

**Rancho Seco Nuclear Generating Station  
Decommissioning Technical Basis Document**

**DTBD-06-002**

**Revision No. 0**

**DPT 06-011**

**RIC 2A.900**

**Use of a Survey Unit Size of 319 m<sup>2</sup> for Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station**

PREPARED BY:

Author

Date

REVIEWED BY:

Technical Reviewer

Date

REVIEWED BY:

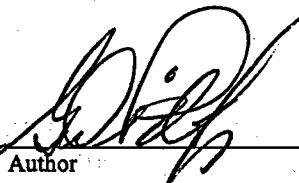
QA Reviewer

Date

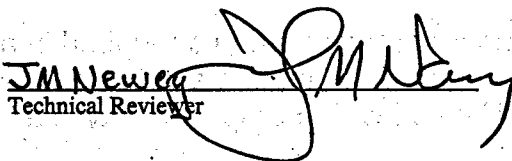
APPROVED BY:

Principal Radiological Engineer

Date



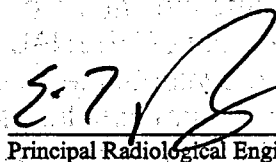
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3/6/06

Michael A. Braun

3/22/06



6-6-06

## 1.0 PURPOSE

The purpose of this Decommissioning Technical Basis Document (DTBD) is to establish the basis for the use of a survey unit size of 319 m<sup>2</sup> for Class 1 structure surveys.

## 2.0 DISCUSSION

NUREG-1575 provides suggested survey unit sizes in section 4.6 (100 m<sup>2</sup> for Class 1 structures). The NUREG requires that the survey units share common characteristics and be limited to a single classification. The NUREG further states that survey units be consistent with the dose model used and notes that Class 1 indoor rooms could be a single survey unit or could be split into lower and upper survey units if floor contamination is significantly greater than that on the upper walls and ceiling. The only real constraints are consistency with the dose model and controlling the size such that the sample density is not less than that described for the suggested size. This technical basis document establishes a survey unit size of 319 m<sup>2</sup> as being consistent with the dose model used in the LTP (DTBD 04-004) for structures, demonstrates that the annual dose rate of 25 mrem is achieved, and preserves the sample density of NUREG-1575. In addition, conservative area factors for use with the larger survey unit size are provided.

## 3.0 DEFINITIONS

**Area Factors**-a geometry correction factor applied to the activity in a small area which results in a value which exceeds the DCGL and yet still maintains compliance with the release criterion.

**Sample Density**-the number of measurements required in a survey unit per m<sup>2</sup> which provides an adequate number of values to meet the requirements of the statistical test used at the applied confidence level. Sample density is a function of survey unit size and data variability.

## 4.0 TECHNICAL POSITION

RESRAD-Build has been appropriately used to determine a conservative room size for the Building Occupant scenario which meets the criteria outlined in both NUREG/CR-5512 and NUREG-1575. Based on the output of RESRAD-Build and the additional evaluation performed using Microshield to evaluate the external exposure from structures, RSNRS proposes to use a maximum structure survey unit size of 319 m<sup>2</sup> total surface area for Class 1 structures. The area factors calculated for 137 m<sup>2</sup> (DTBD 05-003) will be conservatively used.

## 5.0 LIMITATIONS

The survey unit size is limited to Class 1 structures only.

In order to ensure an adequate sample density, 45 direct measurements will be required in a 319 m<sup>2</sup> survey unit which preserves the sample density of 1/7 m<sup>2</sup> (the sample density for an N of 14 used with a survey surface area of 100 m<sup>2</sup>).

## 6.0 TECHNICAL BASES

NUREG/CR-5512 establishes the basis for the radiological parameters used in dose modeling. The dose to the building occupant is mainly external whole body dose from the gamma emitters on the building surfaces. In the section describing the Building Occupancy scenario, NUREG/CR-5512 points out that the use of an infinite plane source approximates the dose rate of a room having non-uniform contamination levels (i.e., contamination is higher on the floor than the walls and higher on the walls than the ceiling). The NUREG states that dose rates are nearly equivalent using either the infinite plane or the multiple plane source geometry for rooms in the 100 m<sup>3</sup> to 250 m<sup>3</sup> size and the infinite plane over estimates the dose rate for smaller rooms. NUREG-1575 "suggests" a survey unit size of 100 m<sup>2</sup> floor area for a Class 1 survey unit based on the assumption that a small office would be occupied by the receptor. Therefore the building occupant dose should be conservatively bounded by the dose equivalent from the floor surface modeled as an infinite plane Co-60 source at the screening level of 15,200 dpm/100 cm<sup>2</sup>. Attachment 8.1 provides the Microshield run showing that the infinite plane dose equivalent rate for Co-60 at the screening value is approximately 49 mrem/y for 2000 hours per year.

The NUREG expands the dose model by describing the room as an 8m by 8m room with 3 m high walls and also as a 100 m<sup>2</sup> floor area. The model considers the lower wall contribution, but at a reduced contamination level. Both of these situations were considered in the survey unit sizes shown in Table 2 (the first and second entries respectively).

DTBD 04-004 describes the dose model used for the Rancho Seco Building Occupancy scenario. Using the probabilistic version of RESRAD-Build, room size was analyzed to determine whether it was a sensitive parameter. Room size was found to be a sensitive parameter in determining dose to the room occupant and, as a result, a distribution of site room sizes was evaluated to determine the most probable size with respect to dose determination. RESRAD-Build determined that a room having a floor area of 137 m<sup>2</sup> (11.7 m by 11.7 m) was the most likely and conservative size to use for dose modeling. Wall height was determined to be 3.89 m which created a room volume of 533 m<sup>3</sup>. The dose model was then used to derive the dose to the occupant located in the center of the room (i.e., the floor and 4 full-height walls having a total surface area of 319 m<sup>2</sup>) contaminated at the Total DCGL of 45,500 dpm/100 cm<sup>2</sup> with the nuclide mixture specified in DTBD 05-015 (Table 1 below). (DTBD 05-015 derived the gross beta DCGL of 43,000 dpm/100 cm<sup>2</sup> using the average of the fractions method. The gross beta DCGL is based on only the beta emitting nuclides in the mixture and correcting for the remaining non-beta emitting nuclides gives a Total DCGL by the average of the fractions method of 45,500 dpm/100 cm<sup>2</sup>.) Note that Cs-137 makes up approximately

84 percent of the total activity with Co-60 comprising just 2 percent which results in lower dose rates than the Co-60 plane source model.

Table 1 Total DCGL Converted to uCi/cm<sup>2</sup>

Source Term	45,500 dpm/100 cm <sup>2</sup>	DCGL	Activity
Nuclide	nf	dpm/100 cm <sup>2</sup>	uCi/cm <sup>2</sup>
Co-60	2.07E-02	943	4.24E-06
Sr-90	8.35E-02	3800	1.71E-05
Cs-134	3.29E-04	15	6.74E-08
Cs-137	8.39E-01	38200	1.72E-04
Pu-238	1.17E-03	53	2.40E-07
Pu-239	3.73E-04	17	7.64E-08
Pu-240	3.73E-04	17	7.64E-08
Pu-241	5.33E-02	2420	1.09E-05
Am-241	1.05E-03	48	2.15E-07
Sum	1.00E+00	45513	2.05E-04

RESRAD-Build was then used to calculate the dose equivalent rate 1 m from a floor at the center of a room and 4 walls of various sizes to determine the dose rate effect on room size. Floor areas ranged from 64 m<sup>2</sup> to 319 m<sup>2</sup> and wall heights ranged from 2 m high to 3.89 m high. A geometry assuming 319 m<sup>2</sup> as a plane source as well as a room geometry with a ceiling included and a total surface area of 319 m<sup>2</sup> were also evaluated as shown in Table 2. The survey unit size with the DTBD 04-004 dose model applied is shown in the next to the last row in Table 2. Assuming the Table 1 source term on all structure surfaces, the dose equivalent rates were all determined to be less than the infinite plane value and less than 25 mrem/y. Reducing the size of the room reduces the dose rates as shown in Table 1 consistent with the information provided in NUREG/CR-5512. The results of the various RESRAD-Build runs are shown in Table 2.

Table 2. TEDE Versus Survey Unit Size

SU Size, m <sup>2</sup>	Floor Area, m <sup>2</sup>	Wall Area, m <sup>2</sup>	Ceiling, m <sup>2</sup>	TEDE, mrem/y
160	64	96	-----	16.4
220	100	120	-----	17.5
231	137	93.6	-----	17.2
256	100	155.6	-----	18.8
281	137	142.8	-----	18.6
319	319	-----	-----	18.1
319	137	181.6	-----	19.8
319	100	120	100	23.1

Area Factors for direct dose were recalculated for a room surface of 319 m<sup>2</sup> as shown in Attachment 8.3. Since the Area Factors presented in chapter 6 of the LTP (DTBD 05-

003) are just slightly less based on 137 m<sup>2</sup>, the LTP factors for direct dose will be used for evaluation of elevated areas in Class 1 structures.

The evaluation demonstrates that a survey unit size of 319 m<sup>2</sup> at the structure surface Total DCGL activity level meets the 25 mrem/y release criterion under the likely geometries in which it could be employed: 1) a 319 m<sup>2</sup> plane source (e.g., a wall area), 2) a 319 m<sup>2</sup> room with a floor of 137 m<sup>2</sup> and four walls of 45.5 m<sup>2</sup>, or 3) a small cubicle of 319 m<sup>2</sup> with a floor, ceiling and four walls.

## 7.0 REFERENCES

- 7.1 NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual", August 2000.
- 7.2 NUREG/CR-5512, "Residual Radioactive Contamination From Decommissioning".
- 7.3 DTBD 04-004, "DCGL for Structure Surfaces".
- 7.4 DTBD 05-003, "Soil and Surface Area Factors for Use at RNGS".
- 7.5 DTBD 05-015, "Structure Nuclide Fractions and DCGLs".

## 8.0 ATTACHMENTS

- 8.1 Microshield Run, Infinite Plane Source
- 8.2 RESRAD-Build Outputs
- 8.3 Microshield Runs for Area Factors

## 9.0 RESPONSIBLE INDIVIDUAL

George Pillsbury

**Attachment 8.1**

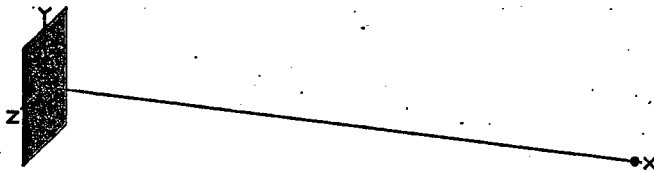
**Microshield Run  
Co-60 Infinite Plane At Screening Level**

**MicroShield v5.05 (5.05-00488)**  
**Sacramento Municipal Utility District**

Page : 1  
DOS File : Case1  
Run Date: February 7, 2006  
Run Time: 10:08:57 AM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

**Case Title: Case 1**  
**Description: Case 1**  
**Geometry: 15 - Infinite Plane**



**Dose Points**

X	Y	Z
100 cm 3 ft 3.4 in	0 cm 0.0 in	0 cm 0.0 in

**Shields**

Shield Name	Material	Density
Air Gap	Air	0.00122

**Source Input**

**Grouping Method : Actual Photon Energies**

Nuclide	$\mu\text{Ci}/\text{cm}^2$	$\text{Bq}/\text{cm}^2$
Co-60	6.8500e-005	2.5345e+000

