

Rancho Seco  
Final Status Survey Summary Report  
October 21, 2016  
IOSB Exterior Surfaces  
Survey Unit F8300313

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Approved By: [Signature] Date: 1/26/17  
Manager, Rancho Seco Assets

## FINAL STATUS SURVEY F8300313

### **Survey Unit:**

F8300313, Interim Onsite Storage Building (IOSB) Exterior Surfaces

### **Survey Unit Description:**

Operating History: Designed primarily to store packaged radioactive waste containers safely, protected from the elements, and maintain radiological dose as low as reasonably achievable (ALARA), the IOSB's storage cells possibly stored media of many types, including filters, resins, contaminated chemicals, DAW, activated reactor components, contaminated plant components and other contaminated items. This survey unit is the vertical exterior surfaces of the IOSB excluding the roof area.

Site Characterization: Section 5.2.2 of MARSSIM identifies the historical site assessment (HSA) data and professional judgment to be used for the evaluation of potential for residual contamination. Based on this evaluation of the IOSB exterior (vertical only) surfaces and the minimal potential for contamination, this survey unit was designed for final status and the area was designated as a Class 3 area.

### **Survey Unit Design Information:**

The Survey Unit Design Parameters are presented in **Table 1**. The survey unit and measurement locations are depicted on the maps in **Attachment 1**. Static measurement locations were randomly determined and approximately 1% of the area scanned. The instrumentation used for the survey along with the MDC values are listed in **Table 2-1 Attachment 2**.

**FINAL STATUS SURVEY F8300313**

**Table 1, Survey Unit Design Parameters**

<b>Evaluation Input Values</b>		<b>Comments</b>
Survey Package:	<b>F830</b>	IOSB Exterior Surfaces
Survey Unit:	<b>031</b>	
Class	<b>3</b>	
SU Area (m <sup>2</sup> )	<b>2750</b>	
Evaluator:	<b>EG</b>	
DCGL <sub>w</sub> :	43,000	Gross Activity DCGL
Area Factor	N/A	Class 3
Design DCGL <sub>emc</sub> (dpm/100cm <sup>2</sup> ):	N/A	Class 3
DCGL <sub>emc</sub> :	N/A	Class 3
LBGR:	21,500	Default = 50% DCGL
Sigma:	175	Survey Data
Type I error:	0.05	
Type II error:	0.05	
Predominant Nuclide	Cs-137	
Sample Area (m <sup>2</sup> )	N/A	
Total Instrument Efficiency:	0.129	
Total Area Scanned (m <sup>2</sup> ):	27.7	
Scan Coverage (%)	1%	Class 3
Material Type:	N/A	Choosing 'N/A' sets material background to "0"
<b>Calculated Values</b>		<b>Comments</b>
Z <sub>1-α</sub> :	1.645	
Z <sub>1-β</sub> :	1.645	
Sign p:	0.99865	
Calculated Relative Shift:	122.8	
Relative Shift Used:	3.0	Uses 3.0 if Relative Shift >3
N-Value:	11	
N-Value+20%:	14	

# FINAL STATUS SURVEY F8300313

## Survey Results:

A total of 15 direct measurements were made in F8300313. The results of the static measurements are shown in **Table 2**. All of the static measurements were less than the DCGL. None of the scan measurements indicated areas of elevated activity. Swipe data was not obtained in this survey unit, therefore no swipe data is included in **Attachment 4**.

**Table 2, Static Measurement Results**

Number	Sample #	Beta (cpm)	Beta (dpm)
1	F8300313C00001	305	2,364
2	F8300313C00002	259	2,008
3	F8300313C00003	284	2,202
4	F8300313C00004	220	1,705
5	F8300313C00005	272	2,109
6	F8300313C00006	268	2,078
7	F8300313C00007	268	2,078
8	F8300313C00008	290	2,248
9	F8300313C00009	252	1,953
10	F8300313C00010	268	2,078
11	F8300313C00011	267	2,070
12	F8300313C00012	270	2,093
13	F8300313C00013	249	1,930
14	F8300313C00014	293	2,271
15	F8300313C00015	307	2,380

**Table 3** contains the statistical summary of the static measurement data for the Exterior Surfaces

**Table 3, Beta Summary Statistics**

<i>Beta Static Exterior Surfaces</i>	
Mean	2,104
Median	2,078
Standard Deviation	175
Minimum	1,705
Maximum	2,380
Count	15

**Survey Unit Data Assessment:**

The survey design required 14 static measurements for the Sign Test. A total of 15 static measurements were collected. 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.

