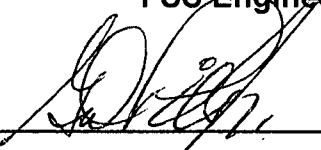
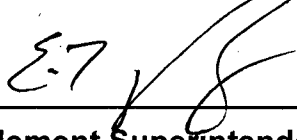


**Rancho Seco**  
**Final Status Survey Summary Report**  
**May 27, 2008**  
**Auxiliary Building Roof**  
**Survey Unit F8131561**

Prepared By:  Date: 5-27-2008  
FSS Engineer

Reviewed By:  Date: 5/28/08  
Lead FSS Engineer

Approved By:  Date: 7-30-08  
Dismantlement Superintendent, Radiological

## FINAL STATUS SURVEY SUMMARY REPORT

### Survey Unit:

F8131561, Auxiliary Building Roof

### Survey Unit Description:

**Operating History:** The reinforced concrete structure 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. One report documented contamination of the auxiliary building roof. The roof was later replaced.

**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 -47' elevation showed a mean gross activity level of 320,071 dpm/100 cm<sup>2</sup> and a maximum value of 5,720,000 dpm/100 cm<sup>2</sup>. Direct measurements on the -29' elevation showed a mean gross activity level of 544,756 dpm/100 cm<sup>2</sup> and a maximum value of 11,370,000 dpm/100 cm<sup>2</sup>. Direct measurements on the -20' elevation showed a mean gross activity level of 247,831 dpm/100 cm<sup>2</sup> and a maximum value of 10,080,000 dpm/100 cm<sup>2</sup>. Direct measurements on the grade elevation showed a mean gross activity level of 373,758 dpm/100 cm<sup>2</sup> and a maximum value of 5,800,000 dpm/100 cm<sup>2</sup>. Direct measurements on the +20' elevation showed a mean gross activity level of 85,408 dpm/100 cm<sup>2</sup> and a maximum value of 1,900,000 dpm/100 cm<sup>2</sup>. Direct measurements on the +40' elevation showed a mean gross activity level of 3,288 dpm/100 cm<sup>2</sup> and a maximum value of 24,781 dpm/100 cm<sup>2</sup>. Direct measurements on the building exterior, including the mezzanine roof, showed a mean gross activity level of 1,897 dpm/100 cm<sup>2</sup> and a maximum value of 2,990 dpm/100 cm<sup>2</sup>. (The roof had been replaced prior to the classification survey.) Based on the classification procedure (DSIP-0020) and levels of gross activity reported, the interior of the auxiliary building was determined to be a Class 1, 2 area and the exterior was a Class 2,3.

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 randomly determined and 150.8 m<sup>2</sup> 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**

<b>Survey Design Parameter</b>	<b>Value</b>	<b>Comment</b>
<b>Survey Area:</b>	F813	Auxiliary Building Roof Structure Surface LTP Table 5-4
<b>Survey Unit:</b>	1561	
<b>Class:</b>	3	
<b>SU Area (m<sup>2</sup>):</b>	1434	
<b>Evaluator:</b>	Gary Frank	
<b>DCGL (dpm/100 cm<sup>2</sup>):</b>	43000	Gross Activity DCGL
<b>Area Factor:</b>	N/A	Class 3
<b>Design DCGL<sub>emc</sub></b> (dpm/100 cm <sup>2</sup> ):	N/A	Class 3
<b>LBGR (dpm/100 cm<sup>2</sup>):</b>	21500	Default = 50% DCGL
<b>Design Sigma (dpm/100 cm<sup>2</sup>):</b>	136	
<b>Type I Error:</b>	0.05	
<b>Type II Error:</b>	0.05	
<b>Predominant Nuclide:</b>	Cs-137	
<b>Sample Area (m<sup>2</sup>):</b>	N/A	Class 3
<b>Scan Area (m<sup>2</sup>):</b>	150.8	
<b>Scan Coverage (%):</b>	11%	Class 3
<b>Z<sub>1-α</sub>:</b>	1.645	
<b>Z<sub>1-β</sub>:</b>	1.645	
<b>Sign P:</b>	0.99865	
<b>Calculated Relative Shift:</b>	158	
<b>Relative Shift Used:</b>	3	Uses 3.0 if Relative Shift is >3
<b>N-Value:</b>	11	
<b>Design N-Value + 20%:</b>	14	NUREG-1575 Table 5-5
<b>Design Min Samples N:</b>	14	Class 3
<b>Grid Spacing L:</b>	N/A	Class 3