**Buildup**

**The material reference is : Air Gap**

Energy MeV	Activity photons/sec	Results			
		Fluence Rate MeV/cm <sup>2</sup> /sec No Buildup	Fluence Rate MeV/cm <sup>2</sup> /sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.6938	4.134e-04	5.910e-04	5.910e-04	1.141e-06	1.141e-06
1.1732	2.535e+00	6.497e+00	6.497e+00	1.161e-02	1.161e-02
1.3325	2.535e+00	7.488e+00	7.488e+00	1.299e-02	1.299e-02
<b>TOTALS:</b>	<b>5.069e+00</b>	<b>1.399e+01</b>	<b>1.399e+01</b>	<b>2.460e-02</b>	<b>2.460e-02</b>

Attachment 8.2

RESRAD Build Outputs



\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 1 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

=====

=====

=====

**RESRAD-BUILD Table of Contents**

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Source Information.....	4
For time = 0.00E+00 yr	
Time Specific Parameters.....	9
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Dose by Pathway Detail.....	15
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Full Summary.....	21

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 2 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

```

=====
=====
RESRAD-BUILD Input Parameters
=====
=====
    
```

```

Number of Sources : 5
Number of Receptors: 1
Total Time : 3.650000E+02 days
Fraction Inside : 2.670000E-01
    
```

===== Receptor Information =====

Receptor	Room	x [m]	y [m]	z [m]	FracTime	Inhalation [m3/day]	Ingestion(Dust) [m2/hr]
1	1	4.000	4.000	1.000	1.000	3.57E+01	1.61E-04

===== Receptor-Source Shielding Relationship =====

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete
1	2	2.40E+00	0.00E+00	Concrete
1	3	2.40E+00	0.00E+00	Concrete
1	4	2.40E+00	0.00E+00	Concrete
1	5	2.40E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 3 \*\*  
Title : 160 m2 room  
Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

=====  
Building Information  
=====

Building Air Exchange Rate: 8.35E-01 1/hr

Height [m]	Air Exchanges [m3/hr]	
Area [m2]		
	*****	
	*	*
	*	*
	*	*
H1: 3.000	*	*←Q01: 1.60E+02
	Room 1	* Q10 : 1.60E+02
	LAMBDA: 8.35E-01	*
Area 64.000	*	*
	*	*
	*****	

Deposition velocity: 4.78E-04 [m/s]    Resuspension Rate: 1.33E-09 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 4 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Source Information

Source: 1

Location:: Room : 1 x: 4.00 y: 4.00 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:8.00E+00 Width[m]:8.00E+00 Direction: z  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]  
 Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
FU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
FU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
FU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
FU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NE-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
FB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 5 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Source: 2

Location:: Room : 1 x: 0.00 y: 4.00 z: 0.00[m]

Geometry:: Type: Area Length[m]:8.00E+00 Width[m]:3.00E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m <sup>2</sup> ]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m <sup>3</sup> )]
FU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
FU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
FU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
FU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
ND-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 6 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Source: 3

Location:: Room : 1 x: 4.00 y: 0.00 z: 0.00[m]

Geometry:: Type: Area Length[m]:6.00E+00 Width[m]:3.00E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: ICRP 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.459E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NE-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 7 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Source: 4

Location:: Room : 1 x: 8.00 y: 4.00 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.00E+00 Width[m]:3.00E+00 Direction: x  
Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]  
Fraction released to air: 5.170E-01  
Removable fraction: 1.000E-01  
Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
FU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-02
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
FU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
FU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
FU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.061E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.692E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 8 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Source: 5

Location:: Room : 1 x: 4.00 y: 8.00 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:8.00E+00 Width[m]:3.00E+00 Direction: y  
 Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]  
 Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: ICRP 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.804E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03



TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 9 \*\*  
 Title : 160 m<sup>2</sup> room  
 Input File : C:\Program Files\RESRAD Family\BUILD\site2.bld  
 Evaluation Time: 0.0000000E+00 years

```

=====
-----
----- Assessment for Time: 1 -----
----- Time =0.00E+00 yr -----
-----
=====
    
```

=====  
 Source Information  
 =====

Source: 1  
 Location:: Room : 1 x: 4.00 y: 4.00 z: 0.00 [m]  
 Geometry:: Type: Area Length[m]:8.00E+00 Width[m]:8.00E+00 Direction: x  
 Pathway ::  
     Direct Ingestion Rate: 3.450E-07 [1/hr]  
     Fraction released to air: 5.170E-01  
     Removable fraction: 1.000E-01  
     Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m <sup>2</sup> ]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NE-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	RB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 10 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Evaluation Time: 0.0000000E+00 years

Source: 2

Location:: Room : 1 x: 0.00 y: 4.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:8.00E+00 Width[m]:3.00E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	FU-240	1.700E+03
	FU-239	1.700E+03
	FU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 11 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Evaluation Time: 0.00000000E+00 years

Source: 3

Location:: Room : 1 x: 4.00 y: 0.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:8.00E+00 Width[m]:3.00E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 2.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	FU-241	2.420E+05
	AM-241	4.800E+03
	FU-240	1.700E+03
	FU-239	1.700E+03
	FU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 12 \*\*

Title : 160 m<sup>2</sup> room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Evaluation Time: 0.00000000E+00 years

Source: 4

Location:: Room : 1 x: 8.00 y: 4.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:8.00E+00 Width[m]:3.00E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m <sup>2</sup> ]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 13 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Evaluation Time: 0.00000000E+00 years

Source: 5

Location:: Room : 1 x: 4.00 y: 8.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:8.00E+00 Width[m]:3.00E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 14 \*\*  
 Title : 160 m<sup>2</sup> room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld  
 Evaluation Time: 0.00000000E+00 years

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RESRAD-BUILD Dose Tables

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Source Contributions to Receptor Doses

[urem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Total
Receptor 1	1.05E+01	1.48E+00	1.48E+00	1.48E+00	1.48E+00	1.64E+01
Total	1.05E+01	1.48E+00	1.48E+00	1.48E+00	1.48E+00	1.64E+01

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 15 \*\*  
 Title : 160 m2 room  
 Input File : C:\Program Files\RESRAD Family\BUILD\site2.bld  
 Evaluation Time: 0.00000000E+00 years

Pathway Detail of Doses

[urem]

Source: 1		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	9.35E+00	2.66E-02	2.07E-05	1.90E-01	3.45E-24	8.97E-01
Total		9.35E+00	2.66E-02	2.07E-05	1.90E-01	3.45E-24	8.97E-01

Source: 2		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	1.06E+00	9.98E-03	7.75E-06	7.11E-02	1.29E-24	3.36E-01
Total		1.06E+00	9.98E-03	7.75E-06	7.11E-02	1.29E-24	3.36E-01

Source: 3		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	1.06E+00	9.98E-03	7.75E-06	7.11E-02	1.29E-24	3.36E-01
Total		1.06E+00	9.98E-03	7.75E-06	7.11E-02	1.29E-24	3.36E-01

Source: 4		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	1.06E+00	9.98E-03	7.75E-06	7.11E-02	1.29E-24	3.36E-01
Total		1.06E+00	9.98E-03	7.75E-06	7.11E-02	1.29E-24	3.36E-01

Source: 5		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	1.06E+00	9.98E-03	7.75E-06	7.11E-02	1.29E-24	3.36E-01
Total		1.06E+00	9.98E-03	7.75E-06	7.11E-02	1.29E-24	3.36E-01

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 16 \*\*  
 Title : 160 m<sup>2</sup> room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld  
 Evaluation Time: 0.00000000E+00 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	7.93E-02	7.93E-02
AM-241	4.40E-03	4.40E-03
NP-237	6.09E-10	6.09E-10
U-233	9.95E-17	9.95E-17
TH-229	2.99E-20	2.99E-20
AM-241		
AM-241	1.11E-01	1.11E-01
NP-237	2.29E-08	2.29E-08
U-233	4.97E-15	4.97E-15
TH-229	1.86E-18	1.86E-18
PU-240		
PU-240	3.85E-02	3.85E-02
U-236	1.03E-10	1.03E-10
TH-232	2.10E-20	2.10E-20
TH-228	1.08E-23	1.08E-23
RA-228	9.04E-23	9.04E-23
PU-239		
PU-239	3.85E-02	3.85E-02
U-235	3.96E-12	3.96E-12
PA-231	4.00E-16	4.00E-16
AC-227	8.12E-18	8.12E-18
PU-238		
PU-238	1.00E-01	1.00E-01
U-234	3.25E-08	3.25E-08
TH-230	2.29E-13	2.29E-13
RA-226	2.76E-17	2.76E-17
PB-210	2.28E-19	2.28E-19
CS-137		
CS-137	9.06E+00	9.06E+00
CS-134		
CS-134	8.08E-03	8.08E-03
SR-90		
SR-90	1.81E-01	1.81E-01
CO-60		
CO-60	8.40E-01	8.40E-01



\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 17 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Evaluation Time: 0.00000000E+00 years

Source: 2

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	2.97E-02	2.97E-02
AM-241	1.64E-03	1.64E-03
NP-237	2.23E-10	2.23E-10
U-233	3.73E-17	3.73E-17
TH-229	1.10E-20	1.10E-20
AM-241		
AM-241	4.13E-02	4.13E-02
NP-237	8.38E-09	8.38E-09
U-233	1.86E-15	1.86E-15
TH-229	6.89E-19	6.89E-19
PU-240		
PU-240	1.44E-02	1.44E-02
U-236	8.85E-11	8.85E-11
TH-232	7.87E-21	7.87E-21
TH-228	2.83E-24	2.83E-24
RA-228	2.19E-23	2.19E-23
PU-239		
PU-239	1.44E-02	1.44E-02
U-235	1.33E-12	1.33E-12
PA-231	1.50E-16	1.50E-16
AC-227	3.03E-18	3.03E-18
PU-238		
PU-238	3.76E-02	3.76E-02
U-234	1.22E-08	1.22E-08
TH-230	8.59E-14	8.59E-14
RA-226	6.08E-18	6.08E-18
PB-210	8.56E-20	8.56E-20
CS-137		
CS-137	1.18E+00	1.18E+00
CS-134		
CS-134	9.76E-04	9.76E-04
SR-90		
SR-90	6.55E-02	6.55E-02
CO-60		
CO-60	9.71E-02	9.71E-02

Source: 3

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	2.97E-02	2.97E-02

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 18 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Evaluation Time: 0.00000000E+00 years

AM-241	1.64E-03	1.64E-03
NP-237	2.23E-10	2.23E-10
U-233	3.73E-17	3.73E-17
TH-229	1.10E-20	1.10E-20
AM-241		
AM-241	4.13E-02	4.13E-02
NP-237	8.38E-09	8.38E-09
U-233	1.86E-15	1.86E-15
TH-229	6.89E-19	6.89E-19
PU-240		
PU-240	1.44E-02	1.44E-02
U-236	3.85E-11	3.85E-11
TH-232	7.87E-21	7.87E-21
TH-228	2.83E-24	2.83E-24
RA-228	2.19E-23	2.19E-23
PU-239		
PU-239	1.44E-02	1.44E-02
U-235	1.33E-12	1.33E-12
PA-231	1.50E-16	1.50E-16
AC-227	3.03E-18	3.03E-18
PU-238		
PU-238	3.76E-02	3.76E-02
U-234	1.22E-08	1.22E-08
TH-230	8.59E-14	8.59E-14
RA-226	6.08E-18	6.08E-18
PB-210	8.56E-20	8.56E-20
CS-137		
CS-137	1.18E+00	1.18E+00
CS-134		
CS-134	9.76E-04	9.76E-04
SR-90		
SR-90	6.55E-02	6.55E-02
CO-60		
CO-60	9.71E-02	9.71E-02