**Table 4, Data Assessment Results**

Static Data Values		Comments
Number of Samples:	15	
Median:	2,078	
Mean:	2,104	
Static Data Standard Deviation:	175	
Maximum:	2,380	
Sign Test Results		Comments
Adjusted N Value:	14	
S+ Value:	15	
Critical Value:	10	
Criteria Satisfaction		Comments
Sufficient samples collected:	Pass	
Maximum value <DCGL <sub>w</sub> :	Pass	
Median value <DCGL <sub>w</sub> :	Pass	
Mean value <DCGL <sub>w</sub> :	Pass	
Maximum value <DCGL <sub>emc</sub> :	N/A	
Sign test results:	Pass	
Final Status		Comments
The survey unit passes all conditions:	Pass	

**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 survey and the sample results are consistent with that classification. 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 the scoping evaluation. The required number of direct measurements was made and the scan

## FINAL STATUS SURVEY F8300313

coverage met the requirement of Table 5-6 of the LTP. All of the static measurements were less than the DCGL. No investigations were required.

The static 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.

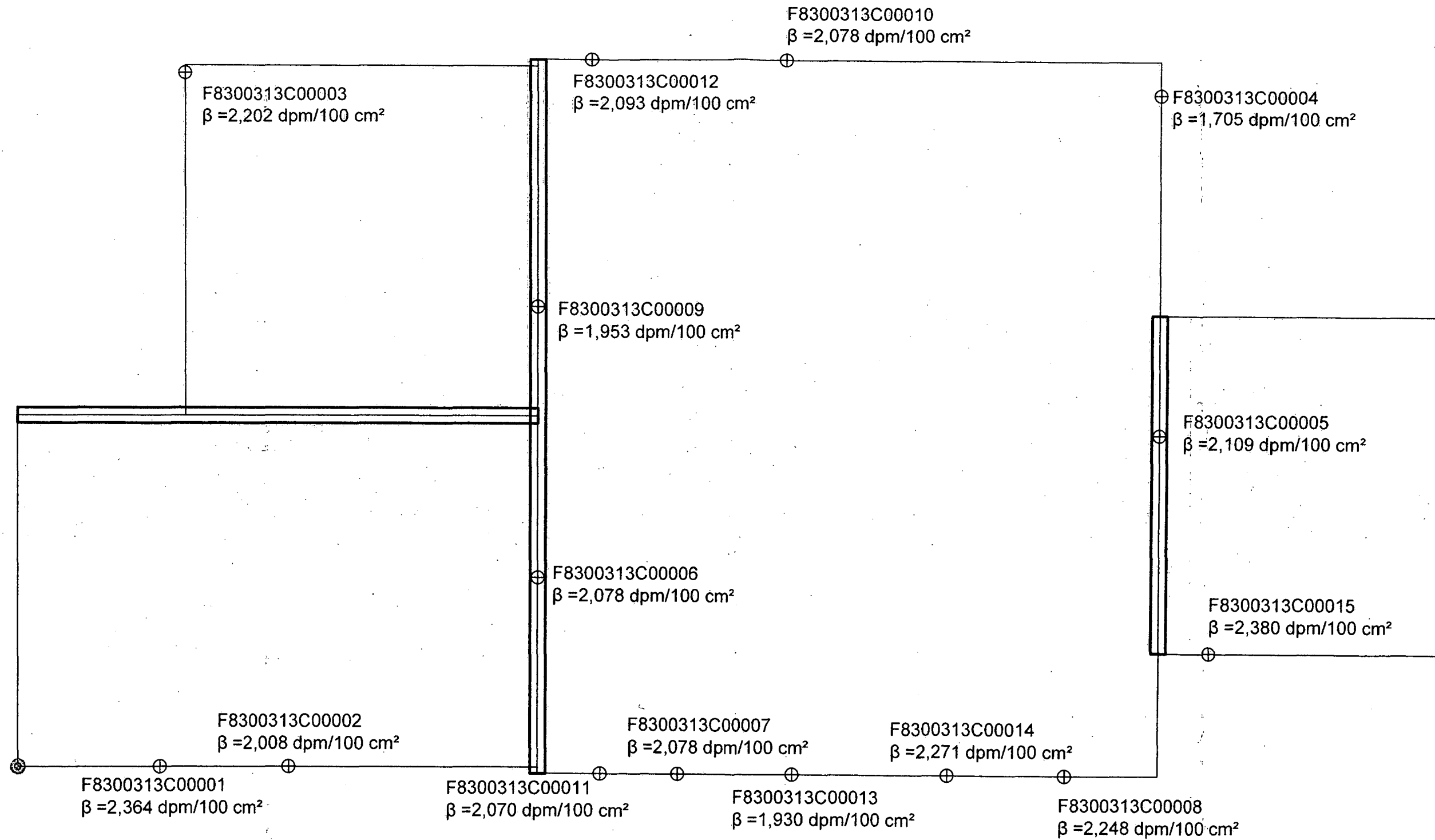
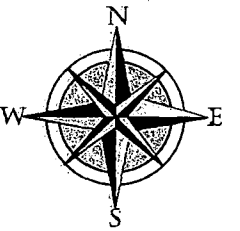
It is concluded that survey unit F8300313 meets the release criteria of 10CFR20.1402.

