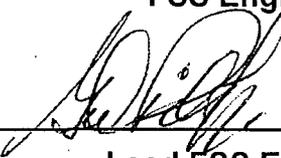


Rancho Seco  
Final Status Survey Summary Report  
October 30, 2007  
Water Treatment Building (exterior)  
Survey Unit F8210002

Prepared By: Dan Tallman  Date: 10/30/2007  
FSS Engineer

Reviewed By:  Date: 10/30/07  
Lead FSS Engineer

Approved By:  Date: 11-13-07  
Dismantlement Superintendent, Radiological

## FINAL STATUS SURVEY SUMMARY REPORT

### Survey Unit:

F8210002, Water Treatment Building (exterior)

### Survey Unit Description:

**Operating History:** This structure, located south of the cooling towers, was used to treat cooling water. This area was not reported to have been used for the storage of radioactive material. Operating records and the HSA document no events with the potential for a release of radioactivity associated with this survey area.

**Site Characterization:** Direct measurements were made of the interior and exterior surfaces of the structure, which confirmed the absence of plant-derived radionuclides. Direct measurements showed a mean gross activity level of 2,968 dpm/100 cm<sup>2</sup> and a maximum value of 3,816 dpm/100 cm<sup>2</sup>. 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 33 m<sup>2</sup> were scanned for approximately 8% 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:	F821	Water Treatment Building (exterior)
Survey Unit:	0002	Structure Surface
Class:	3	LTP Table 5-4
SU Area (m <sup>2</sup> ):	392	
Evaluator:	DA Tallman	
DCGL (dpm/100 cm <sup>2</sup> ):	43000	Gross Activity DCGL
Area Factor:	N/A	Class 3
Design DCGL <sub>mc</sub> (dpm/100 cm <sup>2</sup> ):	N/A	Class 3
LBGR (dpm/100 cm <sup>2</sup> ):	21500	Default = 50% DCGL
Design Sigma (dpm/100 cm <sup>2</sup> ):	511	
Type I Error:	0.05	
Type II Error:	0.05	
Predominant Nuclide:	Cs-137	
Sample Area (m <sup>2</sup> ):	N/A	Class 3
Scan Area (m <sup>2</sup> ):	33	
Scan Coverage (%):	8%	Class 3
Z <sub>1-<math>\alpha</math></sub> :	1.645	
Z <sub>1-<math>\beta</math></sub> :	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	42	
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 F8210002. 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 (range = 3661 dpm/100 cm<sup>2</sup> -7901 dpm/100 cm<sup>2</sup>). 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 one was detected above the MDC shown in Table 2-1 of Attachment 2 (5.99 dpm/100 cm<sup>2</sup> +/- 3.03 dpm/100 cm<sup>2</sup>).

**Table 2. Direct Measurement Results**

Measurement ID	Gross Activity (dpm/100 cm <sup>2</sup> )
F8210002-Q0001BD	908
F8210002-Q0002BD	1157
F8210002-Q0003BD	1053
F8210002-Q0004BD	1006
F8210002-Q0005BD	1219
F8210002-C0006BD	1484
F8210002-K0007BD	2832
F8210002-K0008BD	2070
F8210002-K0009BD	1634
F8210002-C0010BD	1515
F8210002-K0011BD	2049
F8210002-C0012BD	1572
F8210002-K0013BD	2521
F8210002-C0014BD	1572
Mean:	1614
Median:	1543
Standard Deviation:	574
Range:	908 - 2832

**Table 3. Removable Surface Activity Results**

Measurement ID	Surface Beta Activity (dpm/100 cm <sup>2</sup> )
F8210002Q0001SM	7.42
F8210002Q0002SM	8.7
F8210002Q0003SM	17.68
F8210002Q0004SM	4.86
F8210002Q0005SM	3.58
F8210002C0006SM	2.29
F8210002K0007SM	4.86
F8210002K0008SM	7.42
F8210002K0009SM	-0.27
F8210002C0010SM	3.58
F8210002K0011SM	2.29
F8210002C0012SM	3.58
F8210002K0013SM	3.58
F8210002C0014SM	12.55
Mean:	5.86
Median:	4.22
Standard Deviation:	4.67
Range:	-0.27 to 17.68