Source: 4

Naclide	Receptor	Total
	1	
PU-241		
PU-241	2.97E-02	2.97E-02
AM-241	1.64E-03	1.64E-03
NP-237	2.23E-10	2.23E-10
U-233	3.73E-17	3.73E-17
TH-229	1.10E-20	1.10E-20
AM-241		
AM-241	4.13E-02	4.13E-02
NP-237	8.38E-09	8.38E-09
U-233	1.86E-15	1.86E-15
TH-229	6.89E-19	6.89E-19

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 19 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Evaluation Time: 0.00000000E+00 years

PU-240		
PU-240	1.44E-02	1.44E-02
U-236	3.85E-11	3.85E-11
IH-232	7.87E-21	7.87E-21
IH-228	2.83E-24	2.83E-24
RA-228	2.19E-23	2.19E-23
PU-239		
PU-239	1.44E-02	1.44E-02
U-235	1.33E-12	1.33E-12
PA-231	1.50E-16	1.50E-16
AC-227	3.03E-18	3.03E-18
PU-238		
PU-238	3.76E-02	3.76E-02
U-234	1.22E-08	1.22E-08
IH-230	8.59E-14	8.59E-14
RA-226	6.08E-18	6.08E-18
PB-210	8.56E-20	8.56E-20
CS-137		
CS-137	1.18E+00	1.18E+00
CS-134		
CS-134	9.76E-04	9.76E-04
SR-90		
SR-90	6.55E-02	6.55E-02
CO-60		
CO-60	9.71E-02	9.71E-02

Source: 5

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	2.97E-02	2.97E-02
AM-241	1.64E-03	1.64E-03
NP-237	2.23E-10	2.23E-10
U-233	3.73E-17	3.73E-17
IH-229	1.10E-20	1.10E-20
AM-241		
AM-241	4.13E-02	4.13E-02
NP-237	8.38E-09	8.38E-09
U-233	1.86E-15	1.86E-15
IH-229	6.89E-19	6.89E-19
PU-240		
PU-240	1.44E-02	1.44E-02
U-236	3.85E-11	3.85E-11
IH-232	7.87E-21	7.87E-21
IH-228	2.83E-24	2.83E-24
RA-228	2.19E-23	2.19E-23
PU-239		
PU-239	1.44E-02	1.44E-02
U-235	1.33E-12	1.33E-12

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 20 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Evaluation Time: 0.00000000E+00 years

PA-231	1.50E-16	1.50E-16
AC-227	3.03E-18	3.03E-18
PU-238		
FU-238	3.76E-02	3.76E-02
U-234	1.22E-08	1.22E-08
TH-230	8.59E-14	8.59E-14
RA-226	6.08E-18	6.08E-18
PB-210	8.56E-20	8.56E-20
CS-137		
CS-137	1.18E+00	1.18E+00
CS-134		
CS-134	9.76E-04	9.76E-04
SR-90		
SR-90	6.55E-02	6.55E-02
CO-60		
CO-60	9.71E-02	9.71E-02

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 12:55:35 Page: 21 \*\*

Title : 160 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site2.bld

Full Summary

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=====

RESRAD-BUILD Dose (Time) Tables

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=====

Receptor Dose Received for the Exposure Duration

(mrem)

Evaluation Time [yr]

0.00E+00  
-----  
1 1.64E+01

Receptor Dose/Yr Averaged Over Exposure Duration

(mrem/yr)

Evaluation Time [yr]

0.00E+00  
-----  
1 1.64E+01

**\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 1 \*\***  
**Title : 220 m2 room**  
**Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld**

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**RESRAD-BUILD Table of Contents**

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\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 2 \*\*

Title : 220 m<sup>2</sup> room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

=====

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=====

RESRAD-BUILD Input Parameters

=====

=====

Number of Sources : 5  
 Number of Receptors: 1  
 Total Time : 3.650000E+02 days  
 Fraction Inside : 2.670000E-01

===== Receptor Information =====

Receptor	Room	x [m]	y [m]	z [m]	FracTime [m3/day]	Inhalation [m2/hr]	Ingestion (Dust) [m2/hr]
1	1	5.000	5.000	1.000	1.000	3.57E+01	1.61E-04

===== Receptor-Source Shielding Relationship =====

Receptor	Source	Density [g/cm <sup>3</sup> ]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete
1	2	2.40E+00	0.00E+00	Concrete
1	3	2.40E+00	0.00E+00	Concrete
1	4	2.40E+00	0.00E+00	Concrete
1	5	2.40E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 3 \*\*  
Title : 220 m2 room  
Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

=====  
Building Information  
=====

Building Air Exchange Rate: 8.35E-01 1/hr

Height[m]	Air Exchanges [m3/hr]	
Area [m2]		
	*****	
	*	*
	*	*
	*	*
H1: 3.000	* Room 1	* ←Q01: 2.50E+02
	* LAMBDA: 8.35E-01	* Q10 : 2.50E+02
Area 100.000	*	*
	*	*
	*****	

Deposition velocity: 4.78E-04 [m/s] Resuspension Rate: 1.33E-09 [1/s]



\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 4 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

==== Source Information =====

Source: 1

Location:: Room : 1 x: 5.00 y: 5.00 z: 0.00[m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:1.00E+01 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [µrem/dpm]	Inhalation [µrem/dpm]	Submersion [µrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
FB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 5 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Source: 2

Location:: Room : 1 x: 0.00 y: 5.00 z: 0.00[m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration

Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
FU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
FU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
FU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
FU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
FR-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 6 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Source: 3

Location:: Room : 1 x: 5.00 y: 0.00 z: 0.00[m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
FR-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 7 \*\*  
 Title : 220 m2 room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Source: 4

Location:: Room : 1 x: 10.00 y: 5.00 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: x  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]  
 Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
FU-241	2.420E+05	3.021E-05	3.716E-03	1.151E-02
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
FU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
FU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
FU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
MD-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 8 \*\*  
 Title : Z20 m2 room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Source: 5

Location:: Room : 1 x: 5.00 y: 10.00 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [l/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]  
 Radon Release Fraction: 0.000E+00

Contamination::  
 Nuclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
FU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
FU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
FU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
FU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.856E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 9 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Evaluation Time: 0.00000000E+00 years

```

=====
Assessment for Time: 1
Time =0.00E+00 yr
=====
    
```

==== Source Information =====

Source: 1

Location:: Room : 1 x: 5.00 y: 5.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:1.00E+01 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	HP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.600E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 10 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Evaluation Time: 0.00000000E+00 years

Source: 2

Location:: Room : 1 x: 0.00 y: 5.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 11 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Evaluation Time: 0.00000000E+00 years

Source: 3

Location:: Room : 1 x: 5.00 y: 0.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04



\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 18:20:42 Page: 12 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Evaluation Time: 0.0000000E+00 years

Source: 4

Location:: Room : 1 x: 10.00 y: 5.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 13 \*\*  
 Title : 220 m<sup>2</sup> room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld  
 Evaluation Time: 0.00000000E+00 years

Source: 5

Location:: Room : 1 x: 5.00 y: 10.00 z: 0.00 [m]  
 Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m <sup>2</sup> ]
	FU-241	2.420E+05
	AM-241	4.800E+03
	FU-240	1.700E+03
	FU-239	1.700E+03
	FU-238	5.340E+03
	HP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 14 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Evaluation Time: 0.00000000E+00 years

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**RESRAD-BUILD Dose Tables**

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**Source Contributions to Receptor Doses**

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Total
Receptor 1	1.22E+01	1.33E+00	1.33E+00	1.33E+00	1.33E+00	1.75E+01
Total	1.22E+01	1.33E+00	1.33E+00	1.33E+00	1.33E+00	1.75E+01

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 15 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Evaluation Time: 0.00000000E+00 years

Pathway Detail of Doses

[urem]

Source: 1		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	1.07E+01	3.03E-02	2.07E-05	1.90E-01	3.45E-24	1.30E+00
Total		1.07E+01	3.03E-02	2.07E-05	1.90E-01	3.45E-24	1.30E+00

Source: 2		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	8.71E-01	9.10E-03	6.20E-06	5.69E-02	1.04E-24	3.91E-01
Total		8.71E-01	9.10E-03	6.20E-06	5.69E-02	1.04E-24	3.91E-01

Source: 3		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	8.71E-01	9.10E-03	6.20E-06	5.69E-02	1.04E-24	3.91E-01
Total		8.71E-01	9.10E-03	6.20E-06	5.69E-02	1.04E-24	3.91E-01

Source: 4		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	8.71E-01	9.10E-03	6.20E-06	5.69E-02	1.04E-24	3.91E-01
Total		8.71E-01	9.10E-03	6.20E-06	5.69E-02	1.04E-24	3.91E-01

Source: 5		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	8.71E-01	9.10E-03	6.20E-06	5.69E-02	1.04E-24	3.91E-01
Total		8.71E-01	9.10E-03	6.20E-06	5.69E-02	1.04E-24	3.91E-01

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

PAGE 44 OF 215

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 16 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Evaluation Time: 0.00000000E+00 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	1.00E-01	1.00E-01
AM-241	5.31E-03	5.31E-03
NP-237	7.31E-10	7.31E-10
U-233	1.08E-16	1.08E-16
TH-229	3.22E-20	3.22E-20
AM-241		
AM-241	1.33E-01	1.33E-01
NP-237	2.75E-08	2.75E-08
U-233	5.40E-15	5.40E-15
TH-229	2.01E-18	2.01E-18
PU-240		
PU-240	4.63E-02	4.63E-02
U-236	1.12E-10	1.12E-10
TH-232	2.24E-20	2.24E-20
TH-228	1.23E-23	1.23E-23
RA-226	1.20E-22	1.20E-22
PU-239		
PU-239	4.64E-02	4.64E-02
U-235	4.34E-12	4.34E-12
PA-231	4.81E-16	4.81E-16
AC-227	9.03E-18	9.03E-18
PU-238		
PU-238	1.23E-01	1.23E-01
U-234	3.53E-08	3.53E-08
TH-230	2.45E-13	2.45E-13
RA-226	3.41E-17	3.41E-17
PB-210	3.34E-19	3.34E-19
CS-137		
CS-137	1.05E+01	1.05E+01
CS-134		
CS-134	9.29E-03	9.29E-03
SR-90		
SR-90	2.57E-01	2.57E-01
CO-60		
CO-60	9.60E-01	9.60E-01

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 17 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD Family\BUILD\site3.bld

Evaluation Time: 0.00000000E+00 years

Source: 2

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.01E-02	3.01E-02
AM-241	1.58E-03	1.58E-03
NP-237	2.14E-10	2.14E-10
U-233	3.24E-17	3.24E-17
TH-229	9.51E-21	9.51E-21
AM-241		
AM-241	3.98E-02	3.98E-02
NP-237	8.05E-09	8.05E-09
U-233	1.62E-15	1.62E-15
TH-229	5.93E-19	5.93E-19
PU-240		
PU-240	1.39E-02	1.39E-02
U-236	3.35E-11	3.35E-11
TH-232	6.73E-21	6.73E-21
TH-228	2.54E-24	2.54E-24
RA-228	2.44E-23	2.44E-23
PU-239		
PU-239	1.39E-02	1.39E-02
U-235	1.15E-12	1.15E-12
PA-231	1.44E-16	1.44E-16
AC-227	2.69E-18	2.69E-18
PU-238		
PU-238	3.67E-02	3.67E-02
U-234	1.06E-08	1.06E-08
TH-230	7.35E-14	7.35E-14
RA-226	6.17E-18	6.17E-18
PB-210	1.00E-19	1.00E-19
CS-137		
CS-137	1.04E+00	1.04E+00
CS-134		
CS-134	8.35E-04	8.35E-04
SR-90		
SR-90	7.49E-02	7.49E-02
CO-60		
CO-60	8.05E-02	8.05E-02

