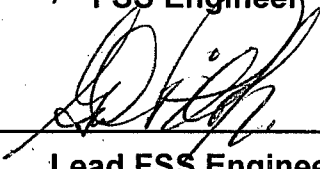


**Rancho Seco**  
**Final Status Survey Summary Report**  
**April 3, 2008**  
**Central N-S Transit Industrial Area**  
**Survey Unit F8000041**

Prepared By:  Date: 4/3/2008  
FSS Engineer

Reviewed By:  Date: 4/4/08  
Lead FSS Engineer

Approved By:  Date: 4-28-08  
Dismantlement Superintendent, Radiological

## FINAL STATUS SURVEY SUMMARY REPORT

### Survey Unit:

F8000041, Central N-S Transit Industrial Area

### Survey Unit Description:

**Operating History:** This area covers the majority of Industrial Area soils exclusive of the building footprints and rail line in this area. Operating records and the HSA document no specific release of radioactivity in these survey areas however this area does border known contaminated areas. The HSA recorded no specific unplanned release events.

**Site Characterization:** Soil and sediment samples were collected and analyzed for the presence of plant-derived radionuclides. Cs-137 was the only detected nuclide of plant origin with a mean activity level of 0.062 pCi/g and a maximum value of 0.299 pCi/g. (Site background levels of Cs-137 have been determined to be approximately 0.312 pCi/g.) As described in section 2 of the LTP, the area was evaluated using DSIP-0020 and was designated as Class 3.

### 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 679 m<sup>2</sup> were scanned for approximately 10% coverage. Soil samples were collected at direct measurement locations where soil was present and analyzed by HPGe detector. Gamma spectroscopy field measurements were obtained with a NaI detector at direct measurement locations where either asphalt or concrete was present. 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>	F800	Central N-S Transit Industrial Area
<b>Survey Unit:</b>	0041	Open Land Area
<b>Class:</b>	3	LTP Table 5-4
<b>SU Area (m<sup>2</sup>):</b>	6634	
<b>Evaluator:</b>	Michael Stein	
<b>DCGL Cs137 surrogate (pCi/g):</b>	51.2	
<b>Area Factor:</b>	N/A	Class 3
<b>Design DCGL<sub>emc</sub> (pCi/g):</b>	N/A	Class 3
<b>LBGR (pCi/g):</b>	25.6	Default = 50% DCGL
<b>Design Sigma (pCi/g):</b>	0.01	DTBD-06-001, Table 5-B
<b>Type I Error:</b>	0.05	
<b>Type II Error:</b>	0.05	
<b>Nuclide:</b>	Cs137	
<b>Sample Area (m<sup>2</sup>):</b>	N/A	Class 3
<b>Total Area Scanned (m<sup>2</sup>):</b>	679	
<b>Scan Coverage (%):</b>	10.2%	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>	2560	
<b>Relative Shift Used:</b>	3	Uses 3.0 if Rel Shift >3
<b>N-Value:</b>	11	
<b>Design N-Value + 20%:</b>	14	NUREG-1575 Table 5-5
<b>Grid Spacing L:</b>	N/A	Class 3

## Survey Results:

A total of 14 direct measurements were made in F8000041. The results including mean, median, standard deviation and range are shown in Table 2. All of the direct measurements were less than the DCGL. Soil samples (SS) and gamma direct (GD) measurements were counted to the MDCs shown in Table 2-1 of Attachment 2.

**Table 2. Direct Measurement Results**  
(all activity values in pCi/g)

Measurement ID	Cs137 MDA	Cs137 Activity	Uncertainty
<b>Mean:</b>		6.65E-01	
<b>Median:</b>		8.29E-01	
<b>Standard Deviation:</b>		3.38E-01	
<b>Range:</b>	5.00E-02 to 8.96E-01		
F8000041 A0007GD	8.65E-01	< 8.65E-01	
F8000041 A0013GD	8.96E-01	< 8.96E-01	
F8000041 A0009GD	8.23E-01	< 8.23E-01	
F8000041 A0008GD	7.96E-01	< 7.96E-01	
F8000041 A0011GD	8.70E-01	< 8.70E-01	
F8000041 A0014GD	8.31E-01	< 8.31E-01	
F8000041 A0003GD	8.26E-01	< 8.26E-01	
F8000041 A0001GD	8.62E-01	< 8.62E-01	
F8000041 A0012GD	8.85E-01	< 8.85E-01	
F8000041 C0006GD	6.27E-01	< 6.27E-01	
F8000041 A0005GD	8.69E-01	< 8.69E-01	
F8000041S0004SS	5.54E-02	< 5.54E-02	
F8000041S0010SS	5.00E-02	< 5.00E-02	
F8000041S0002SS	5.26E-02	< 5.26E-02	

**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 3. The sample mean and median values were less than the DCGL. The sample standard deviation was greater than the design standard deviation. However, both values of sigma result in a relative shift of greater than 3 so no additional samples were required.

