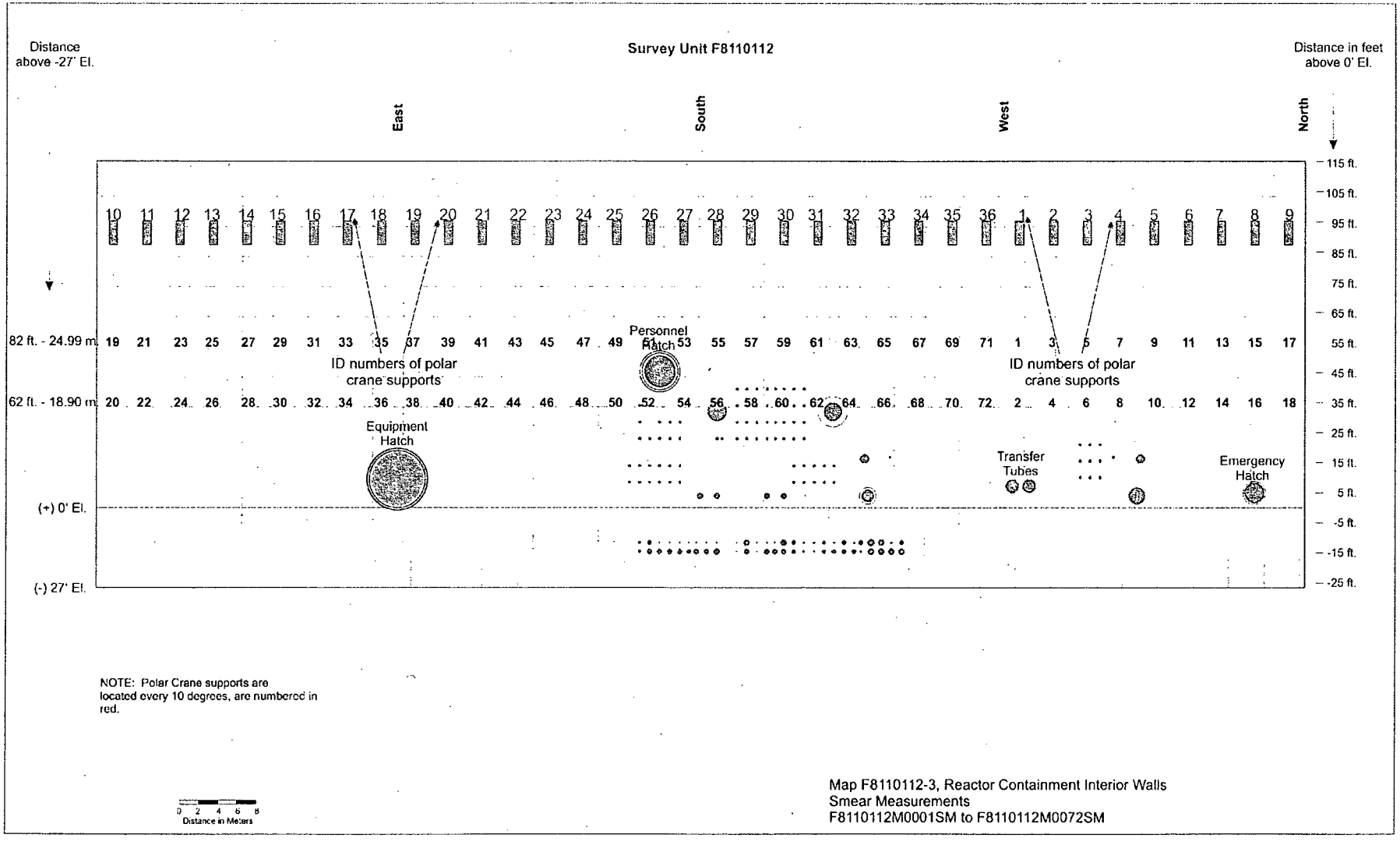
Survey Unit F8110112



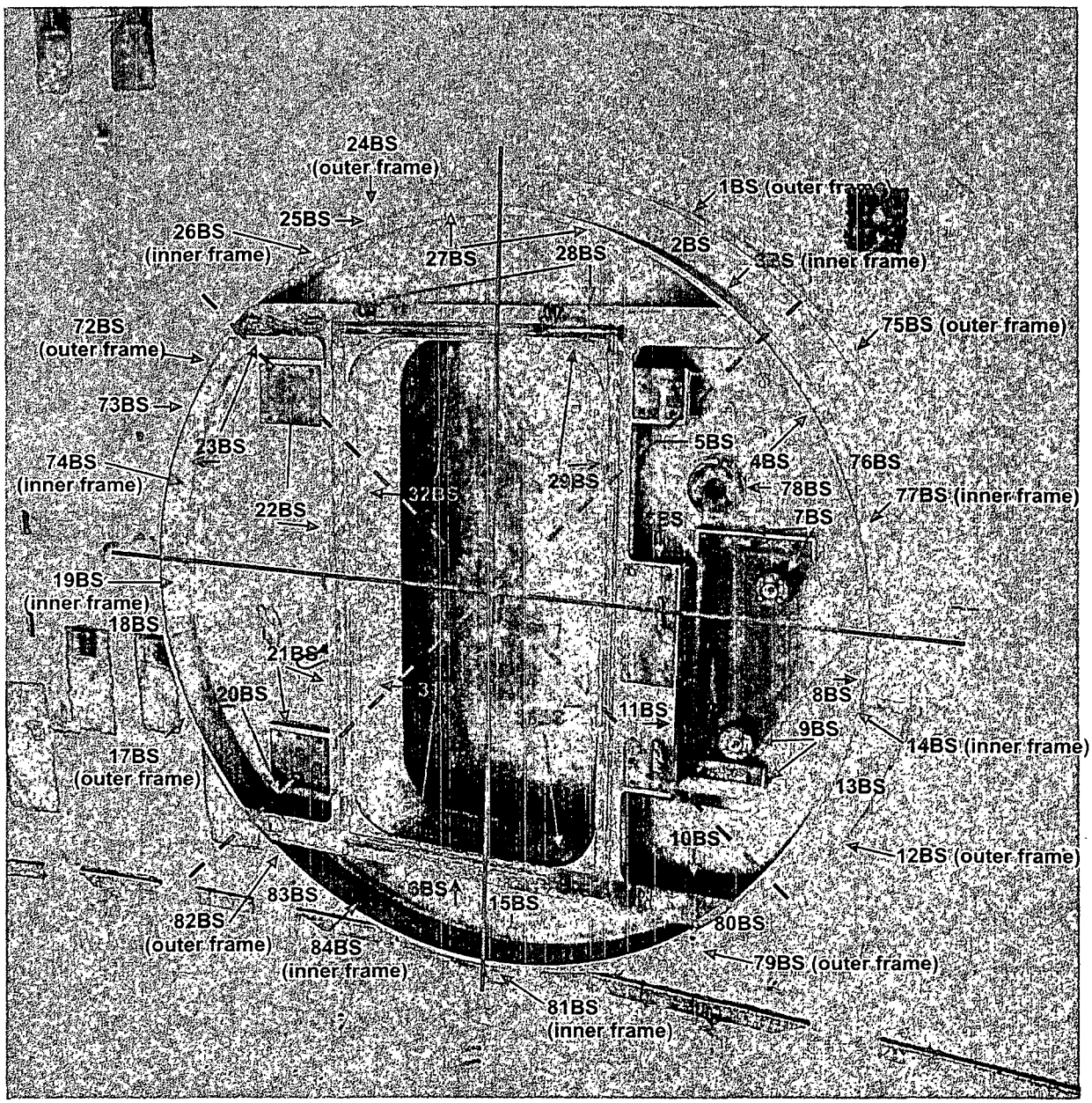
Map F8110112-1, Containment Building
Location at Rancho Seco site