### Survey Results:

A total of 14 direct measurements were made in F8131561. The results including mean, median, standard deviation and range are shown in Table 2. All direct measurements were less than the DCGL. Scan measurements are all less than MDA. Actual scan MDAs ranged from 2290 to 2470 dpm/100 cm<sup>2</sup> for Cs-137 and 1500 to 1960 dpm/100 cm<sup>2</sup> for Co-60. 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 <sup>2</sup> )
F8131561-Q0001GD	1530
F8131561-Q0002GD	1580
F8131561-Q0003GD	1560
F8131561-Q0004GD	1470
F8131561-Q0005GD	1560
F8131561-Q0006GD	1480
F8131561-Q0007GD	1460
F8131561-Q0008GD	1430
F8131561-Q0009GD	1570
F8131561-Q0010GD	1540
F8131561-Q0011GD	1440
F8131561-Q0012GD	1440
F8131561-Q0013GD	1510
F8131561-Q0014GD	1560
Mean:	1509
Median:	1520
Standard Deviation:	54
Range:	1430 - 1580

**Table 3. Removable Surface Activity Results**

Measurement ID	Surface Beta Activity (dpm/100 cm <sup>2</sup> )
F8131561Q0001SM	2.93
F8131561Q0002SM	6.8
F8131561Q0003SM	-0.95
F8131561Q0004SM	5.51
F8131561Q0005SM	-2.24
F8131561Q0006SM	-0.95
F8131561Q0007SM	-0.95
F8131561Q0008SM	1.64
F8131561Q0009SM	0.34
F8131561Q0010SM	15.84
F8131561Q0011SM	-0.95
F8131561Q0012SM	-0.95
F8131561Q0013SM	-3.53
F8131561Q0014SM	1.64
Mean:	1.73
Median:	-0.3
Standard Deviation:	4.98
Range:	-3.53 to 15.84

**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**

<b>Survey Results Parameter</b>	<b>Value</b>	<b>Comment</b>	
<b>Material Background Used</b> (dpm/100 cm <sup>2</sup> ):	N/A	Average Ambient BKG = 0	
<b>Ambient Background Used</b> (dpm/100 cm <sup>2</sup> ):	N/A		
<b>Actual Direct Measurements (N):</b>	14		
<b>Median</b> (dpm/100 cm <sup>2</sup> ):	1520		
<b>Mean</b> (dpm/100 cm <sup>2</sup> ):	1509		
<b>Direct Measurement Standard Deviation</b>	54		
(dpm/100 cm <sup>2</sup> ):			
<b>Total Standard Deviation</b> (dpm/100 cm <sup>2</sup> ):	54		Based on samples and backgrounds.
<b>Maximum</b> (dpm/100 cm <sup>2</sup> ):	1580		
<b>Material Type:</b>	N/A		Background Subtract Not Applied
<b>Sign Test Final N Value:</b>	14		
<b>S+ Value:</b>	14		
<b>Critical Value:</b>	10		
<b>Sufficient Samples Collected:</b>	Yes		
<b>Maximum Value &lt; DCGL:</b>	Yes		
<b>Median Value &lt; DCGL:</b>	Yes		
<b>Mean Value &lt; DCGL:</b>	Yes		
<b>Maximum Value &lt; DCGL<sub>emc</sub>:</b>	N/A	Class 3	
<b>Total Standard Deviation &lt;= Sigma:</b>	Yes		
<b>Pass the Sign Test?</b>	Yes		
<b>Reject the Null Hypothesis?</b>	Yes		
<b>Does the Survey Unit Pass All Criteria?</b>	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, 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 cm<sup>2</sup> 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 F8131561 meets the release criteria of 10CFR20.1402.