**Table 3. Data Assessment Results**

<b>Survey Results Parameter</b>	<b>Value</b>	<b>Comment</b>
<b>Actual Direct Measurements (N):</b>	14	
<b>Median (pCi/g):</b>	8.29E-01	
<b>Mean (pCi/g):</b>	6.65E-01	
<b>Standard Deviation (pCi/g):</b>	3.38E-01	
<b>Maximum (pCi/g):</b>	8.96E-01	
<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>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>The survey unit passes all conditions?</b>	Investigate	Survey Unit Passes

### **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 land survey and the sample results are consistent with that classification. The sample standard deviation was greater than the design standard deviation. However, both values of sigma result in a relative shift of greater than 3 so no additional samples were required.

### **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. All of the direct measurements were less than the DCGL.

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 F8000041 meets the release criteria of 10CFR20.1402.

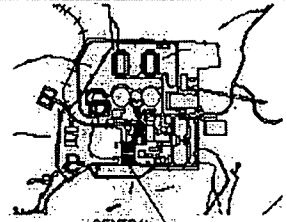
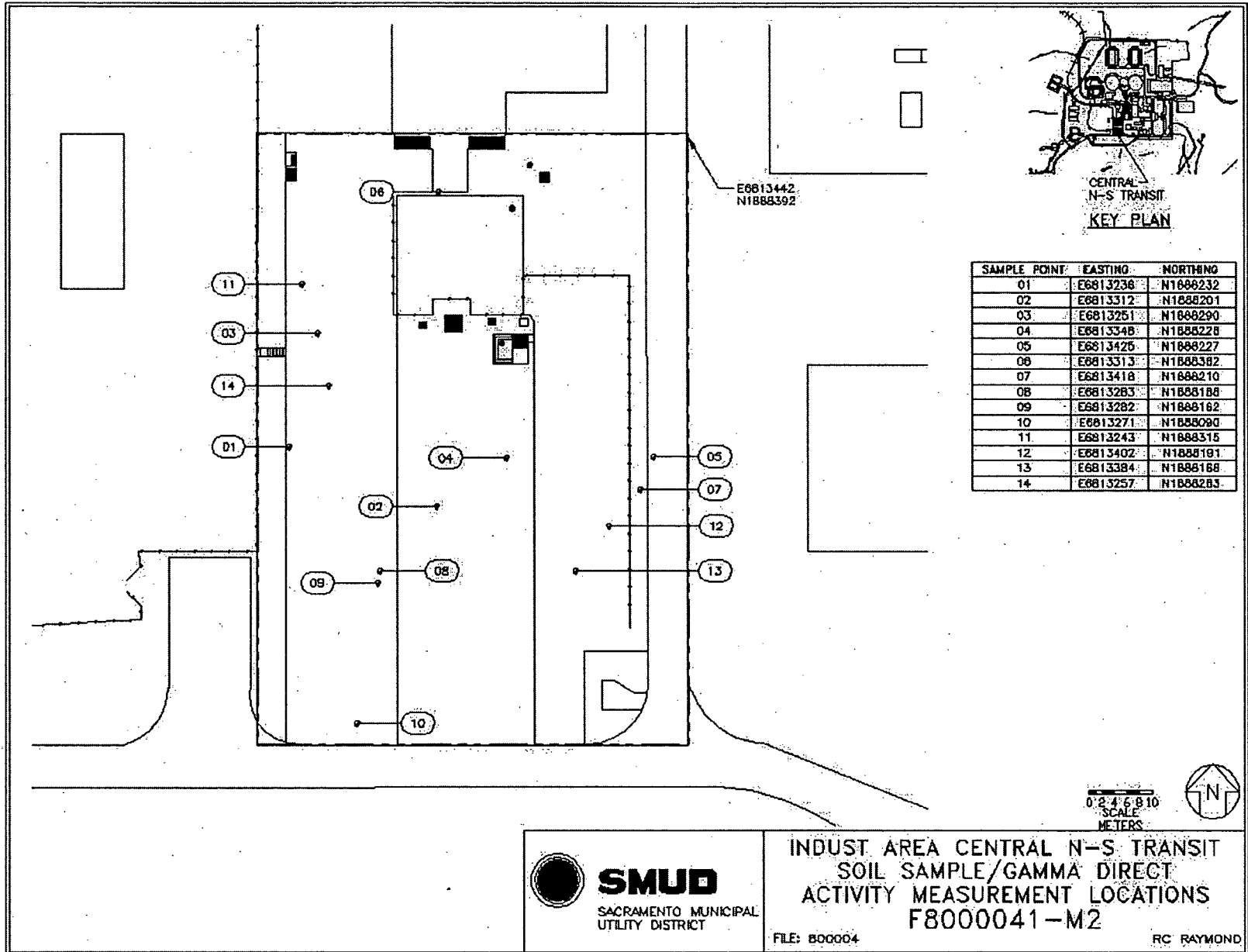
**Attachment 1**