Source: 3

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.01E-02	3.01E-02

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 18 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Evaluation Time: 0.00000000E+00 years

AM-241	1.58E-03	1.58E-03
NP-237	2.14E-10	2.14E-10
U-233	3.24E-17	3.24E-17
IH-229	9.51E-21	9.51E-21
AM-241		
AM-241	3.98E-02	3.98E-02
NP-237	8.05E-09	8.05E-09
U-233	1.62E-15	1.62E-15
IH-229	5.93E-19	5.93E-19
PU-240		
PU-240	1.39E-02	1.39E-02
U-236	3.35E-11	3.35E-11
IH-232	6.73E-21	6.73E-21
IH-228	2.54E-24	2.54E-24
RA-228	2.44E-23	2.44E-23
PU-239		
PU-239	1.39E-02	1.39E-02
U-235	1.15E-12	1.15E-12
PA-231	1.44E-16	1.44E-16
AC-227	2.69E-18	2.69E-18
PU-238		
PU-238	3.67E-02	3.67E-02
U-234	1.06E-08	1.06E-08
IH-230	7.35E-14	7.35E-14
RA-226	6.17E-18	6.17E-18
PB-210	1.00E-19	1.00E-19
CS-137		
CS-137	1.04E+00	1.04E+00
CS-134		
CS-134	8.35E-04	8.35E-04
SR-90		
SR-90	7.49E-02	7.49E-02
CO-60		
CO-60	8.05E-02	8.05E-02

Source: 4

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.01E-02	3.01E-02
AM-241	1.58E-03	1.58E-03
NP-237	2.14E-10	2.14E-10
U-233	3.24E-17	3.24E-17
IH-229	9.51E-21	9.51E-21
AM-241		
AM-241	3.98E-02	3.98E-02
NP-237	8.05E-09	8.05E-09
U-233	1.62E-15	1.62E-15
IH-229	5.93E-19	5.93E-19

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 19 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Evaluation Time: 0.00000000E+00 years

PU-240		
PU-240	1.39E-02	1.39E-02
U-236	3.35E-11	3.35E-11
TH-232	6.73E-21	6.73E-21
TH-228	2.54E-24	2.54E-24
RA-228	2.44E-23	2.44E-23
PU-239		
PU-239	1.39E-02	1.39E-02
U-235	1.15E-12	1.15E-12
PA-231	1.44E-16	1.44E-16
AC-227	2.69E-18	2.69E-18
PU-238		
PU-238	3.67E-02	3.67E-02
U-234	1.06E-08	1.06E-08
TH-230	7.35E-14	7.35E-14
RA-226	6.17E-18	6.17E-18
PB-210	1.00E-19	1.00E-19
CS-137		
CS-137	1.04E+00	1.04E+00
CS-134		
CS-134	8.35E-04	8.35E-04
SR-90		
SR-90	7.49E-02	7.49E-02
CO-60		
CO-60	8.05E-02	8.05E-02

Source: 5

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.01E-02	3.01E-02
AM-241	1.58E-03	1.58E-03
NP-237	2.14E-10	2.14E-10
U-233	3.24E-17	3.24E-17
TH-229	9.51E-21	9.51E-21
AM-241		
AM-241	3.98E-02	3.98E-02
NP-237	8.05E-09	8.05E-09
U-233	1.62E-15	1.62E-15
TH-229	5.93E-19	5.93E-19
PU-240		
PU-240	1.39E-02	1.39E-02
U-236	3.35E-11	3.35E-11
TH-232	6.73E-21	6.73E-21
TH-228	2.54E-24	2.54E-24
RA-228	2.44E-23	2.44E-23
PU-239		
PU-239	1.39E-02	1.39E-02
U-235	1.15E-12	1.15E-12



TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 20 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD Family\BUILD\site3.bld

Evaluation Time: 0.00000000E+00 years

PA-231	1.44E-16	1.44E-16
AC-227	2.69E-18	2.69E-18
PU-238		
PU-238	3.67E-02	3.67E-02
U-234	1.06E-08	1.06E-08
TR-230	7.35E-14	7.35E-14
RA-226	6.17E-18	6.17E-18
PB-210	1.00E-19	1.00E-19
CS-137		
CS-137	1.04E+00	1.04E+00
CS-134		
CS-134	8.35E-04	8.35E-04
SR-90		
SR-90	7.49E-02	7.49E-02
CO-60		
CO-60	8.05E-02	8.05E-02

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:20:42 Page: 21 \*\*

Title : 220 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site3.bld

Full Summary

```

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RESRAD-BUILD Dose (Time) Tables
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Receptor Dose Received for the Exposure Duration

(mrem)

Evaluation Time [yr]

	0.00E+00
1	1.75E+01

Receptor Dose/Yr Averaged Over Exposure Duration

(mrem/yr)

Evaluation Time [yr]

	0.00E+00
1	1.75E+01

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 1 \*\*

Title : 231 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld

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\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 2 \*\*

Title : 231 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld

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=====
RESRAD-BUILD Input Parameters
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```

Number of Sources : 5  
 Number of Receptors: 1  
 Total Time : 3.650000E+02 days  
 Fraction Inside : 2.670000E-01

===== Receptor Information =====

Receptor	Room	X [m]	Y [m]	Z [m]	FracTime	Inhalation [m3/day]	Ingestion(Dust) [m2/hr]
1	1	5.850	5.850	1.000	1.000	3.57E+01	1.61E-04

===== Receptor-Source Shielding Relationship =====

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete
1	2	2.40E+00	0.00E+00	Concrete
1	3	2.40E+00	0.00E+00	Concrete
1	4	2.40E+00	0.00E+00	Concrete
1	5	2.40E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 3 \*\*  
Title : 231 m2 room  
Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld

=====  
Building Information  
=====

Building Air Exchange Rate: 8.35E-01 1/hr

Height[m]		Air Exchanges [m3/hr]	
Area [m2]		*****	
		*	
		*	
		*	
		*	←Q01: 2.29E+02
H1: 2.000	Room 1	*	Q10 : 2.29E+02
	LAMBDA: 8.35E-01	*	
Area 137.000		*	
		*	
		*****	

Deposition velocity: 4.78E-04 [m/s]      Resuspension Rate: 1.33E-09 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 4 \*\*  
 Title : 231 m2 room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld

==== Source Information =====

Source: 1

Location:: Room : 1 x: 5.85 y: 5.85 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:1.17E+01 Direction: z  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]  
 Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.887E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 5 \*\*

Title : 231 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld

Source: 2

Location:: Room : 1 x: 0.00 y: 5.85 z: 0.00[m]  
Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:2.00E+00 Direction: x  
Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]  
Fraction released to air: 5.170E-01  
Removable fraction: 1.000E-01  
Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [urem/dpm]	Inhalation [urem/dpm]	Submersion [urem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.495E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
 at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 6 \*\*  
 Title : 231 m2 room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld

Source: 3

Location:: Room : 1 x: 5.85 y: 0.00 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:2.00E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]  
 Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
FU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
FU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
FU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
FU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03



TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 7 \*\*  
 Title : 231 m2 room  
 Input File : C:\Program Files\RESRAD Family\BUILD\site4.bld

Source: 4

Location:: Room : 1 x: 11.70 y: 5.85 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:2.00E+00 Direction: x  
 Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
FB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 8 \*\*

Title : 231 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld

Source: 5

Location:: Room : 1 x: 5.85 y: 11.70 z: 0.00[m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:2.00E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.281E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:06 Page: 9 \*\*  
 Title : 231 m2 room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld  
 Evaluation Time: 0.00000000E+00 years