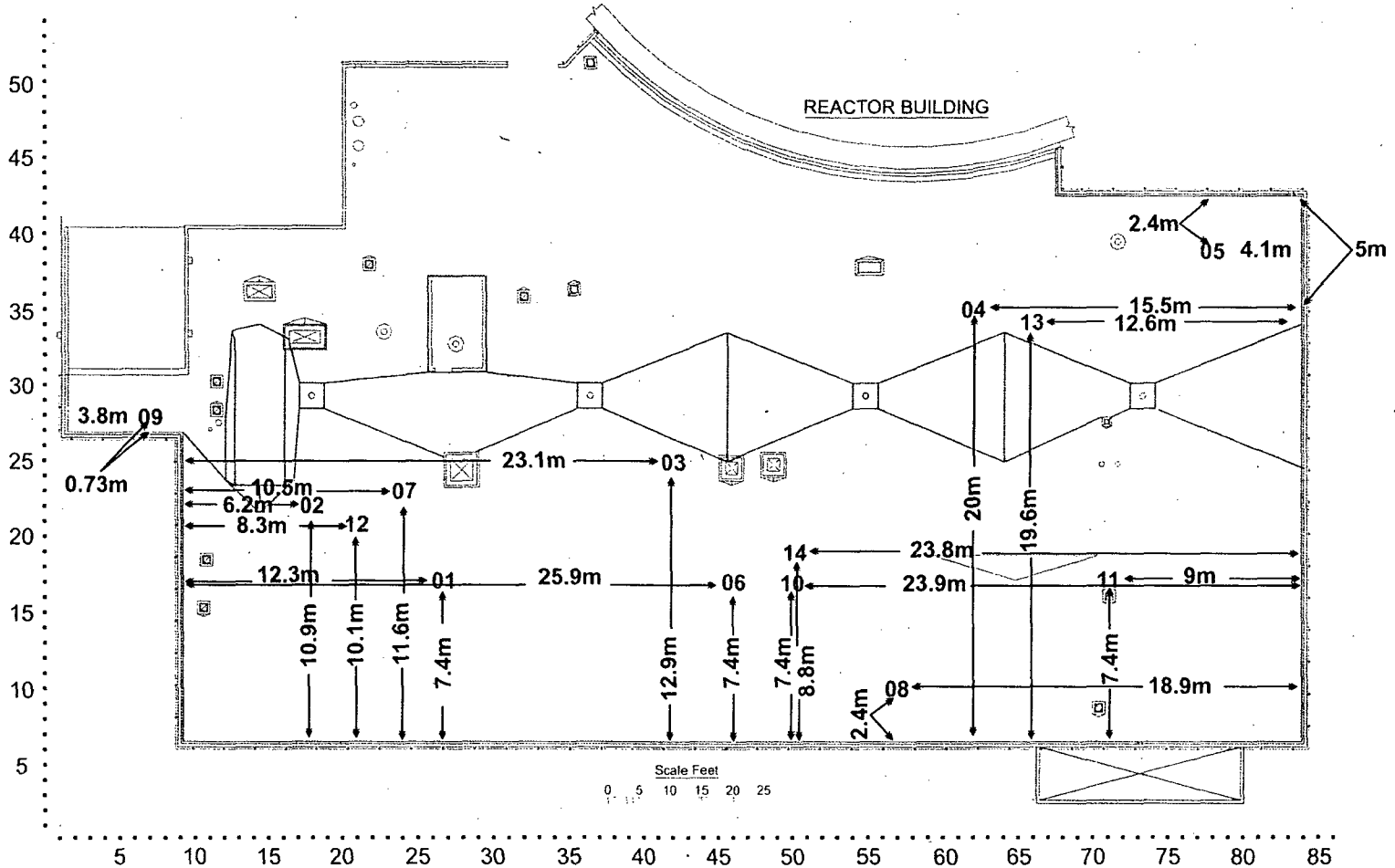
**Attachment 1**

**Maps**

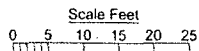
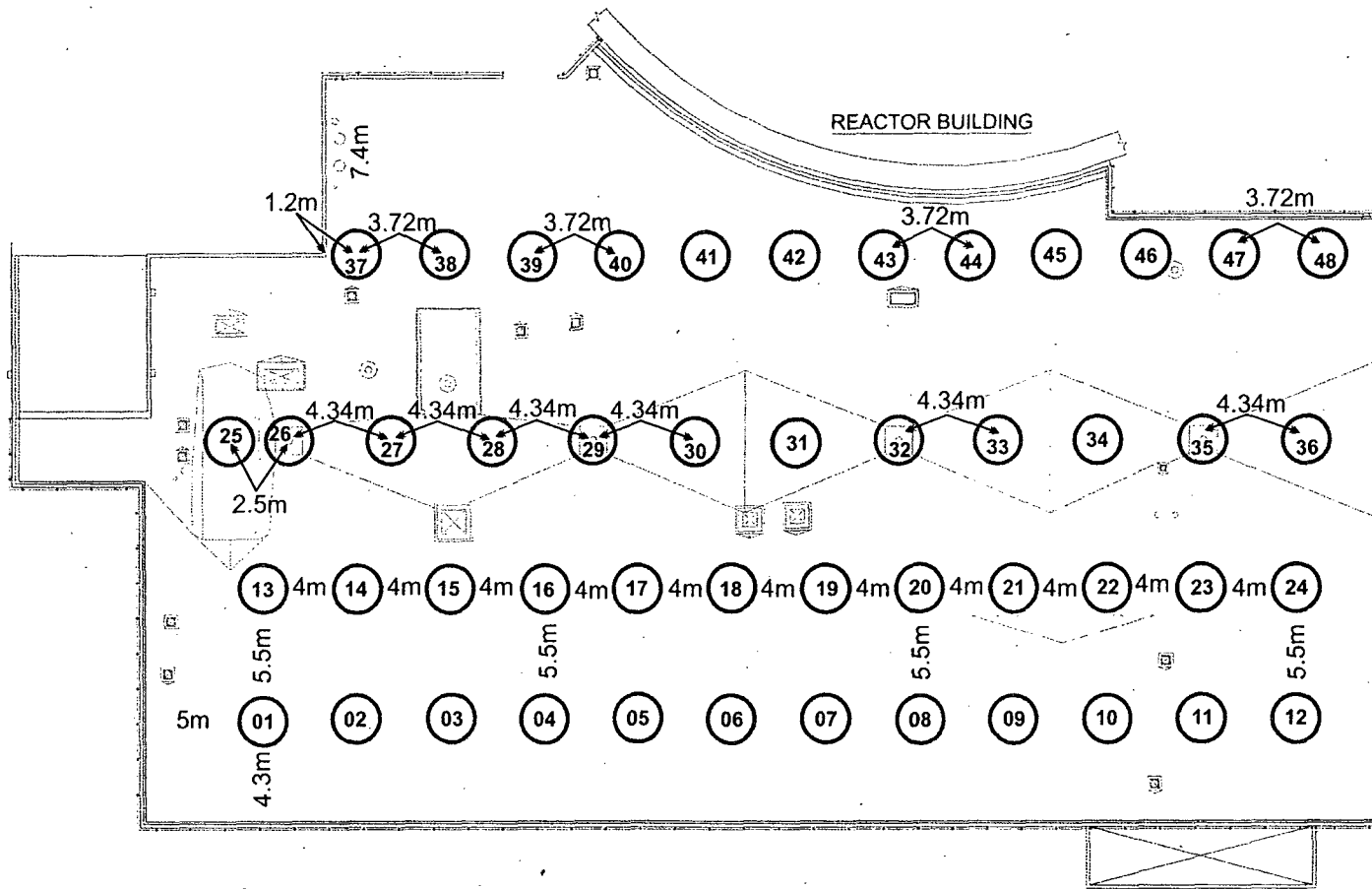
**May 27, 2008**

**Survey Unit F8131561**

Auxiliary Building Roof  
Gamma Direct



### Auxiliary Building Roof ISOCS Scans



F8131561-M2

**Attachment 2**

**Instrumentation**

**May 27, 2008**

**Survey Unit F8131561**

**Table 2-1. Survey Unit Instrumentation**

<b>Instrument Model; Serial No.</b>	<b>Detector Model; Serial No.</b>	<b>MDC Static (dpm/100 cm<sup>2</sup>)</b>	<b>MDC Scan (dpm/100 cm<sup>2</sup>)</b>
InSpector	IN1K; 10054579	2000	N/A
ISOCS	GC4019; 1983920	2000	N/A
Tennelec; 0401171	N/A	6 dpm $\alpha$ , 12 dpm $\beta$	N/A

**Table 2-2. Investigation Criteria and DCGL**

<b>Parameter</b>	<b>Value (dpm/100 cm<sup>2</sup>)</b>
Investigation Criteria - Direct	14300
Investigation Criteria - Scan	14300
DCGL <sub>w</sub>	43000
DCGL <sub>EMC</sub>	N/A

**Attachment 3**

**Investigation**

**May 27, 2008**

**Survey Unit F8131561**

**(none required)**

**Attachment 4**

**Data Assessment**

**May 27, 2008**

**Survey Unit F8131561**