**Maps**

**April 3, 2008**

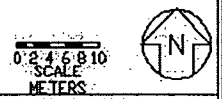
**Survey Unit F8000041**





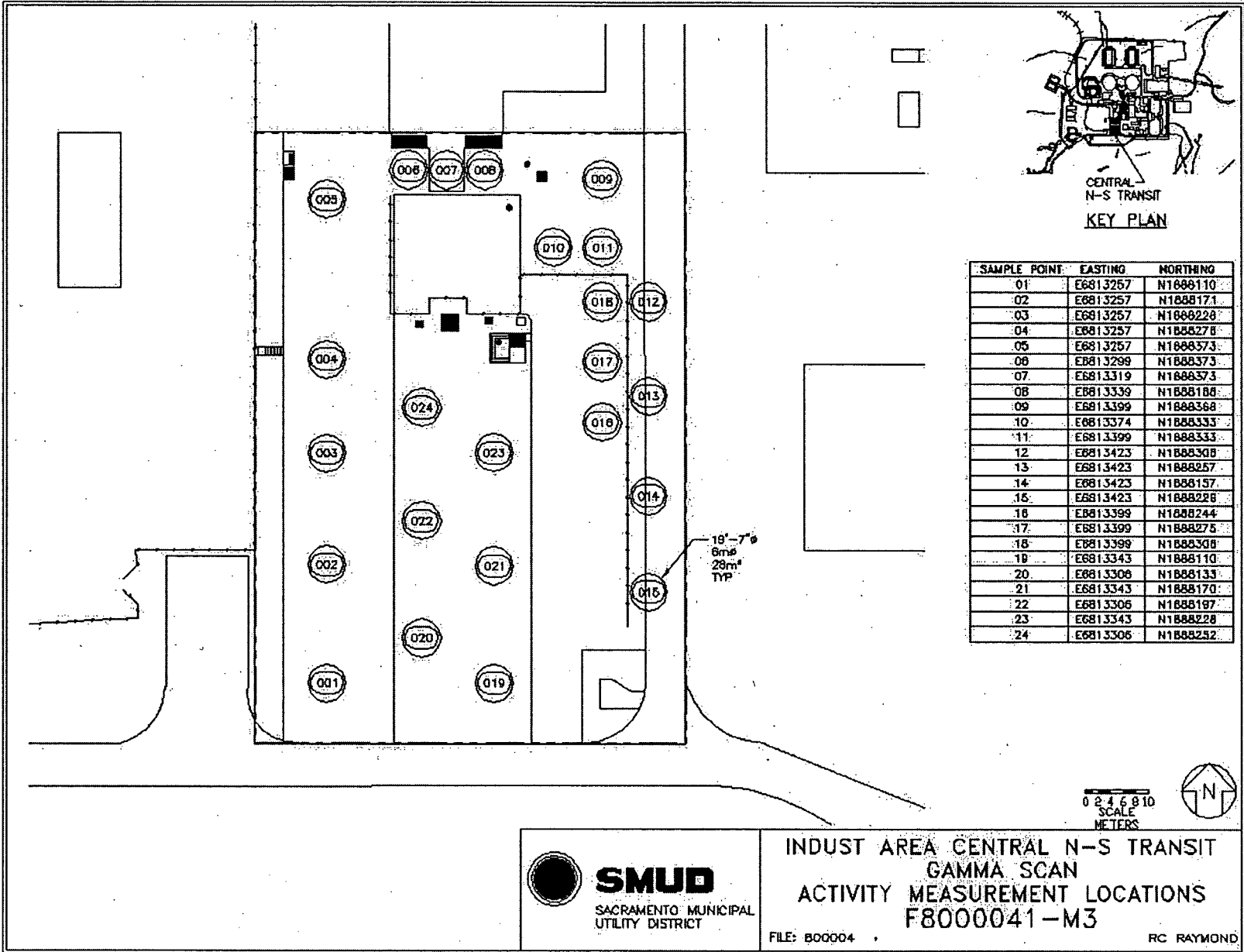
CENTRAL  
N-S TRANSIT  
KEY PLAN

SAMPLE POINT	EASTING	NORTHING
01	E6813236	N1688232
02	E6813312	N1688201
03	E6813251	N1688290
04	E6813348	N1688228
05	E6813426	N1688227
06	E6813313	N1688382
07	E6813418	N1688210
08	E6813283	N1688188
09	E6813282	N1688162
10	E6813271	N1688090
11	E6813243	N1688315
12	E6813402	N1688191
13	E6813384	N1688168
14	E6813257	N1688283



**SMUD**  
SACRAMENTO MUNICIPAL  
UTILITY DISTRICT

INDUST AREA CENTRAL N-S TRANSIT  
SOIL SAMPLE/GAMMA DIRECT  
ACTIVITY MEASUREMENT LOCATIONS  
F8000041-M2  
FILE: 800004 RC RAYMOND



INDUST AREA CENTRAL N-S TRANSIT  
GAMMA SCAN  
ACTIVITY MEASUREMENT LOCATIONS  
F8000041-M3

FILE: 800004

RC RAYMOND

**Attachment 2**

**Instrumentation**

**April 3, 2008**

**Survey Unit F8000041**

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

<b>Instrument</b>	<b>Detector Model No.</b>	<b>Detector Serial No.</b>	<b>MDC</b>
HPGe	N/A	05069128	Soil – 5.54E-2 pCi/g Cs-137 5.88E-2 pCi/g Co-60
Inspector	N/A	08051294	Concrete – 6.27E-1 pCi/g Cs-137 6.55E-1 pCi/g Co-60 Asphalt – 8.96E-1 pCi/g Cs-137 9.05E-1 pCi/g Co-60