```

=====
=====
=====
Assessment for Time: 1
Time =0.00E+00 yr
=====
=====
    
```

===== Source Information =====

Source: 1

Location:: Room : 1 x: 5.85 y: 5.85 z: 0.00 [m]  
 Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:1.17E+01 Direction: z  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 10 \*\*

Title : 231 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld

Evaluation Time: 0.0000000E+00 years

Source: 2

Location:: Room : 1 x: 0.00 y: 5.85 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:2.00E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 11 \*\*

Title : 231 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\sitet\_bld

Evaluation Time: 0.00000000E+00 years

Source: 3

Location:: Room : 1 x: 5.85 y: 0.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:2.00E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

\*\* HESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 12 \*\*

Title : 231 m2 room

Input File : C:\Program Files\HESRAD\_Family\BUILD\site4.bld

Evaluation Time: 0.00000000E+00 years

Source: 4

Location:: Room : 1 x: 11.70 y: 5.85 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:2.00E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-226	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 13 \*\*

Title : 231 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld

Evaluation Time: 0.0000000E+00 years

Source: 5

Location:: Room : 1 x: 5.85 y: 11.70 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:2.00E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	3.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 14 \*\*  
 Title : 231 m2 room  
 Input File : C:\Program Files\RESRAD Family\BUILD\site4.bld  
 Evaluation Time: 0.00000000E+00 years

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RESRAD-BUILD Dose Tables

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Source Contributions to Receptor Doses

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Total
Receptor 1	1.37E+01	8.73E-01	8.73E-01	8.73E-01	8.73E-01	1.72E+01
Total	1.37E+01	8.73E-01	8.73E-01	8.73E-01	8.73E-01	1.72E+01



\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 15 \*\*

Title : 231 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld

Evaluation Time: 0.00000000E+00 years

Pathway Detail of Doses

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1.16E+01	4.50E-02	2.80E-05	2.71E-01	4.66E-24	1.79E+00
Total	1.16E+01	4.50E-02	2.80E-05	2.71E-01	4.66E-24	1.79E+00

Source: 2

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	5.13E-01	7.70E-03	4.79E-06	4.64E-02	7.97E-25	3.06E-01
Total	5.13E-01	7.70E-03	4.79E-06	4.64E-02	7.97E-25	3.06E-01

Source: 3

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	5.13E-01	7.70E-03	4.79E-06	4.64E-02	7.97E-25	3.06E-01
Total	5.13E-01	7.70E-03	4.79E-06	4.64E-02	7.97E-25	3.06E-01

Source: 4

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	5.13E-01	7.70E-03	4.79E-06	4.64E-02	7.97E-25	3.06E-01
Total	5.13E-01	7.70E-03	4.79E-06	4.64E-02	7.97E-25	3.06E-01

Source: 5

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	5.13E-01	7.70E-03	4.79E-06	4.64E-02	7.97E-25	3.06E-01
Total	5.13E-01	7.70E-03	4.79E-06	4.64E-02	7.97E-25	3.06E-01

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 16 \*\*  
 Title : 231 m<sup>2</sup> room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld  
 Evaluation Time: 0.00000000E+00 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor	Total
	1	
PU-241		
FU-241	1.35E-01	1.35E-01
AM-241	7.56E-03	7.56E-03
NP-237	1.04E-09	1.04E-09
U-233	1.59E-16	1.59E-16
TH-229	4.71E-20	4.71E-20
AM-241		
AM-241	1.90E-01	1.90E-01
NP-237	3.92E-08	3.92E-08
U-233	7.93E-15	7.93E-15
TH-229	2.94E-18	2.94E-18
PU-240		
FU-240	6.66E-02	6.66E-02
U-236	1.64E-10	1.64E-10
TH-232	3.31E-20	3.31E-20
TH-228	1.49E-23	1.49E-23
RA-228	1.49E-22	1.49E-22
PU-239		
FU-239	6.67E-02	6.67E-02
U-235	6.12E-12	6.12E-12
PA-231	6.91E-16	6.91E-16
AC-227	1.22E-17	1.22E-17
PU-238		
FU-238	1.71E-01	1.71E-01
U-234	5.18E-08	5.18E-08
TH-230	3.62E-13	3.62E-13
RA-226	4.20E-17	4.20E-17
PB-210	4.57E-19	4.57E-19
CS-137		
CS-137	1.17E+01	1.17E+01
CS-134		
CS-134	1.02E-02	1.02E-02
SR-90		
SR-90	3.49E-01	3.49E-01
CO-60		
CO-60	1.05E+00	1.05E+00

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 17 \*\*

Title : 231 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld

Evaluation Time: 0.00000000E+00 years

Source: 2

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	2.32E-02	2.32E-02
AM-241	1.29E-03	1.29E-03
NP-237	1.75E-10	1.75E-10
U-233	2.71E-17	2.71E-17
TH-229	7.96E-21	7.96E-21
AM-241		
AM-241	3.24E-02	3.24E-02
NP-237	6.58E-09	6.58E-09
U-233	1.35E-15	1.35E-15
TH-229	4.96E-19	4.96E-19
PU-240		
PU-240	1.14E-02	1.14E-02
U-236	2.80E-11	2.80E-11
TH-232	5.66E-21	5.66E-21
TH-228	1.81E-24	1.81E-24
RA-228	1.82E-23	1.82E-23
PU-239		
PU-239	1.14E-02	1.14E-02
U-235	9.52E-13	9.52E-13
PA-231	1.18E-16	1.18E-16
AC-227	2.07E-18	2.07E-18
PU-238		
PU-238	2.93E-02	2.93E-02
U-234	8.85E-09	8.85E-09
TH-230	6.18E-14	6.18E-14
RA-226	4.60E-18	4.60E-18
PB-210	7.80E-20	7.80E-20
CS-137		
CS-137	6.57E-01	6.57E-01
CS-134		
CS-134	5.12E-04	5.12E-04
SR-90		
SR-90	5.82E-02	5.82E-02
CO-60		
CO-60	4.80E-02	4.80E-02

Source: 3

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	2.32E-02	2.32E-02



TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 18 \*

Title : 231 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld

Evaluation Time: 0.00000000E+00 years

AM-241	1.29E-03	1.29E-03
NP-237	1.75E-10	1.75E-10
U-233	2.71E-17	2.71E-17
IH-229	7.96E-21	7.96E-21
AM-241		
AM-241	3.24E-02	3.24E-02
NP-237	6.58E-09	6.58E-09
U-233	1.35E-15	1.35E-15
IH-229	4.96E-19	4.96E-19
PU-240		
PU-240	1.14E-02	1.14E-02
U-236	2.80E-11	2.80E-11
IH-232	5.66E-21	5.66E-21
IH-228	1.81E-24	1.81E-24
RA-228	1.82E-23	1.82E-23
PU-239		
PU-239	1.14E-02	1.14E-02
U-235	9.52E-13	9.52E-13
PA-231	1.18E-16	1.18E-16
AC-227	2.07E-18	2.07E-18
PU-238		
PU-238	2.93E-02	2.93E-02
U-234	8.85E-09	8.85E-09
IH-230	6.18E-14	6.18E-14
RA-226	4.60E-18	4.60E-18
PB-210	7.80E-20	7.80E-20
CS-137		
CS-137	6.57E-01	6.57E-01
CS-134		
CS-134	5.12E-04	5.12E-04
SR-90		
SR-90	5.82E-02	5.82E-02
CO-60		
CO-60	4.80E-02	4.80E-02

Source: 4

Nuclide	Receptor	Total
1		
PU-241		
PU-241		2.32E-02
AM-241		1.29E-03
NP-237		1.75E-10
U-233		2.71E-17
IH-229		7.96E-21
AM-241		
AM-241		3.24E-02
NP-237		6.58E-09
U-233		1.35E-15
IH-229		4.96E-19

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 19 \*\*  
 Title : 231 m2 room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld  
 Evaluation Time: 0.00000000E+00 years

PU-240		
PU-240	1.14E-02	1.14E-02
U-236	2.80E-11	2.80E-11
TH-232	5.66E-21	5.66E-21
TH-228	1.81E-24	1.81E-24
RA-228	1.82E-23	1.82E-23
PU-239		
PU-239	1.14E-02	1.14E-02
U-235	9.52E-13	9.52E-13
PA-231	1.18E-16	1.18E-16
AC-227	2.07E-18	2.07E-18
PU-238		
PU-238	2.93E-02	2.93E-02
U-234	8.85E-09	8.85E-09
TH-230	6.18E-14	6.18E-14
RA-226	4.60E-18	4.60E-18
PB-210	7.80E-20	7.80E-20
CS-137		
CS-137	6.57E-01	6.57E-01
CS-134		
CS-134	5.12E-04	5.12E-04
SR-90		
SR-90	5.82E-02	5.82E-02
CO-60		
CO-60	4.80E-02	4.80E-02

Source: 5

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	2.32E-02	2.32E-02
AM-241	1.29E-03	1.29E-03
NP-237	1.75E-10	1.75E-10
U-233	2.71E-17	2.71E-17
TH-229	7.96E-21	7.96E-21
AM-241		
AM-241	3.24E-02	3.24E-02
NP-237	6.58E-09	6.58E-09
U-233	1.35E-15	1.35E-15
TH-229	4.96E-19	4.96E-19
PU-240		
PU-240	1.14E-02	1.14E-02
U-236	2.80E-11	2.80E-11
TH-232	5.66E-21	5.66E-21
TH-228	1.81E-24	1.81E-24
RA-228	1.82E-23	1.82E-23
PU-239		
PU-239	1.14E-02	1.14E-02
U-235	9.52E-13	9.52E-13

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 20 \*\*

Title : 231 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld

Evaluation Time: 0.00000000E+00 years

PA-231	1.18E-16	1.18E-16
AC-227	2.07E-18	2.07E-18
PU-238		
PU-238	2.93E-02	2.93E-02
U-234	8.85E-09	8.85E-09
TH-230	6.18E-14	6.18E-14
RA-226	4.60E-18	4.60E-18
PB-210	7.80E-20	7.80E-20
CS-137		
CS-137	6.57E-01	6.57E-01
CS-134		
CS-134	5.12E-04	5.12E-04
SR-90		
SR-90	5.82E-02	5.82E-02
CO-60		
CO-60	4.80E-02	4.80E-02

\*\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 13:42:00 Page: 21 \*\*\*  
Title : 231 m2 room  
Input File : C:\Program Files\RESRAD\_Family\BUILD\site4.bld  
Full Summary

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RESRAD-BUILD Dose (Time) Tables

Receptor Dose Received for the Exposure Duration

(mrem)

Evaluation Time [yr]

0.00E+00  
-----  
1 1.72E+01

Receptor Dose/Yr Averaged Over Exposure Duration

(mrem/yr)

Evaluation Time [yr]

0.00E+00  
-----  
1 1.72E+01



\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 1 \*\*

Title : 256 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

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\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 2 \*\*  
 Title : 256 m2 room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

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RESRAD-BUILD Input Parameters

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Number of Sources : 5  
 Number of Receptors: 1  
 Total Time : 3.650000E+02 days  
 Fraction Inside : 2.670000E-01

===== Receptor Information =====

Receptor	Room	x [m]	y [m]	z [m]	FracTime	Inhalation [m3/day]	Ingestion(Dust) [m2/hr]
1	1	5.000	5.000	1.000	1.000	3.57E+01	1.61E-04

===== Receptor-Source Shielding Relationship =====

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete
1	2	2.40E+00	0.00E+00	Concrete
1	3	2.40E+00	0.00E+00	Concrete
1	4	2.40E+00	0.00E+00	Concrete
1	5	2.40E+00	0.00E+00	Concrete

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 3 \*\*  
Title : 256 m2 room  
Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

==== Building Information =====

Building Air Exchange Rate: 8.35E-01 1/hr

Height[m]	Air Exchanges [m3/hr]	
Area [m2]		
	*****	
	*	*
	*	*
	*	*
H1: 3.890	Room 1	<=Q01: 3.25E+02
	LAMRDA: 8.35E-01	Q10 : 3.25E+02
Area 100.000	*	*
	*	*
	*****	

Deposition velocity: 4.78E-04 [m/s]      Resuspension Rate: 1.33E-09 [1/s]

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 4 \*\*  
Title : 256 m2 room  
Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

----- Source Information -----

Source: 1  
Location:: Room : 1 x: 5.00 y: 5.00 z: 0.00[m]  
Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:1.00E+01 Direction: x  
Pathway ::  
Direct Ingestion Rate: 3.450E-07 [1/hr]  
Fraction released to air: 5.170E-01  
Removable fraction: 1.000E-01  
Time to Remove: 5.280E+04 [day]  
  
Radon Release Fraction: 0.000E+00

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [µrem/dpm]	Inhalation [µrem/dpm]	Submersion [µrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
FB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 5 \*\*

Title : 256 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

Source: 2

Location:: Room : 1 x: 0.00 y: 5.00 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.89E+00 Direction: x  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]  
 Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 6 \*\*  
Title : 256 m2 room  
Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

Source: 3

Location:: Room : 1 x: 5.00 y: 0.00 z: 0.00[m]  
Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.69E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 3.450E-07 [1/hr]  
Fraction released to air: 5.170E-01  
Removable fraction: 1.000E-01  
Time to Remove: 5.280E+04 [day]  
  
Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 7 \*\*

Title : 256 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

Source: 4

Location:: Room : 1 x: 10.00 y: 5.00 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.89E+00 Direction: x  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]  
 Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
FU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
FU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
FU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
FU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
HP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RRSRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 8 \*\*  
 Title : 256 m2 room  
 Input File : C:\Program Files\RRSRAD\_Family\BUILD\site5.bld

Source: 5

Location:: Room : 1 x: 5.00 y: 10.00 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.89E+00 Direction: y  
 Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
FU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-02
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
FU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
FU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
FU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.887E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03



\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 9 \*\*

Title : 256 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

Evaluation Time: 0.0000000E+00 years