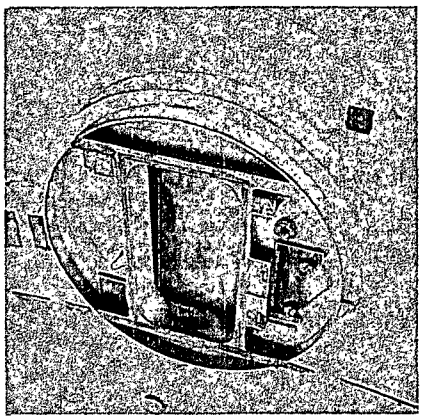


Map F8110112-2, Reactor Containment Interior Walls
ISOCS Gamma Scan Measurements
F8110112M0001GS to F8110112M0180GS
19.6 sq. meter field of view

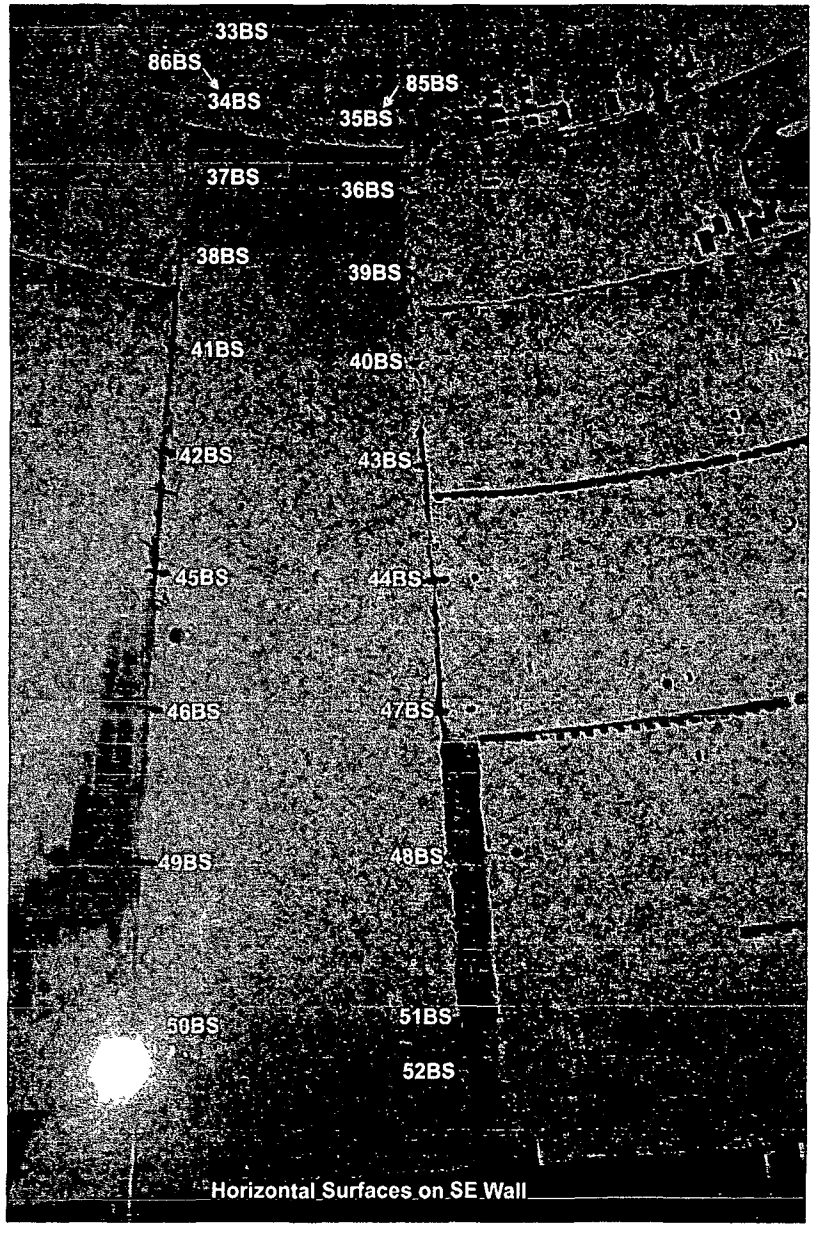


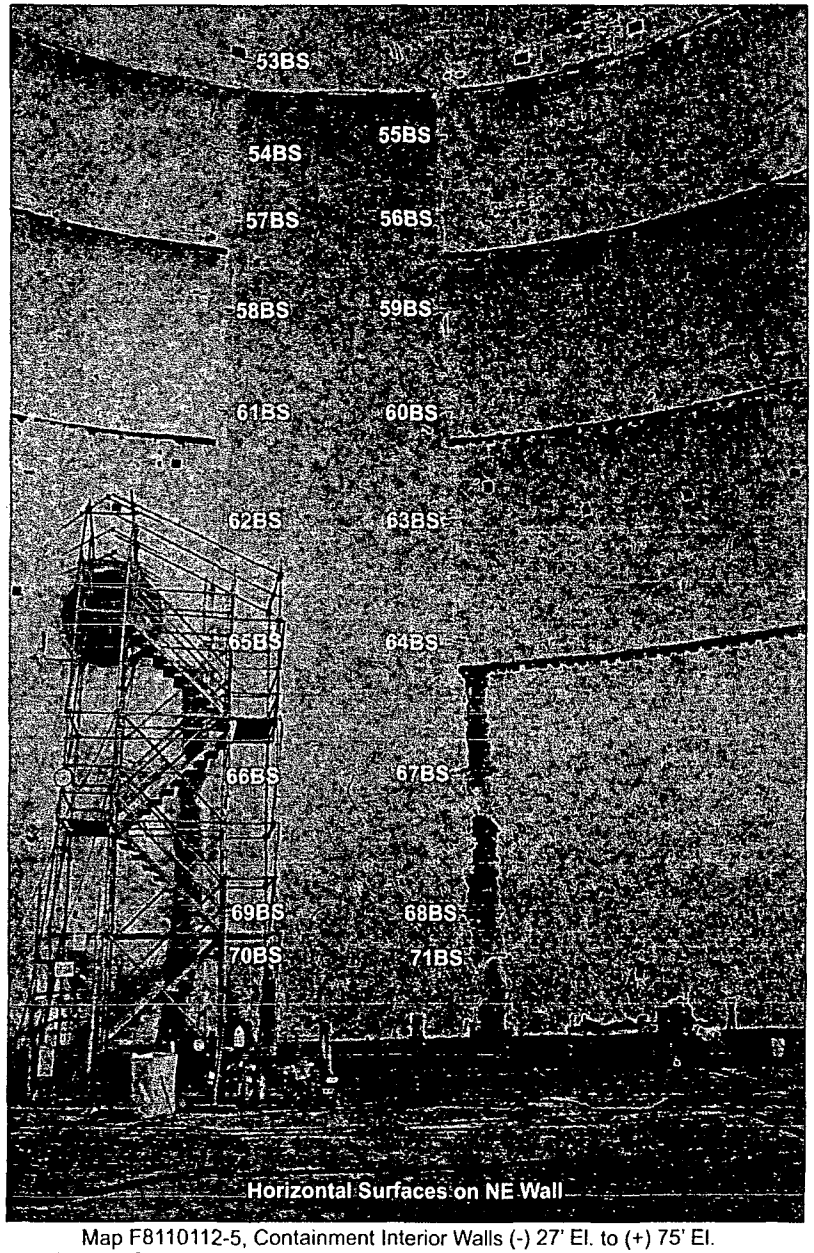
Map F8110112-3, Reactor Containment Interior Walls