ISOCS	N/A	2983947	Soil – 2.93E-1 pCi/g Cs-137 2.31E-1 pCi/g Co-60 Concrete – 3.31E-1 pCi/g Cs-137 2.28E-1 pCi/g Co-60 Asphalt – 3.19E-1 pCi/g Cs-137 2.46E-1 pCi/g Co-60

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

<b>Instrument</b>	<b>Parameter</b>	<b>Value</b>
ISOCS	Investigation Criteria - Scan	20 pCi/g Cs-137
All	DCGL <sub>w</sub>	51.2 Cs-137 12.6 Co-60
All	DCGL <sub>EMC</sub>	N/A

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

<b>Instrument</b>	<b>Detector Model No.</b>	<b>Detector Serial No.</b>	<b>MDC</b>
HPGe	N/A	05069128	Soil – 5.54E-2 pCi/g Cs-137 5.88E-2 pCi/g Co-60
Inspector	N/A	08051294	Concrete – 6.27E-1 pCi/g Cs-137 6.55E-1 pCi/g Co-60 Asphalt – 8.96E-1 pCi/g Cs-137 9.05E-1 pCi/g Co-60
ISOCS	N/A	2983947	Soil – 2.93E-1 pCi/g Cs-137 2.31E-1 pCi/g Co-60 Concrete – 3.31E-1 pCi/g Cs-137 2.28E-1 pCi/g Co-60 Asphalt – 3.19E-1 pCi/g Cs-137 2.46E-1 pCi/g Co-60

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

<b>Instrument</b>	<b>Parameter</b>	<b>Value</b>
ISOCS	Investigation Criteria - Scan	20 pCi/g Cs-137
All	DCGL <sub>W</sub>	52.6 Cs-137 12.6 Co-60
All	DCGL <sub>EMC</sub>	N/A

**Attachment 3**  
**Investigation**  
**April 3, 2008**  
**Survey Unit F800041**

**(none required)**

**Attachment 4**

**Data Assessment**

**April 3, 2008**

**Survey Unit F8000041**