```

=====
-----
Assessment for Time: 1
Time =0.00E+00 yr
-----
=====
    
```

----- Source Information -----

Source: 1

Location:: Room : 1 x: 5.00 y: 5.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:1.00E+01 Direction: z

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 10 \*\*

Title : 256 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

Evaluation Time: 0.00000000E+00 years

Source: 2

Location:: Room : 1 x: 0.00 y: 5.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.89E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m <sup>2</sup> ]
	Pu-241	2.420E+05
	Am-241	4.800E+03
	Pu-240	1.700E+03
	Pu-239	1.700E+03
	Pu-238	5.340E+03
	Np-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	Pa-231	0.000E+00
	Th-232	0.000E+00
	Th-230	0.000E+00
	Th-229	0.000E+00
	Th-228	0.000E+00
	Ac-227	0.000E+00
	Ra-228	0.000E+00
	Ra-226	0.000E+00
	Pb-210	0.000E+00
	Cs-137	3.820E+06
	Cs-134	1.500E+03
	Sr-90	3.800E+05
	Co-60	9.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 11 \*\*

Title : 256 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site5\_bld

Evaluation Time: 0.00000000E+00 years

Source: 3

Location:: Room : 1 x: 5.00 y: 0.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.89E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NE-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.8 02/21/06 14:01:54 Page: 12 \*\*  
 Title : 256 m2 room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld  
 Evaluation Time: 0.00000000E+00 years

Source: 4

Location:: Room : 1 x: 10.00 y: 5.00 z: 0.00 [m]  
 Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.89E+00 Direction: x  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 13 \*\*

Title : 256 m2 room

Input File : C:\Program Files\RESRAD Family\BUILD\site5.bld

Evaluation Time: 0.00000000E+00 years

Source: 5

Location:: Room : 1 x: 5.00 y: 10.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.89E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [Gpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 14 \*\*  
 Title : 256 m2 room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld  
 Evaluation Time: 0.00000000E+00 years

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RESRAD-BUILD Dose Tables

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Source Contributions to Receptor Doses

[µrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Total
Receptor 1	1.21E+01	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.88E+01
Total	1.21E+01	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.88E+01

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 15 \*\*

Title : 256 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

Evaluation Time: 0.00000000E+00 years

Pathway Detail of Doses

[mrem]

Source:	Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1	1.07E+01	2.45E-02	1.67E-05	1.50E-01	2.80E-24	1.27E+00
	Total	1.07E+01	2.45E-02	1.67E-05	1.50E-01	2.80E-24	1.27E+00
Source: 2							
	Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
	1	1.12E+00	9.54E-03	6.51E-06	5.82E-02	1.09E-24	4.94E-01
	Total	1.12E+00	9.54E-03	6.51E-06	5.82E-02	1.09E-24	4.94E-01
Source: 3							
	Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
	1	1.12E+00	9.54E-03	6.51E-06	5.82E-02	1.09E-24	4.94E-01
	Total	1.12E+00	9.54E-03	6.51E-06	5.82E-02	1.09E-24	4.94E-01
Source: 4							
	Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
	1	1.12E+00	9.54E-03	6.51E-06	5.82E-02	1.09E-24	4.94E-01
	Total	1.12E+00	9.54E-03	6.51E-06	5.82E-02	1.09E-24	4.94E-01
Source: 5							
	Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
	1	1.12E+00	9.54E-03	6.51E-06	5.82E-02	1.09E-24	4.94E-01
	Total	1.12E+00	9.54E-03	6.51E-06	5.82E-02	1.09E-24	4.94E-01

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 16 \*\*  
 Title : 256 m2 room  
 Input File : C:\Program Files\RESRAD Family\BUILD\site5\_bld  
 Evaluation Time: 0.00000000E+00 years

Nuclide Detail of Doses

[urem]

Source: 1

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	9.29E-02	9.29E-02
AM-241	4.69E-03	4.69E-03
NP-237	6.45E-10	6.45E-10
U-233	8.87E-17	8.87E-17
TH-229	2.64E-20	2.64E-20
AM-241		
AM-241	1.18E-01	1.18E-01
NP-237	2.42E-08	2.42E-08
U-233	4.43E-15	4.43E-15
TH-229	1.65E-18	1.65E-18
PU-240		
PU-240	4.07E-02	4.07E-02
U-236	9.18E-11	9.18E-11
TH-232	1.82E-20	1.82E-20
TH-228	1.16E-23	1.16E-23
RA-228	1.19E-22	1.19E-22
PU-239		
PU-239	4.08E-02	4.08E-02
U-235	3.68E-12	3.68E-12
PA-231	4.23E-16	4.23E-16
AC-227	7.82E-18	7.82E-18
PU-238		
PU-238	1.10E-01	1.10E-01
U-234	2.90E-08	2.90E-08
TH-230	1.99E-13	1.99E-13
RA-226	3.33E-17	3.33E-17
PB-210	3.27E-19	3.27E-19
CS-137		
CS-137	1.05E+01	1.05E+01
CS-134		
CS-134	9.29E-03	9.29E-03
SR-90		
SR-90	2.49E-01	2.49E-01
CO-60		
CO-60	9.59E-01	9.59E-01



\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 17 \*\*

Title : 256 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

Evaluation Time: 0.00000000E+00 years

Source: 2

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.62E-02	3.62E-02
AM-241	1.81E-03	1.81E-03
NP-237	2.45E-10	2.45E-10
U-233	3.45E-17	3.45E-17
TH-229	1.01E-20	1.01E-20
AM-241		
AM-241	4.56E-02	4.56E-02
NP-237	9.19E-09	9.19E-09
U-233	1.72E-15	1.72E-15
TH-229	6.28E-19	6.28E-19
PU-240		
PU-240	1.58E-02	1.58E-02
U-236	3.56E-11	3.56E-11
TH-232	7.09E-21	7.09E-21
TH-228	3.01E-24	3.01E-24
RA-228	3.14E-23	3.14E-23
PU-239		
PU-239	1.59E-02	1.59E-02
U-235	1.24E-12	1.24E-12
PA-231	1.64E-16	1.64E-16
AC-227	3.02E-18	3.02E-18
PU-238		
PU-238	4.27E-02	4.27E-02
U-234	1.12E-08	1.12E-08
TH-230	7.75E-14	7.75E-14
RA-226	7.64E-18	7.64E-18
PB-210	1.27E-19	1.27E-19
CS-137		
CS-137	1.32E+00	1.32E+00
CS-134		
CS-134	1.07E-03	1.07E-03
SR-90		
SR-90	9.42E-02	9.42E-02
CO-60		
CO-60	1.03E-01	1.03E-01

Source: 3

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.62E-02	3.62E-02

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 18 \*\*

Title : 256 m2 rooms

Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

Evaluation Time: 0.00000000E+00 years

AM-241	1.81E-03	1.81E-03
NP-237	2.45E-10	2.45E-10
U-233	3.45E-17	3.45E-17
TH-229	1.01E-20	1.01E-20
AM-241		
AM-241	4.56E-02	4.56E-02
NP-237	9.19E-09	9.19E-09
U-233	1.72E-15	1.72E-15
TH-229	6.28E-19	6.28E-19
PU-240		
PU-240	1.58E-02	1.58E-02
U-236	3.56E-11	3.56E-11
TH-232	7.09E-21	7.09E-21
TH-228	3.01E-24	3.01E-24
RA-228	3.14E-23	3.14E-23
PU-239		
PU-239	1.59E-02	1.59E-02
U-235	1.24E-12	1.24E-12
PA-231	1.64E-16	1.64E-16
AC-227	3.02E-18	3.02E-18
PU-238		
PU-238	4.27E-02	4.27E-02
U-234	1.12E-08	1.12E-08
TH-230	7.75E-14	7.75E-14
RA-226	7.64E-18	7.64E-18
PB-210	1.27E-19	1.27E-19
CS-137		
CS-137	1.32E+00	1.32E+00
CS-134		
CS-134	1.07E-03	1.07E-03
SR-90		
SR-90	9.42E-02	9.42E-02
CO-60		
CO-60	1.03E-01	1.03E-01

Source: 4

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.62E-02	3.62E-02
AM-241	1.81E-03	1.81E-03
NP-237	2.45E-10	2.45E-10
U-233	3.45E-17	3.45E-17
TH-229	1.01E-20	1.01E-20
AM-241		
AM-241	4.56E-02	4.56E-02
NP-237	9.19E-09	9.19E-09
U-233	1.72E-15	1.72E-15
TH-229	6.28E-19	6.28E-19

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 19 \*\*

Title : 256 m2 room

Input File : C:\Program Files\RESRAD Family\BUILD\site5.bld

Evaluation Time: 0.00000000E+00 years

PU-240		
PU-240	1.58E-02	1.58E-02
U-236	3.56E-11	3.56E-11
TH-232	7.09E-21	7.09E-21
TH-228	3.01E-24	3.01E-24
RA-228	3.14E-23	3.14E-23
PU-239		
PU-239	1.59E-02	1.59E-02
U-235	1.24E-12	1.24E-12
PA-231	1.64E-16	1.64E-16
AC-227	3.02E-18	3.02E-18
PU-238		
PU-238	4.27E-02	4.27E-02
U-234	1.12E-08	1.12E-08
TH-230	7.75E-14	7.75E-14
RA-226	7.64E-18	7.64E-18
PB-210	1.27E-19	1.27E-19
CS-137		
CS-137	1.32E+00	1.32E+00
CS-134		
CS-134	1.07E-03	1.07E-03
SR-90		
SR-90	9.42E-02	9.42E-02
CO-60		
CO-60	1.03E-01	1.03E-01

Source: 5

Nuclide	Receptor	Total
1		
PU-241		
PU-241	3.62E-02	3.62E-02
AM-241	1.81E-03	1.81E-03
NP-237	2.45E-10	2.45E-10
U-233	3.45E-17	3.45E-17
TH-229	1.01E-20	1.01E-20
AM-241		
AM-241	4.56E-02	4.56E-02
NP-237	9.19E-09	9.19E-09
U-233	1.72E-15	1.72E-15
TH-229	6.28E-19	6.28E-19
PU-240		
PU-240	1.58E-02	1.58E-02
U-236	3.56E-11	3.56E-11
TH-232	7.09E-21	7.09E-21
TH-228	3.01E-24	3.01E-24
RA-228	3.14E-23	3.14E-23
PU-239		
PU-239	1.59E-02	1.59E-02
U-235	1.24E-12	1.24E-12

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 20 \*\*

Title : 256 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

Evaluation Time: 0.00000000E+00 years

EA-231	1.64E-16	1.64E-16
AC-227	3.02E-18	3.02E-18
PU-238		
PU-238	4.27E-02	4.27E-02
U-234	1.12E-08	1.12E-08
TH-230	7.75E-14	7.75E-14
RA-226	7.64E-18	7.64E-18
PB-210	1.27E-19	1.27E-19
CS-137		
CS-137	1.32E+00	1.32E+00
CS-134		
CS-134	1.07E-03	1.07E-03
SR-90		
SR-90	9.42E-02	9.42E-02
CO-60		
CO-60	1.03E-01	1.03E-01

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:01:54 Page: 21 \*\*

Title : 256 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site5.bld

Full Summary

=====

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=====

RESRAD-BUILD Dose (Time) Tables

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Receptor Dose Received for the Exposure Duration

(mrem)

Evaluation Time [yr]

0.00E+00

1 1.88E+01

Receptor Dose/Yr Averaged Over Exposure Duration

(mrem/yr)

Evaluation Time [yr]

0.00E+00

1 1.88E+01

**\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 1 \*\***  
**Title : 281 m2 room**  
**Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld**

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**RESRAD-BUILD Table of Contents**

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\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 2 \*\*

Title : 281 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

```

=====
=====
=====
RESRAD-BUILD Input Parameters
=====
=====
    
```

Number of Sources : 5  
 Number of Receptors: 1  
 Total Time : 3.650000E+02 days  
 Fraction Inside : 2.670000E-01

===== Receptor Information =====

Receptor	Room	x [m]	y [m]	z [m]	FracTime	Inhalation [m3/day]	Ingestion(Dust) [m2/hr]
1	1	5.850	5.850	1.000	1.000	3.57E+01	1.61E-04

===== Receptor-Source Shielding Relationship =====

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete
1	2	2.40E+00	0.00E+00	Concrete
1	3	2.40E+00	0.00E+00	Concrete
1	4	2.40E+00	0.00E+00	Concrete
1	5	2.40E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 3 \*\*  
Title : 281 m2 room  
Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

===== Building Information =====

Building Air Exchange Rate: 8.35E-01 1/hr

Height [m]	Air Exchanges [m3/hr]
Area [m2]	*****
	* * * * *
	* * * * *
	* * * * *
H1: 3.000	* Room 1 * ←Q01: 3.43E+02
	* LAMBDA: 8.35E-01 * Q10 : 3.43E+02
Area 137.000	* * * * *
	*****

Deposition velocity: 4.78E-04 [m/s]      Resuspension Rate: 1.33E-09 [1/s]



-- RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 4 --  
 Title : 281 m2 room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

----- Source Information -----

Source: 1  
 Location:: Room : 1 x: 5.85 y: 5.85 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:1.17E+01 Direction: x  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]  
 Radon Release Fraction: 0.000E+00

Contamination::  
 Nuclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 5 \*\*  
Title : 281 m2 room  
Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

Source: 2

Location:: Room : 1 x: 0.00 y: 5.85 z: 0.00[m]  
Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.00E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 3.450E-07 [1/hr]  
Fraction released to air: 5.170E-01  
Removable fraction: 1.000E-01  
Time to Remove: 5.280E+04 [day]  
Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
FU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
FU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
FU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
FU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 6 \*\*  
 Title : 281 m2 room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

Source: 3

Location:: Room : 1 x: 5.85 y: 0.00 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.00E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]  
 Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.091E-05	3.716E-03	1.151E-08
AM-241	4.600E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:05 Page: 7 \*\*

Title : 281 m<sup>2</sup> room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

Source: 4

Location:: Room : 1 x: 11.70 y: 5.85 z: 0.00[m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.00E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Noclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m <sup>2</sup> ]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m <sup>3</sup> )]
DU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.804E-05
DU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
DU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
DU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
HP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 8.3 02/21/06 14:22:09 Page: 8 \*\*

Title : 281 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

Source: 5

Location:: Room : 1 x: 5.85 y: 11.70 z: 0.00[m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.00E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: ICR 13 Morbidity

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
FU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-06
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	8.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 9 \*\*

Title : 281 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

Evaluation Time: 0.00000000E+00 years