Smear Measurements
F8110112M0001SM to F8110112M0072SM



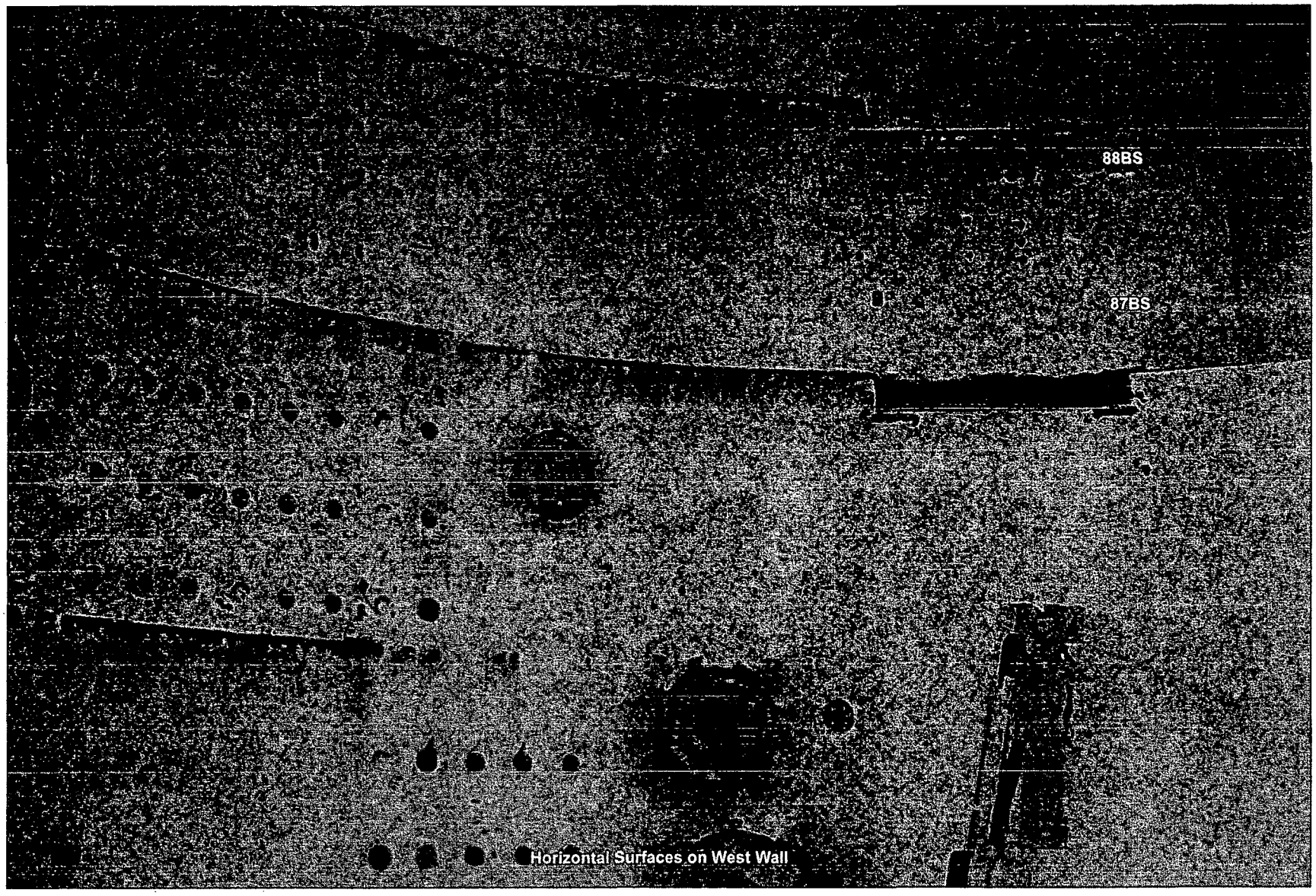


Map F8110112-4, Containment Interior Walls
(+) 25' El. to (+) 75' El., Personnel Hatch
Beta Scan Measurements
F8110112M0001BS to F8110112M0032BS and
F8110112M0072BS to F8110112M0084BS