**Attachment 1**

**Maps**

**October 21, 2016**

**Survey Unit F8300313**



ENGINEERS / SCIENTISTS / PROGRAM MANAGERS	
<b>IOSB EXTERIOR SURFACES</b>	
Contract No.:	4500091426
Location:	Rancho Seco
Task:	Final Status
Drawing No.:	IOSB Final Status Survey
Description:	IOSB Exterior
Drawn By:	C Gray
QC'd:	J Reese
Date:	10062016
Rev No.:	1

**SMUD**  
Approved by:  
Approval date:



**Attachment 2**

**Instrumentation**

**October 21, 2016**

**Survey Unit F8300313**

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

Measurement Type	Instrument Type	Minimum Detectable Activity <sup>a</sup>	Detector Efficiencies	Calibration Due Date <sup>b</sup>
Beta Static Measurement	Ludlum Model 2350-1 Ludlum Model 44-116 B Detector	Beta – 500 dpm/100 cm <sup>2</sup>	12.9%	<u>317899/331973</u> 2/10/17

<sup>a</sup> Minimum detectable activities for the count rate instrumentation were calculated in accordance with NUREG-1507, "Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions" (U.S. NRC, 1997).

<sup>b</sup> Detectors are required to be calibrated once every 12 months. Calibration due date indicates the date by which the detector must be calibrated again.

cm<sup>2</sup> = square centimeters

cpm = counts per minute

dpm = disintegrations per minute

## Static Measurement MDA

### Variables

Beta Survey Type  
331973 Detector Number  
175 Background count rate (cpm)  
1 Count Time (min)  
0.129 Efficiency  
100 Area of Detector (cm<sup>2</sup>)

### Constants

60 sec/min  
2.54 cm/in

### Assumptions

Background count time and sample count time are equivalent

### Calculate Static MDA

Static MDA =  $3 + 4.65(B_r * t)^{0.5} / t * E * A / 100$  (NUREG 1507)

Where:  $B_r$  Background  
           $t$  Countrate  
           $E$  Count Time (min)  
           $A$  Efficiency  
                  Area of detector (cm<sup>2</sup>)

Static MDA                      500 dpm/100 cm<sup>2</sup>

**Attachment 3**  
**Investigation**  
**October 21, 2016**  
**Survey Unit F8300313**

**(none required)**

**Attachment 4**  
**Data Assessment**  
**October 21, 2016**  
**Survey Unit F8300313**