```

=====
-----
Assessment for Time: 1
Time =0.00E+00 yr
-----
=====
    
```

=====  
Source Information  
=====

Source: 1

Location:: Room : 1 x: 5.85 y: 5.85 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:1.17E+01 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	FR-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.2 02/21/06 14:22:09 Page: 10 \*\*

Title : 281 m2 room

Input File : C:\Program Files\RESRAD Family\BUILD\site6.bld

Evaluation Time: 0.00000000E+00 years

Source: 2

Location:: Room : 1 x: 0.00 y: 5.85 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.00E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 11 \*\*  
 Title : 281 m2 room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld  
 Evaluation Time: 0.0000000E+00 years

Source: 3

Location:: Room : 1 x: 5.85 y: 0.00 z: 0.00 [m]  
 Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.00E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/br]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [Bq/m <sup>2</sup> ]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04



\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 12 \*\*

Title : 281 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

Evaluation Time: 0.00000000E+00 years

Source: 4

Location:: Room : 1 x: 11.70 y: 5.85 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.00E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	HP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 13 \*\*

Title : 281 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

Evaluation Time: 0.00000000E+00 years

Source: 5

Location:: Room : 1 x: 5.85 y: 11.70 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.00E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-226	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	3.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 14 \*\*

Title : 281 m<sup>2</sup> room

Input File : C:\Program Files\RESRAD Family\BUILD\site6.bld

Evaluation Time: 0.00000000E+00 years

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**RESRAD-BUILD Dose Tables**

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**Source Contributions to Receptor Doses**

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Total
Receptor 1	1.35E+01	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.86E+01
<b>Total</b>	<b>1.35E+01</b>	<b>1.25E+00</b>	<b>1.25E+00</b>	<b>1.25E+00</b>	<b>1.25E+00</b>	<b>1.86E+01</b>

\*\*- RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 15 \*\*  
 Title : 281 m2 room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld  
 Evaluation Time: 0.00000000E+00 years

Pathway Detail of Doses

[urem]

Source: 1		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	1.16E+01	3.30E-02	2.06E-05	1.89E-01	3.45E-24	1.72E+00
Total		1.16E+01	3.30E-02	2.06E-05	1.89E-01	3.45E-24	1.72E+00

Source: 2		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	7.54E-01	8.47E-03	5.29E-06	4.86E-02	8.84E-25	4.41E-01
Total		7.54E-01	8.47E-03	5.29E-06	4.86E-02	8.84E-25	4.41E-01

Source: 3		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	7.54E-01	8.47E-03	5.29E-06	4.86E-02	8.84E-25	4.41E-01
Total		7.54E-01	8.47E-03	5.29E-06	4.86E-02	8.84E-25	4.41E-01

Source: 4		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	7.54E-01	8.47E-03	5.29E-06	4.86E-02	8.84E-25	4.41E-01
Total		7.54E-01	8.47E-03	5.29E-06	4.86E-02	8.84E-25	4.41E-01

Source: 5		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	7.54E-01	8.47E-03	5.29E-06	4.86E-02	8.84E-25	4.41E-01
Total		7.54E-01	8.47E-03	5.29E-06	4.86E-02	8.84E-25	4.41E-01

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 16 \*\*

Title : 281 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

Evaluation Time: 0.00000000E+00 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	1.22E-01	1.22E-01
AM-241	6.24E-03	6.24E-03
NP-237	8.56E-10	8.56E-10
U-233	1.17E-16	1.17E-16
TH-229	3.45E-20	3.45E-20
AM-241		
AM-241	1.57E-01	1.57E-01
NP-237	3.21E-08	3.21E-08
U-233	5.83E-15	5.83E-15
TH-229	2.15E-18	2.15E-18
PU-240		
PU-240	5.44E-02	5.44E-02
U-236	1.21E-10	1.21E-10
TH-232	2.39E-20	2.39E-20
TH-228	1.37E-23	1.37E-23
RA-228	1.48E-22	1.48E-22
PU-239		
PU-239	5.44E-02	5.44E-02
U-235	4.69E-12	4.69E-12
PA-231	5.64E-16	5.64E-16
AC-227	9.95E-18	9.95E-18
PU-238		
PU-238	1.45E-01	1.45E-01
U-234	3.81E-08	3.81E-08
TH-230	2.62E-13	2.62E-13
RA-226	4.01E-17	4.01E-17
PB-210	4.43E-19	4.43E-19
CS-137		
CS-137	1.16E+01	1.16E+01
CS-134		
CS-134	1.02E-02	1.02E-02
SR-90		
SR-90	3.34E-01	3.34E-01
CO-60		
CO-60	1.05E+00	1.05E+00

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 17 \*\*

Title : 281 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

Evaluation Time: 0.00000000E+00 years

Source: 2

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.13E-02	3.13E-02
AM-241	1.59E-03	1.59E-03
NP-237	2.15E-10	2.15E-10
U-233	2.99E-17	2.99E-17
TH-229	8.71E-21	8.71E-21
AM-241		
AM-241	4.00E-02	4.00E-02
NP-237	8.06E-09	8.06E-09
U-233	1.49E-15	1.49E-15
TH-229	5.43E-19	5.43E-19
PU-240		
PU-240	1.39E-02	1.39E-02
U-236	3.09E-11	3.09E-11
TH-232	6.13E-21	6.13E-21
TH-228	2.40E-24	2.40E-24
RA-228	2.69E-23	2.69E-23
PU-239		
PU-239	1.39E-02	1.39E-02
U-235	1.06E-12	1.06E-12
PA-231	1.44E-16	1.44E-16
AC-227	2.53E-18	2.53E-18
PU-238		
PU-238	3.72E-02	3.72E-02
U-234	9.75E-09	9.75E-09
TH-230	6.70E-14	6.70E-14
RA-226	6.40E-18	6.40E-18
PB-210	1.13E-19	1.13E-19
CS-137		
CS-137	9.59E-01	9.59E-01
CS-134		
CS-134	7.54E-04	7.54E-04
SR-90		
SR-90	8.37E-02	8.37E-02
CO-60		
CO-60	7.05E-02	7.05E-02

Source: 3

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.13E-02	3.13E-02

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 18 \*\*

Title : 281 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

Evaluation Time: 0.00000000E+00 years

AM-241	1.59E-03	1.59E-03
NP-237	2.15E-10	2.15E-10
U-233	2.99E-17	2.99E-17
IH-229	8.71E-21	8.71E-21
AM-241		
AM-241	4.00E-02	4.00E-02
NP-237	8.06E-09	8.06E-09
U-233	1.49E-15	1.49E-15
IH-229	5.43E-19	5.43E-19
PU-240		
PU-240	1.39E-02	1.39E-02
U-236	3.09E-11	3.09E-11
IH-232	6.13E-21	6.13E-21
IH-228	2.40E-24	2.40E-24
RA-228	2.69E-23	2.69E-23
PU-239		
PU-239	1.39E-02	1.39E-02
U-235	1.06E-12	1.06E-12
PA-231	1.44E-16	1.44E-16
AC-227	2.53E-18	2.53E-18
PU-238		
PU-238	3.72E-02	3.72E-02
U-234	9.75E-09	9.75E-09
IH-230	6.70E-14	6.70E-14
RA-226	6.40E-18	6.40E-18
PB-210	1.13E-19	1.13E-19
CS-137		
CS-137	9.59E-01	9.59E-01
CS-134		
CS-134	7.54E-04	7.54E-04
SR-90		
SR-90	8.37E-02	8.37E-02
CO-60		
CO-60	7.05E-02	7.05E-02

Source: 4

Nuclide	Receptor	Total
1		
PU-241		
PU-241	3.13E-02	3.13E-02
AM-241	1.59E-03	1.59E-03
NP-237	2.15E-10	2.15E-10
U-233	2.99E-17	2.99E-17
IH-229	8.71E-21	8.71E-21
AM-241		
AM-241	4.00E-02	4.00E-02
NP-237	8.06E-09	8.06E-09
U-233	1.49E-15	1.49E-15
IH-229	5.43E-19	5.43E-19

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 19 \*\*

Title : 281 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

Evaluation Time: 0.00000000E+00 years

PU-240		
PU-240	1.39E-02	1.39E-02
U-236	3.09E-11	3.09E-11
TH-232	6.13E-21	6.13E-21
TH-228	2.40E-24	2.40E-24
RA-228	2.69E-23	2.69E-23
PU-239		
PU-239	1.39E-02	1.39E-02
U-235	1.06E-12	1.06E-12
PA-231	1.44E-16	1.44E-16
AC-227	2.53E-18	2.53E-18
PU-238		
PU-238	3.72E-02	3.72E-02
U-234	9.75E-09	9.75E-09
TH-230	6.70E-14	6.70E-14
RA-226	6.40E-18	6.40E-18
PB-210	1.13E-19	1.13E-19
CS-137		
CS-137	9.59E-01	9.59E-01
CS-134		
CS-134	7.54E-04	7.54E-04
SR-90		
SR-90	8.37E-02	8.37E-02
CO-60		
CO-60	7.05E-02	7.05E-02

Source: 5

Naclide	Receptor	Total
1		
PU-241		
PU-241	3.13E-02	3.13E-02
AM-241	1.59E-03	1.59E-03
NP-237	2.15E-10	2.15E-10
U-233	2.99E-17	2.99E-17
TH-229	8.71E-21	8.71E-21
AM-241		
AM-241	4.00E-02	4.00E-02
NP-237	8.06E-09	8.06E-09
U-233	1.49E-15	1.49E-15
TH-229	5.43E-19	5.43E-19
PU-240		
PU-240	1.39E-02	1.39E-02
U-236	3.09E-11	3.09E-11
TH-232	6.13E-21	6.13E-21
TH-228	2.40E-24	2.40E-24
RA-228	2.69E-23	2.69E-23
PU-239		
PU-239	1.39E-02	1.39E-02
U-235	1.06E-12	1.06E-12



TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 20 \*\*

Title : 281 m2 room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld

Evaluation Time: 0.00000000E+00 years

PA-231	1.44E-16	1.44E-16
AC-227	2.53E-18	2.53E-18
PU-238		
PU-238	3.72E-02	3.72E-02
U-234	9.75E-09	9.75E-09
IH-230	6.70E-14	6.70E-14
RA-226	6.40E-18	6.40E-18
PB-210	1.13E-19	1.13E-19
CS-137		
CS-137	9.59E-01	9.59E-01
CS-134		
CS-134	7.54E-04	7.54E-04
SR-90		
SR-90	8.37E-02	8.37E-02
CO-60		
CO-60	7.05E-02	7.05E-02

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:22:09 Page: 21 \*\*  
Title : 281 m2 room  
Input File : C:\Program Files\RESRAD\_Family\BUILD\site6.bld  
Full Summary

=====

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=====

RESRAD-BUILD Dose (Time) Tables

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Receptor Dose Received for the Exposure Duration

(mrem)

Evaluation Time [yr]

0.00E+00  
-----  
1 1.86E+01

Receptor Dose/Yr Averaged Over Exposure Duration

(mrem/yr)

Evaluation Time [yr]

0.00E+00  
-----  
1 1.86E+01

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:43:02 Page: 1 \*\*

Title : 319 m2 Area

Input File : C:\Program Files\RESRAD\_Family\BUILD\319m2area.bld

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\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:43:02 Page: 2 \*\*

Title : 319 m2 Area

Input File : C:\Program Files\RESRAD\_Family\BUILD\319m2area.bld

=====

RESRAD-BUILD Input Parameters

=====

Number of Sources : 1  
 Number of Receptors: 1  
 Total Time : 3.650000E+02 days  
 Fraction Inside : 2.670000E-01

===== Receptor Information =====

Receptor	Room	x [m]	y [m]	z [m]	FracTime	Inhalation [m3/day]	Ingestion(Dust) [m2/hr]
1	1	8.930	8.930	1.000	1.000	3.57E+01	1.61E-04

===== Receptor-Source Shielding Relationship =====

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:43:02 Page: 3 \*\*

Title : 319 m<sup>2</sup> Area

Input File : C:\Program Files\RESRAD\_Family\BUILD\319m2area.bld

=====  
Building Information  
=====

Building Air Exchange Rate: 8.35E-01 1/hr

Height [m]	Air Exchanges [m <sup>3</sup> /hr]	
Area [m <sup>2</sup> ]		
	*****	
	*	*
	*	*
	*	*
H1: 3.890	Room 1	←Q01: 1.04E+03
	LAMBDA: 8.35E-01	Q10 : 1.04E+03
Area 319.000	*	*
	*	*
	*****	

Deposition velocity: 4.78E-04 [m/s]    Resuspension Rate: 1.33E-09 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:43:02 Page: 4 \*\*  
 Title : 319 m2 Area  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\319m2area.bld

==== Source Information =====

Source: 1

Location:: Room : 1 x: 8.93 y: 8.93 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:1.79E+01 Width[m]:1.79E+01 Direction: x  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]  
 Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
FR-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.823E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:43:02 Page: 5 \*\*

Title : 319 m2 Area

Input File : C:\Program Files\RESRAD\_Family\BUILD\319m2area.bld

Evaluation Time: 0.00000000E+00 years