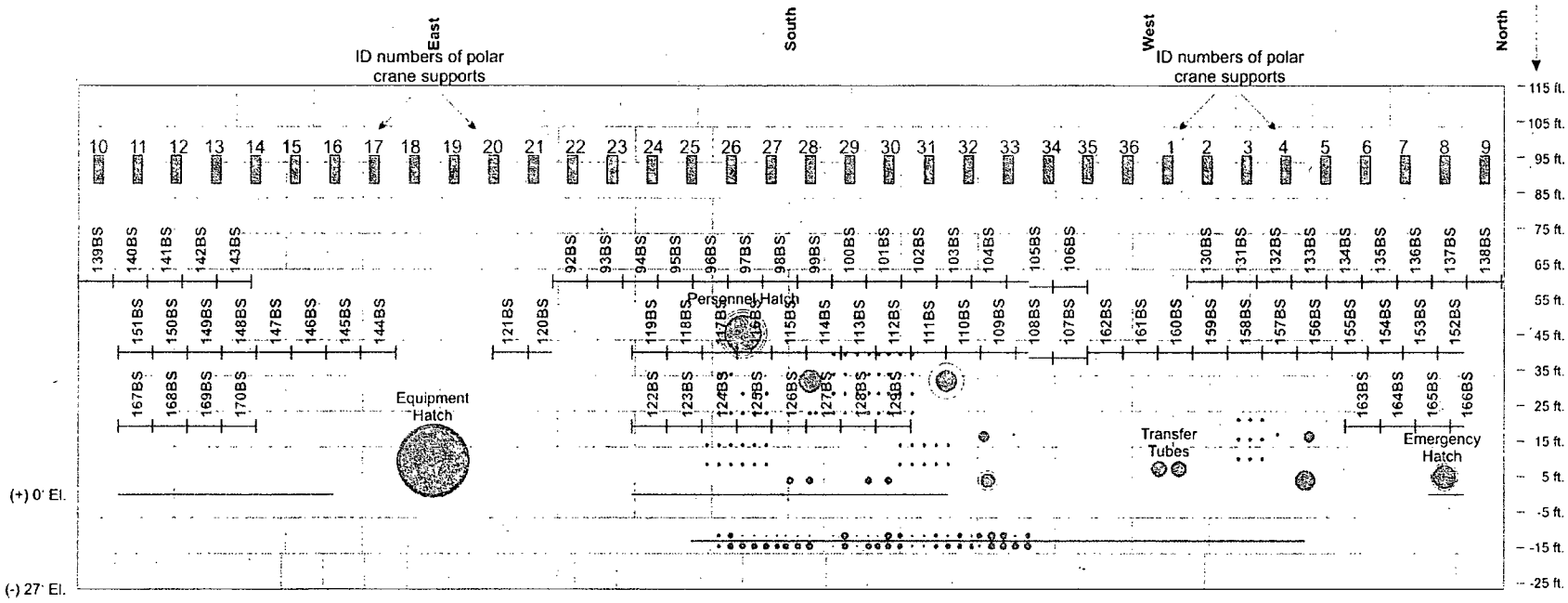


Map F8110112-5, Containment Interior Walls (-) 27' El. to (+) 75' El.
Beta Scan Measurements
F8110112M0033BS to F8110112M0071BS and
F8110112M0085BS to F8110112M0086BS



Map F8110112-6, Containment Interior Walls (-) 27' El. to (+) 75' El.
Beta Scan Measurements
F8110112M0087BS to F8110112M0088BS

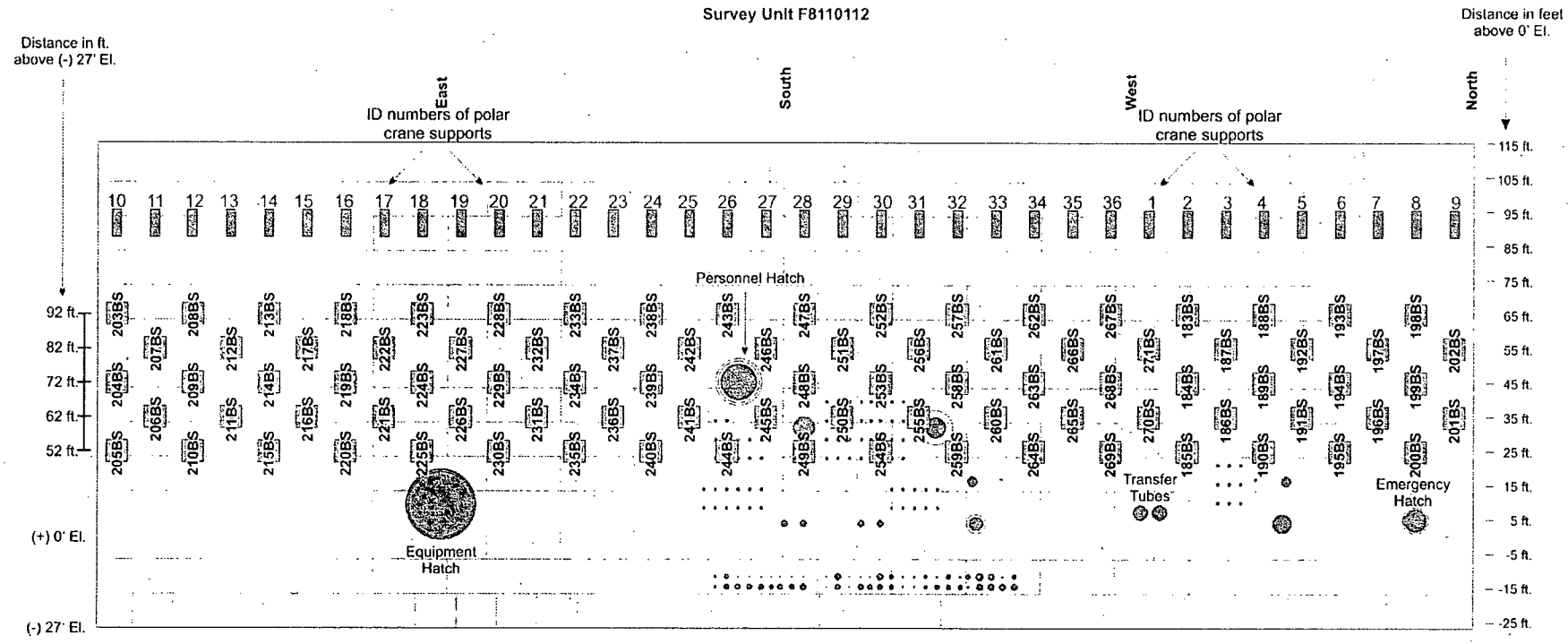
Survey Unit F8110112



NOTE: Polar Crane supports are located every 10 degrees and are numbered in red.