**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 50% the DCGL. While the sample standard deviation was not less than the design standard deviation, both the values for sigma resulted in a relative shift of greater than three (3) 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	
<b>Ambient Background Used</b> (dpm/100 cm <sup>2</sup> ):	N/A	Average Ambient BKG = 0
<b>Actual Direct Measurements (N):</b>	14	
<b>Median</b> (dpm/100 cm <sup>2</sup> ):	1543	
<b>Mean</b> (dpm/100 cm <sup>2</sup> ):	1614	
<b>Direct Measurement Standard Deviation</b>	574	
(dpm/100 cm <sup>2</sup> ):		
<b>Total Standard Deviation</b> (dpm/100 cm <sup>2</sup> ):	574	Based on samples and backgrounds.
<b>Maximum</b> (dpm/100 cm <sup>2</sup> ):	2832	
<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>mc</sub>:</b>	N/A	Class 3
<b>Total Standard Deviation &lt;= Sigma:</b>	Investigate	No additional samples required
<b>Pass the Sign Test?</b>	Yes	
<b>Reject the Null Hypothesis?</b>	Yes	
<b>Does the Survey Unit Pass All Criteria?</b>	Investigate	Survey unit passes all conditions No additional samples required

### **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. While the variability of the survey results was not less than the characterization data used for survey design, no additional samples were required. 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 43,000 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.

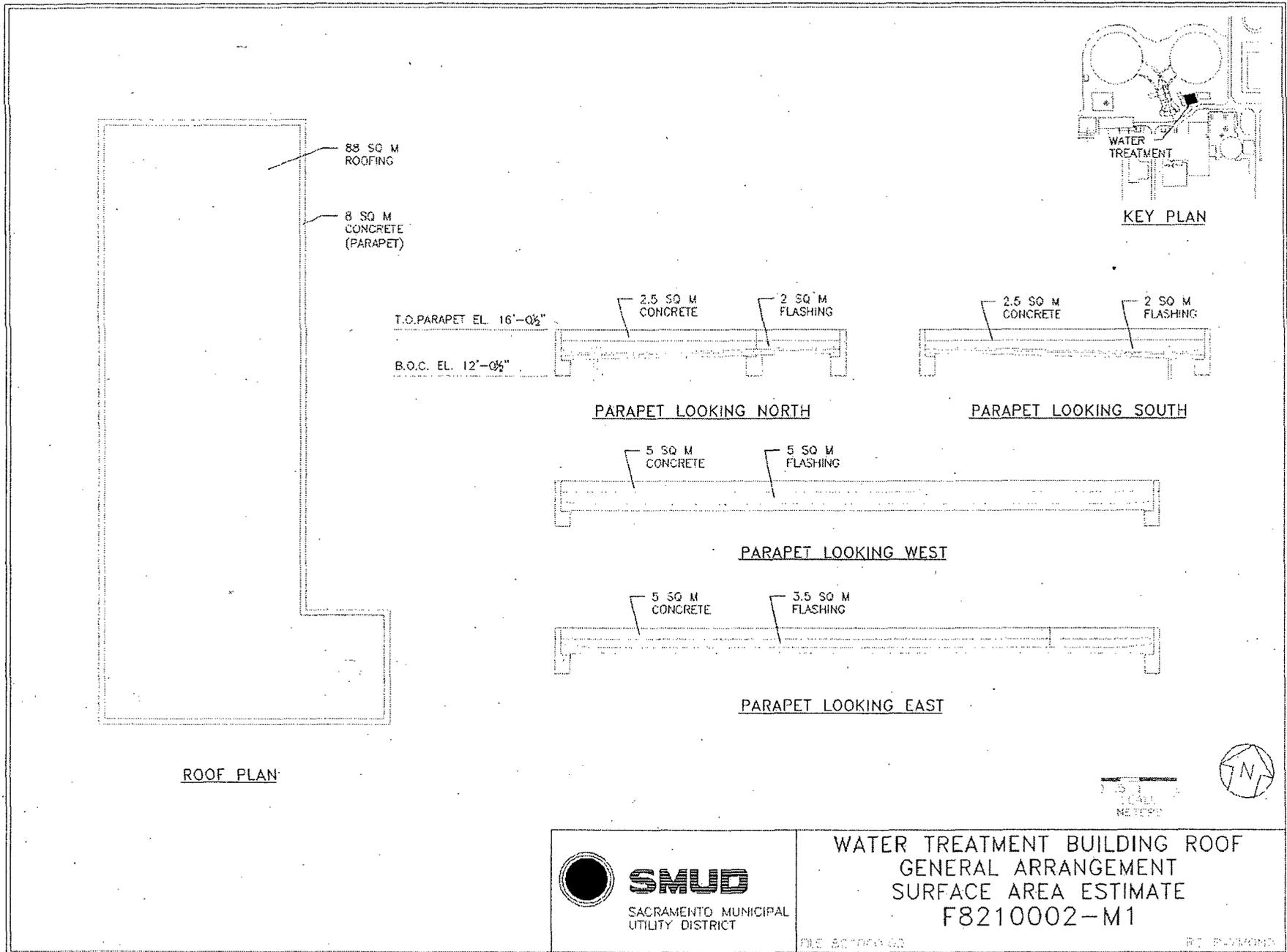
It is concluded that survey unit F8210002 meets the release criteria of 10CFR20.1402.