0 2 4 6 8
Distance in Meters

Map F8110112-7, Reactor Containment Interior Walls
Beta Scan Measurements
F8110112M0092BS to F8110112M0170BS

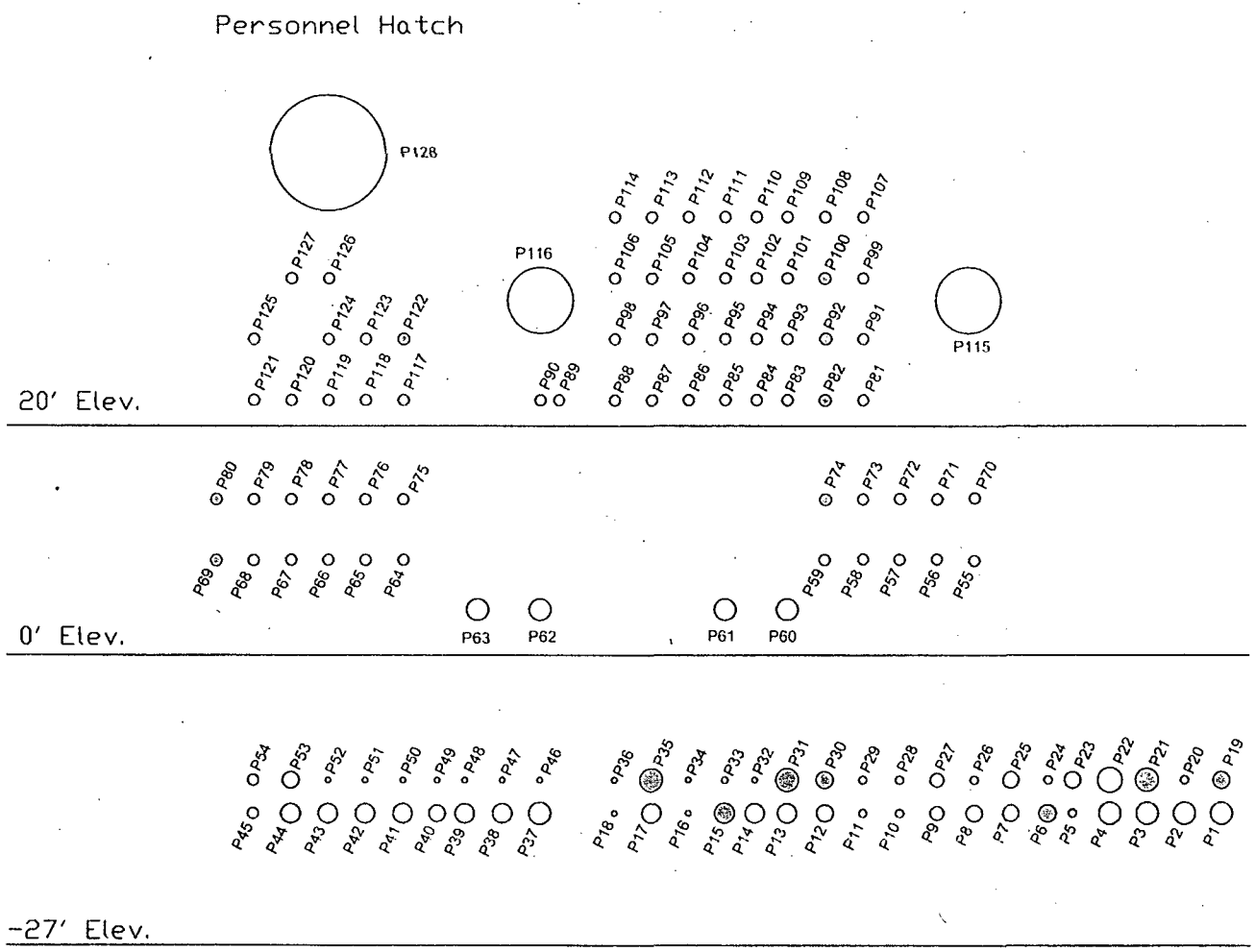


NOTE: Polar Crane supports are located every 10 degrees and are numbered in red.

- Beta scan area of approximately 2 m by 2 m

0 2 4 6 8
Distance in Meters

Map F8110112-8, Reactor Containment Interior Walls
Beta Scan Measurements
F8110112M0183BS to F8110112M0271BS



Penetrations to be surveyed under FSS Package F8110112

Penetrations to be surveyed under FSS Package F8110113

Penetrations to be surveyed under FSS Package F8110113

= Penetration CLOSED from Rx Side

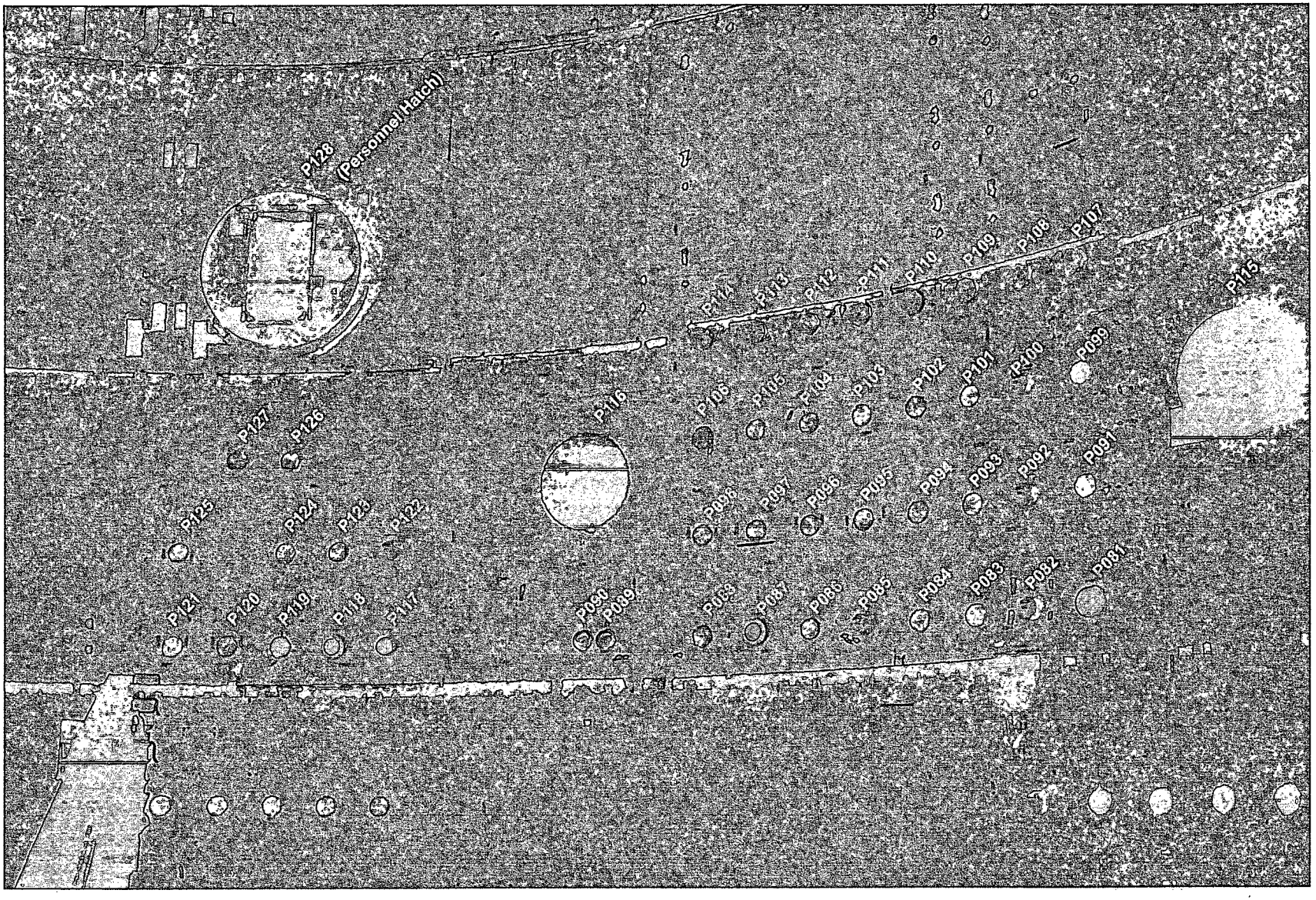
= Penetration OPEN from Rx Side

SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT

Rx Bldg. Inside View
Penetrations
MEASUREMENT LOCATIONS
Map F8110112-9

FILE:

J Grinley



Map F8110112-10, Containment Interior Walls (+) 25' El. to (+) 75' El.
Beta Scan Measurements of Penetrations
F8110112P081BS to F8110112P127BS

Attachment 2

Instrumentation

December 10, 2008

Survey Unit F8110112

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; 149789	43-68B; 161415	257	612
M2350; 142509	43-68B; 160699	257	612
M2350; 149789	43-68B; 148633	257	612
M2350; 149789	43-51B; 190167	788	2,675
M2350; 149789	43-116-1B; 256006	290	436
Tennelec; 0401171	N/A	4.93 dpm α, 8.21 dpm β	N/A

Instrument	Detector Model No.	Detector Serial No.	MDC
ISOCS	N/A	1983920	Metal – 901 dpm/100 cm^2 Cs-137, Metal – 621 dpm/100 cm^2 Co-60

Table 2-2. Investigation Criteria and DCGL

Parameter	Value (dpm/100 cm^2)
Investigation Criteria - Direct	640,700
Investigation Criteria – Beta Scan	43,000
Investigation Criteria – Gamma Scan (ISOCS average activity – 19.6 sq. meter field of view)	34,000 Cs-137 11,000 Co-60
$DCGL_W$	43,000
$DCGL_{EMC}$	640,700

Attachment 3

Investigation

December 10, 2008

Survey Unit F8110112

Table 3-1 Survey Unit Investigation

Grid	Investigation Level (cpm)	Initial Value (cpm)	Investigation Result (cpm)	Elevated Area (m^2)	Area Factor	$DCGL_{emc}$	Investigation Result ($dpm/100cm^2$)	$DCGL_{emc}$ Unity Fraction
33	1,100	1,329	346 (scan)	(N/A)	(N/A)	(N/A)	1,505	(N/A)
34	1,100	1,808	3,345 (scan)	(N/A)	(N/A)	(N/A)	14,554	(N/A)
35	1,100	4,646	8,239 (scan)	(N/A)	(N/A)	(N/A)	35,848	(N/A)
36	1,100	3,078	2,346 (scan)	(N/A)	(N/A)	(N/A)	10,207	(N/A)
39	1,100	2,436	1,634 (scan)	(N/A)	(N/A)	(N/A)	7,110	(N/A)
43	1,100	1,222	2,856 (scan)	(N/A)	(N/A)	(N/A)	12,426	(N/A)
44	1,100	1,936	3,423 (scan)	(N/A)	(N/A)	(N/A)	14,894	(N/A)
45	1,100	1,769	2,201 (scan)	(N/A)	(N/A)	(N/A)	9,577	(N/A)
47	1,100	2,371	1,540 (scan)	(N/A)	(N/A)	(N/A)	6,701	(N/A)
53	1,100	3,189	1,291 (scan)	(N/A)	(N/A)	(N/A)	5,617	(N/A)
54	1,100	2,013	903 (scan)	(N/A)	(N/A)	(N/A)	3,929	(N/A)
55	1,100	12,771	6,094 (scan)	(N/A)	(N/A)	(N/A)	26,515	(N/A)
56	1,100	2,329	2,966 (scan)	(N/A)	(N/A)	(N/A)	12,905	(N/A)
58	1,100	2,564	742 (scan)	(N/A)	(N/A)	(N/A)	3,228	(N/A)
59	1,100	1,226	1,166 (scan)	(N/A)	(N/A)	(N/A)	5,073	(N/A)
60	1,100	1,564	4,749 (scan)	(N/A)	(N/A)	(N/A)	20,663	(N/A)
79	9,880	47,983	35,957	0.023	559.1	24,039,191	110,610	0.005
85	9,880	20,710	14,791	0.093	141.6	6,086,753	45,500	0.007
86	9,880	15,879	11,340	0.005	2,309.2	99,294,293	34,884	N/A
92	7,214	16,290	9,005	0.022	591.6	25,440,358	37,947	N/A
94	7,214	17,619	14,009	0.048	272.2	11,704,369	59,033	0.005
97	7,214	9,567	13,800	0.097	135.1	5,809,305	58,153	0.010
98	7,214	15,927	9,085	0.037	352.0	15,134,355	38,284	N/A

Grid	Investigation Level (cpm)	Initial Value (cpm)	Investigation Result (cpm)	Elevated Area (m^2)	Area Factor	$DCGL_{emc}$	Investigation Result ($dpm/100cm^2$)	$DCGL_{emc}$ Unity Fraction
99	7,214	11,885	13,622	0.133	99.6	4,282,247	57,402	0.013
102	7,214	11,702	6,027	0.130	101.6	4,370,233	25,397	N/A
103	7,214	14,237	2,480	0.099	133.2	5,729,394	10,451	N/A
104	7,214	10,090	4,643	0.016	788.7	33,914,181	19,565	N/A
137	7,214	9,649	9,100	0.082	159.6	6,863,178	38,347	N/A
138	7,214	14,459	8,708	0.166	80.3	3,450,978	36,695	N/A
139	7,214	19,450	15,823	0.148	89.7	3,855,933	66,677	0.017
140	7,214	20,094	14,733	0.129	102.7	4,415,614	62,084	0.014
141	7,214	11,574	10,551	0.111	118.7	5,106,180	44,461	0.009
142	7,214	11,197	8,143	0.073	180.5	7,760,334	34,314	N/A
143	7,214	8,733	5,315	0.107	123.2	5,297,813	22,397	N/A
147	7,214	8,589	6,988	0.032	412.5	17,738,929	29,447	N/A
160	7,214	11,620	48,464	0.018	728.1	31,307,015	204,225	0.007
208	9,880	13,394	12,500	0.139	95.2	4,092,904	38,452	N/A
233	9,880	12,777	13,294	0.750	19.4	834,022	40,895	N/A
238	9,880	18,270	11,956	1.064	14.2	610,314	36,779	N/A
243	9,880	22,930	21,302	0.240	56.0	2,407,457	65,528	0.027
247	9,880	18,392	17,077	0.434	32.1	1,381,047	52,532	0.038
P087 Ext.	1,100	1,389	777	0.006	2,351.1	101,097,300	19,577	N/A
Survey Unit Remainder						DCGL = 43,000	SU Mean = 2,852	0.066
							EMC Unity Sum	0.219