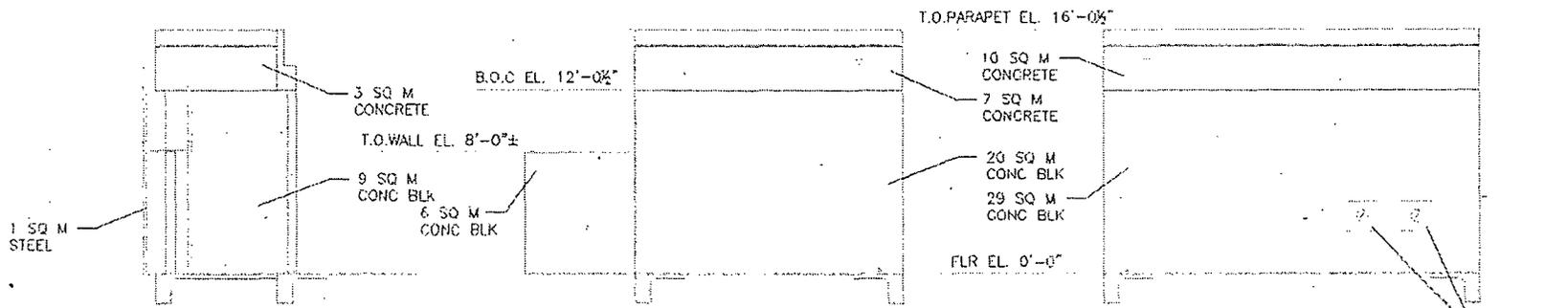
**Attachment 1**

**Maps**

**October 30, 2007**

**Survey Unit F8210002**

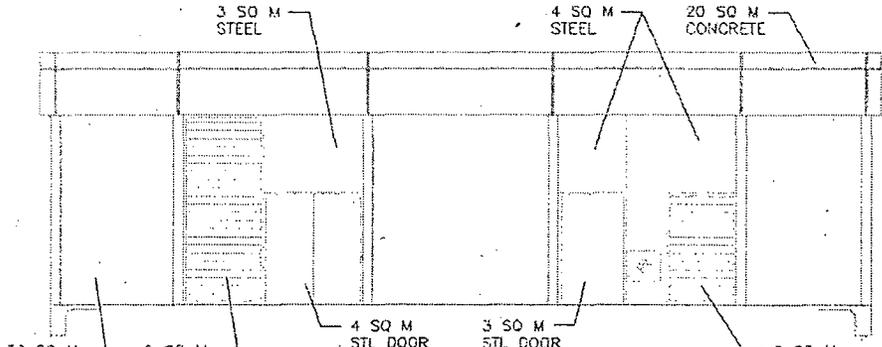




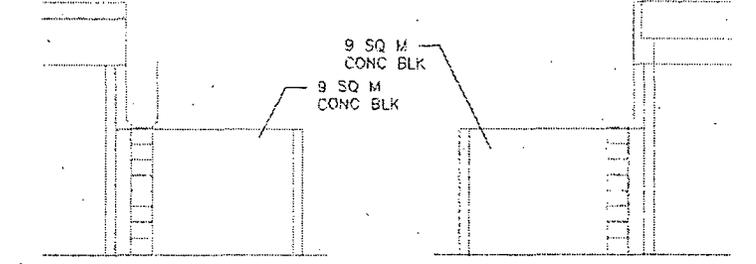
ELEVATION  
LKG SOUTH AT TANK ENCLOSURE

ELEVATION LOOKING SOUTH

ELEVATION LOOKING NORTH

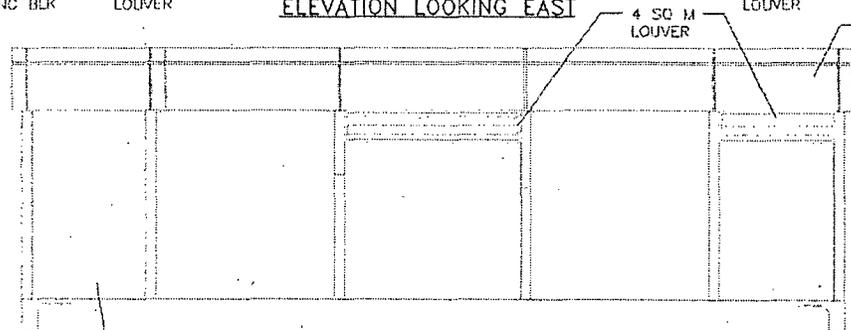


ELEVATION LOOKING EAST

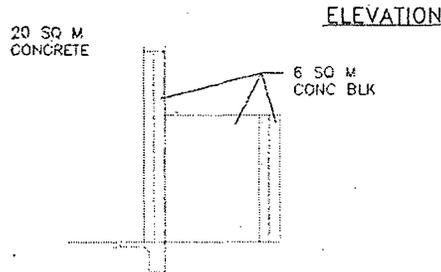


LKG WEST AT TANK ENCLOSURE EXTERIOR

LKG EAST AT TANK ENCLOSURE INTERIOR



ELEVATION LOOKING WEST

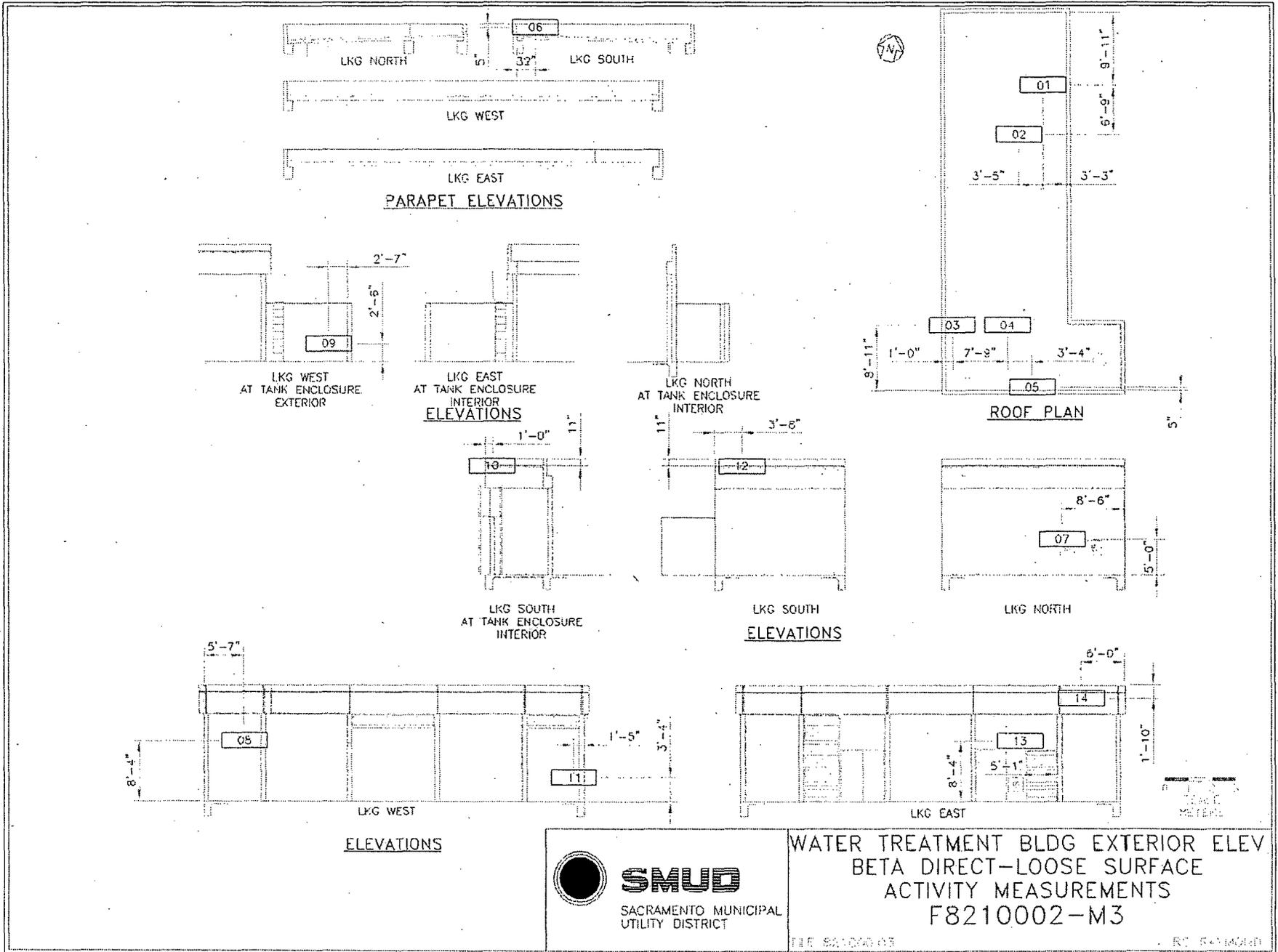


ELEVATION  
LKG NORTH AT TANK ENCLOSURE INTERIOR

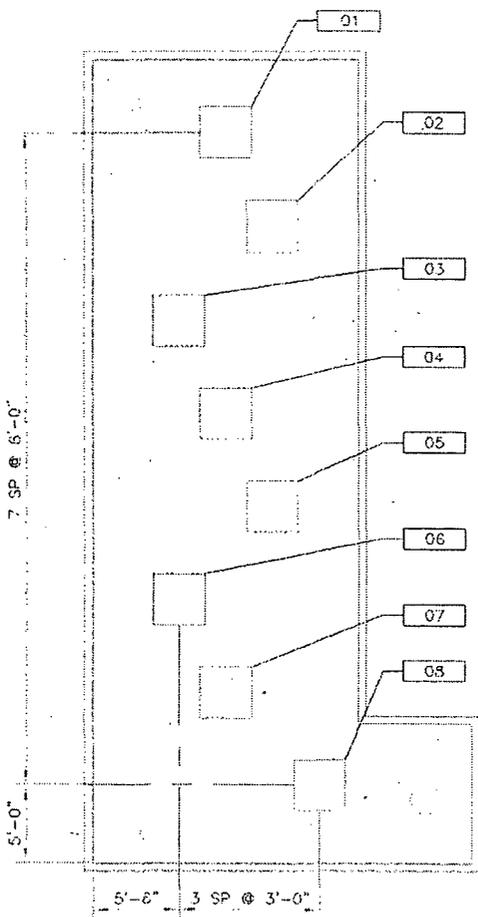