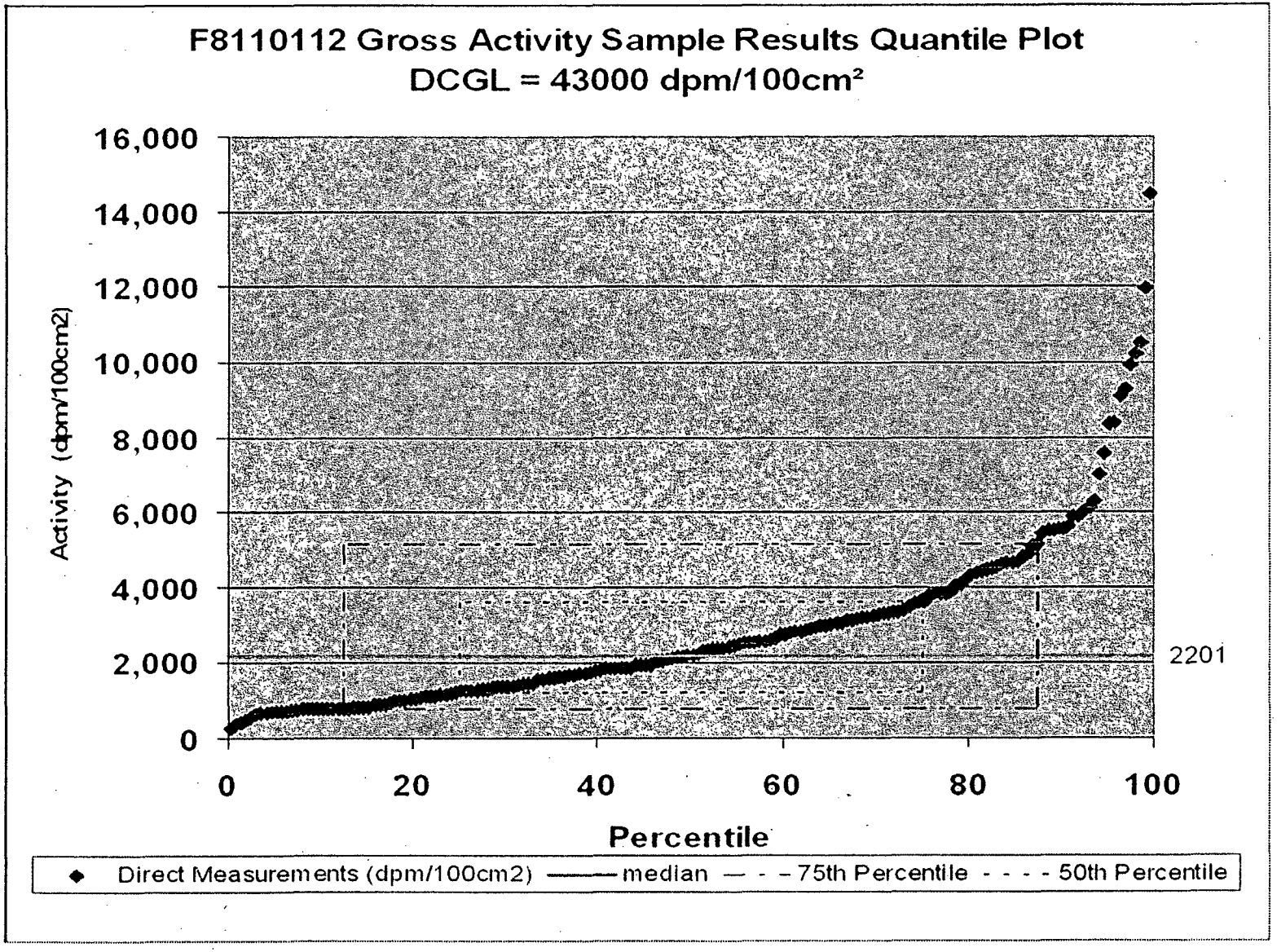
Grids 33 through 60 were initially greater than the $DCGL_{EMC}$. Investigation of the areas resulted in the decision to perform additional remediation. The investigation results for these grids represent the residual radioactivity levels following additional remediation.