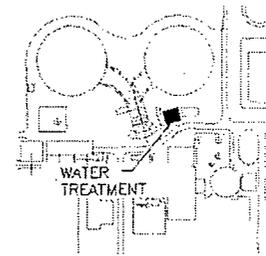


WATER TREATMENT BLDG EXTERIOR ELEV  
 GENERAL ARRANGEMENT  
 SURFACE AREA ESTIMATE  
 F8210002-M2

FILE NO. F8210002-03 DATE: 04/20/03



WATER TREATMENT BLDG EXTERIOR ELEV  
BETA DIRECT-LOOSE SURFACE  
ACTIVITY MEASUREMENTS  
F8210002-M3



T.O. PARAPET EL. 15'-0 $\frac{1}{2}$ "  
 B.O.C. EL. 12'-0 $\frac{1}{2}$ "



PARAPET LOOKING NORTH



PARAPET LOOKING SOUTH



PARAPET LOOKING WEST



PARAPET LOOKING EAST



**SMUD**  
 SACRAMENTO MUNICIPAL  
 UTILITY DISTRICT

WATER TREATMENT BUILDING ROOF  
 BETA SCAN  
 MEASUREMENTS  
 F8210002-M4

FILE: F8210002.DWG



**Attachment 2**

**Instrumentation**

**October 30, 2007**

**Survey Unit F8210002**

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

<b>Instrument Model; Serial No.</b>	<b>Detector Model; Serial No.</b>	<b>MDC Static</b>	<b>MDC Scan</b>
M2350; 180738	43-68B; 160051	433	1033
Tennelec; 0401171	N/A	5 dpm $\alpha$ , 11 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	21500
Investigation Criteria – Scan	43000
DCGL <sub>w</sub>	43000
DCGL <sub>EMC</sub>	N/A

**Attachment 3**  
**Investigation**  
**October 30, 2007**  
**Survey Unit F8210002**

**(none required)**

**Attachment 4**

**Data Assessment**

**October 30, 2007**

**Survey Unit F8210002**