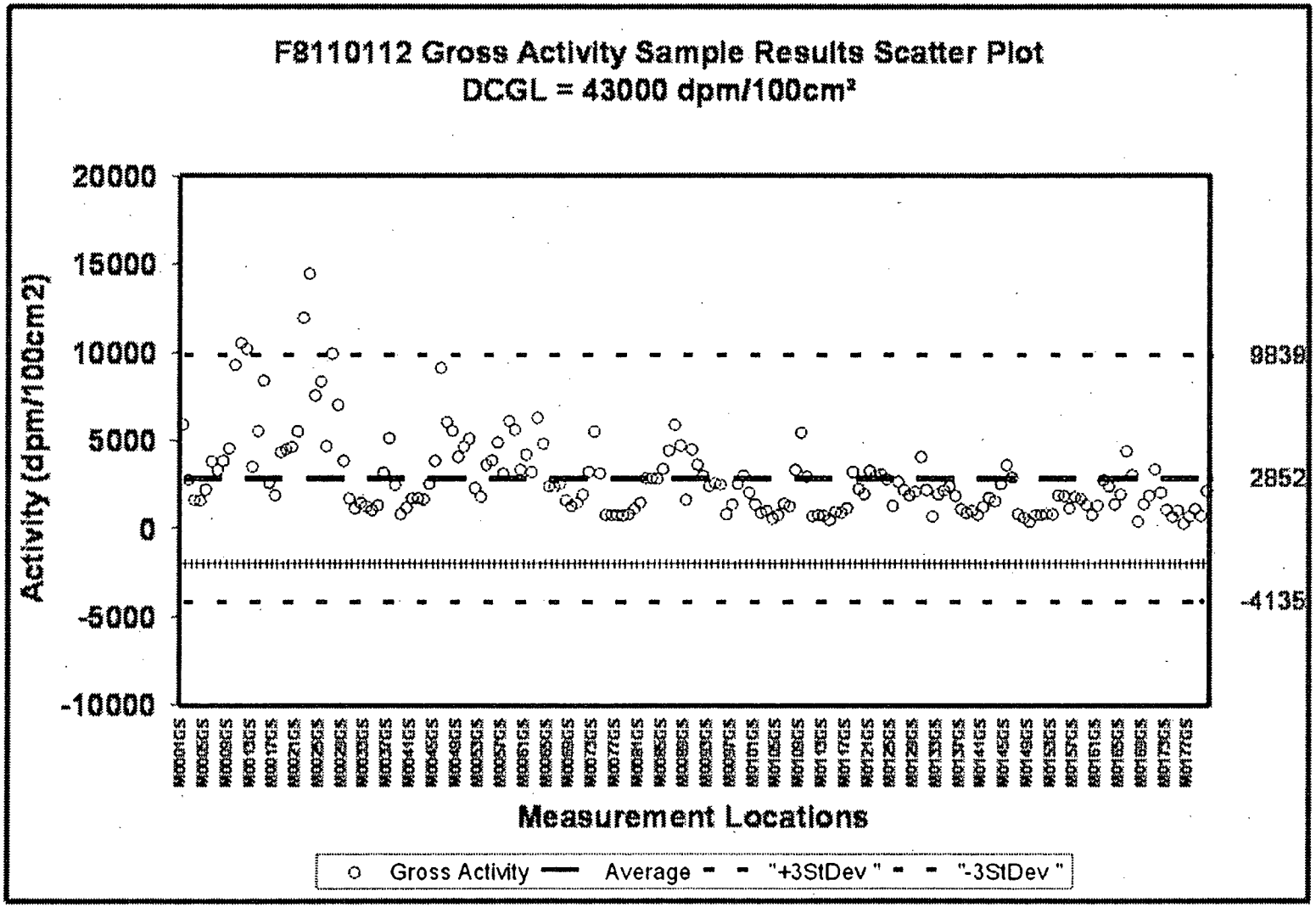
Attachment 4

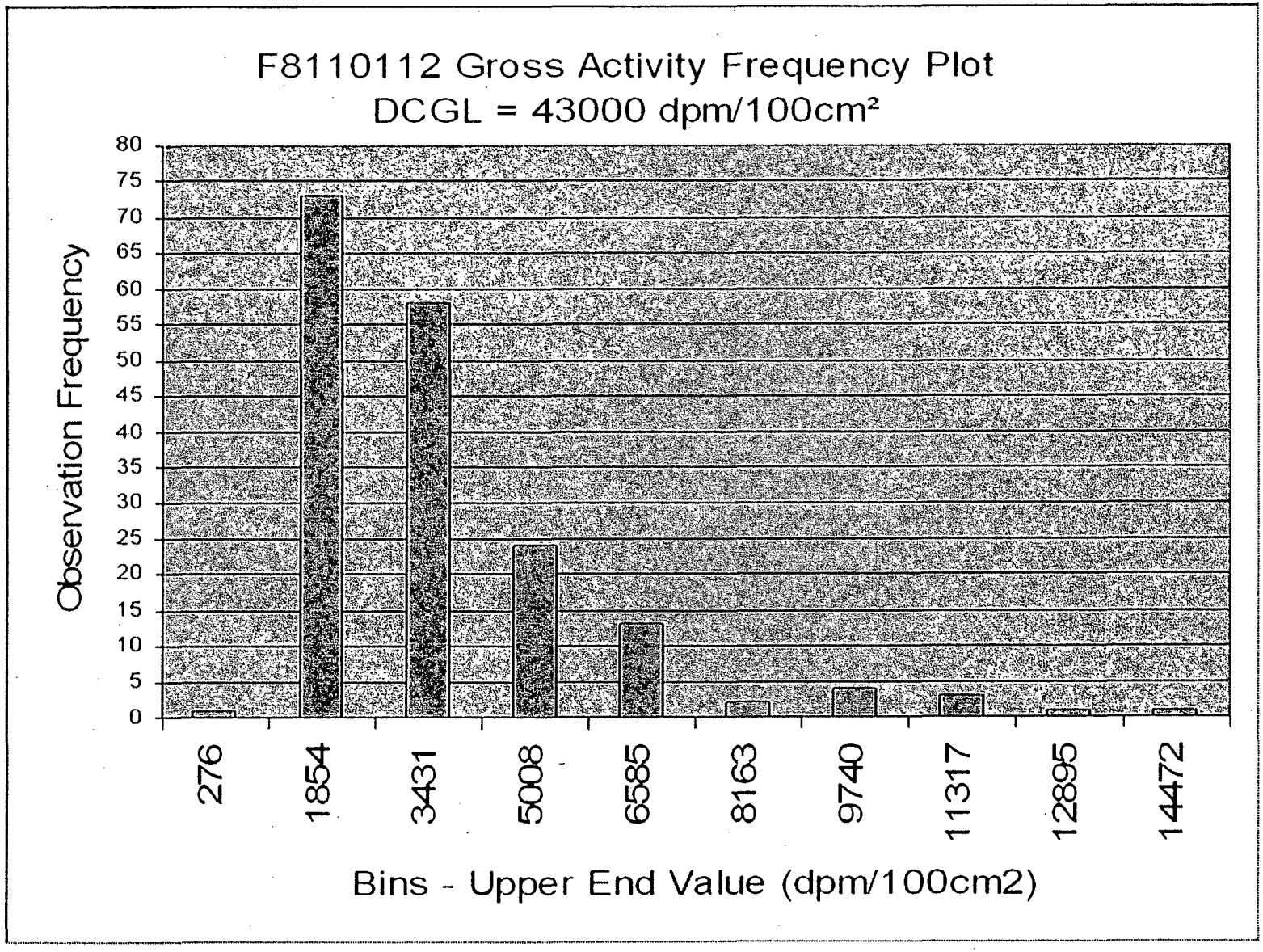
Data Assessment

December 10, 2008

Survey Unit F8110112


F8110112 Gross Activity Sample Results Quantile Plot
DCGL = 43000 dpm/100cm²
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Activity (dpm/100cm2)
2201
0
20
40
60
80
100
Percentile
Direct Measurements (dpm/100cm2)
median
75th Percentile
50th Percentile


F8110112 Gross Activity Sample Results Scatter Plot
DCGL = 43000 dpm/100cm²
Activity (dpm/100cm2)
20000
15000
10000
5000
0
-5000
-10000
9839
2852
-4135
Measurement Locations
Gross Activity
Average
"+3StDev"
"-3StDev"


F8110112 Gross Activity Frequency Plot
DCGL = 43000 dpm/100cm²
Observation Frequency
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
276
1854
3431
5008
6585
8163
9740
11317
12895
14472
Bins - Upper End Value (dpm/100cm2)