```

=====
Assessment for Time: 1
Time =0.00E+00 yr
=====
    
```

----- Source Information -----

Source: 1

Location:: Room : 1 x: 8.93 y: 8.93 z: 0.00 [m]  
 Geometry:: Type: Area Length[m]:1.79E+01 Width[m]:1.79E+01 Direction: x  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04





\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:43:02 Page: 7 \*\*

Title : 319 m2 Area

Input File : C:\Program Files\RESRAD\_Family\BUILD\319m2area.bld

Evaluation Time: 0.00000000E+00 years

Pathway Detail of Doses

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1.41E+01	3.25E-02	1.67E-05	1.50E-01	2.80E-24	3.74E+00
Total	1.41E+01	3.25E-02	1.67E-05	1.50E-01	2.80E-24	3.74E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:43:02 Page: 8 \*\*  
 Title : 319 m<sup>2</sup> Area  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\319m2area.bld  
 Evaluation Time: 0.0000000E+00 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	2.21E-01	2.21E-01
AM-241	1.02E-02	1.02E-02
NP-237	1.38E-09	1.38E-09
U-233	1.40E-16	1.40E-16
TH-229	4.02E-20	4.02E-20
AM-241		
AM-241	2.57E-01	2.57E-01
NP-237	5.18E-08	5.18E-08
U-233	7.01E-15	7.01E-15
TH-229	2.51E-18	2.51E-18
PU-240		
PU-240	8.85E-02	8.85E-02
U-236	1.45E-10	1.45E-10
TH-232	2.71E-20	2.71E-20
TH-228	1.86E-23	1.86E-23
RA-228	2.74E-22	2.74E-22
PU-239		
PU-239	8.85E-02	8.85E-02
U-235	5.67E-12	5.67E-12
PA-231	9.18E-16	9.18E-16
AC-227	1.33E-17	1.33E-17
PU-238		
PU-238	2.45E-01	2.45E-01
U-234	4.59E-08	4.59E-08
TH-230	2.97E-13	2.97E-13
RA-226	6.50E-17	6.50E-17
PB-210	9.70E-19	9.70E-19
CS-137		
CS-137	1.52E+01	1.52E+01
CS-134		
CS-134	1.30E-02	1.30E-02
SR-90		
SR-90	7.08E-01	7.08E-01
CO-60		
CO-60	1.29E+00	1.29E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:43:02 Page: 9 \*\*

Title : 319 m2 Area

Input File : C:\Program Files\RESRAD\_Family\BUILD\319m2area.bld

Full Summary

```

=====
=====
=====
RESRAD-BUILD Dose (Time) Tables
=====
=====
=====

```

Receptor Dose Received for the Exposure Duration

(mrem)

Evaluation Time [yr]

0.00E+00

1 1.81E+01

Receptor Dose/Yr Averaged Over Exposure Duration

(mrem/yr)

Evaluation Time [yr]

0.00E+00

1 1.81E+01

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 1 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\sitel.bld

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**RESRAD-BUILD Table of Contents**

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\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 2 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\sitel.bld

```

=====
=====
=====
RESRAD-BUILD Input Parameters
=====
=====
=====
    
```

Number of Sources : 5  
 Number of Receptors: 1  
 Total Time : 3.650000E+02 days  
 Fraction Inside : 2.670000E-01

===== Receptor Information =====

Receptor	Room	x [m]	y [m]	z [m]	FracTime	Inhalation [m3/day]	Ingestion(Dust) [m2/hr]
1	1	5.850	5.850	1.000	1.000	3.57E+01	1.61E-04

===== Receptor-Source Shielding Relationship =====

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete
1	2	2.40E+00	0.00E+00	Concrete
1	3	2.40E+00	0.00E+00	Concrete
1	4	2.40E+00	0.00E+00	Concrete
1	5	2.40E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 3 \*\*  
Title : 319 m2 Room  
Input File : C:\Program Files\RESRAD\_Family\BUILD\sitel.bld

===== Building Information =====

Building Air Exchange Rate: 8.35E-01 1/hr

Height[m]	Air Exchanges [m3/hr]	
Area [m2]		
	*****	
	*	*
	*	*
	*	←Q01: 4.45E+02
H1: 3.890	* Room 1	* Q10 : 4.45E+02
	* LAMBDA: 8.35E-01	*
Area 137.000	*	*
	*	*
	*****	

Deposition velocity: 4.78E-04 [m/s]    Resuspension Rate: 1.33E-09 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 4 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site1.bld

==== Source Information =====

Source: 1

Location:: Room : 1 x: 5.85 y: 5.85 z: 0.00[m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:1.17E+01 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 5 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\sitel.bld

Source: 2

Location:: Room : 1 x: 0.00 y: 5.85 z: 0.00[m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.89E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: ICRP 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
Pu-241	2.420E+05	3.081E-05	3.716E-03	1.151E-06
Am-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
Pu-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
Pu-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
Pu-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
Np-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
Pa-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
Th-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
Th-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
Th-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
Th-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
Ac-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
Ra-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
Ra-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
Pb-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
Cs-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
Cs-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
Sr-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
Co-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03



TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 6 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\sitel\_bld

Source: 3

Location:: Room : 1 x: 5.85 y: 0.00 z: 0.00[m]  
Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.89E+00 Direction: y  
Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]  
Fraction released to air: 5.170E-01  
Removable fraction: 1.000E-01  
Time to Remove: 5.260E+04 [day]  
Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: ICRP 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.276E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.776E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
EB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 7 \*\*  
 Title : 319 m2 Room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site1.bld

Source: 4

Location:: Room : 1 x: 11.70 y: 5.85 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.89E+00 Direction: x  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]  
 Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.804E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 8 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\sitel.bld

Source: 5

Location:: Room : 1 x: 5.85 y: 11.70 z: 0.00[m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.89E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
FU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.800E+03	1.640E-03	2.000E-01	4.304E-05
FU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
FU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
FU-238	5.840E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
FR-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.487E-05	1.484E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 9 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\sitel.bld

Evaluation Time: 0.0000000E+00 years

```

=====
-----
Assessment for Time: 1
Time =0.00E+00 yr
-----
=====
    
```

----- Source Information -----

Source: 1

Location:: Room : 1 x: 5.85 y: 5.85 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:1.17E+01 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	Pu-241	2.420E+05
	Am-241	4.800E+03
	Pu-240	1.700E+03
	Pu-239	1.700E+03
	Pu-238	5.340E+03
	Np-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	Pa-231	0.000E+00
	Th-232	0.000E+00
	Th-230	0.000E+00
	Th-229	0.000E+00
	Th-228	0.000E+00
	Ac-227	0.000E+00
	Ra-228	0.000E+00
	Ra-226	0.000E+00
	Pb-210	0.000E+00
	Cs-137	3.820E+06
	Cs-134	1.500E+03
	Sr-90	3.800E+05
	Co-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 10 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD Family\BUILD\sitel.bld

Evaluation Time: 0.00000000E+00 years

Source: 2

Location:: Room : 1 x: 0.00 y: 5.85 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.89E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	FU-241	2.420E+05
	AM-241	4.800E+03
	FU-240	1.700E+03
	FU-239	1.700E+03
	FU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	FR-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 11 \*\*  
 Title : 319 m2 Room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site1.bld  
 Evaluation Time: 0.00000000E+00 years

Source: 3

Location:: Room : 1 x: 5.85 y: 0.00 z: 0.00 [m]  
 Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.89E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	FR-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 12 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\sitel.bld

Evaluation Time: 0.00000000E+00 years

Source: 4

Location:: Room : 1 x: 11.70 y: 5.85 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.89E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 13 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site1.bld

Evaluation Time: 0.00000000E+00 years

Source: 5

Location:: Room : 1 x: 5.85 y: 11.70 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.17E+01 Width[m]:3.89E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.800E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04



\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 14 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\sitel.bld

Evaluation Time: 0.00000000E+00 years

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**RESRAD-BUILD Dose Tables**

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**Source Contributions to Receptor Doses**

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Total
Receptor 1	1.35E+01	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.98E+01
Total	1.35E+01	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.98E+01

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 15 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\sitel.bld

Evaluation Time: 0.00000000E+00 years

Pathway Detail of Doses

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1.16E+01	2.67E-02	1.67E-05	1.49E-01	2.80E-24	1.69E+00
Total	1.16E+01	2.67E-02	1.67E-05	1.49E-01	2.80E-24	1.69E+00

Source: 2

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	9.67E-01	8.87E-03	5.56E-06	4.97E-02	9.31E-25	5.61E-01
Total	9.67E-01	8.87E-03	5.56E-06	4.97E-02	9.31E-25	5.61E-01

Source: 3

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	9.67E-01	8.87E-03	5.56E-06	4.97E-02	9.31E-25	5.61E-01
Total	9.67E-01	8.87E-03	5.56E-06	4.97E-02	9.31E-25	5.61E-01

Source: 4

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	9.67E-01	8.87E-03	5.56E-06	4.97E-02	9.31E-25	5.61E-01
Total	9.67E-01	8.87E-03	5.56E-06	4.97E-02	9.31E-25	5.61E-01

Source: 5

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	9.67E-01	8.87E-03	5.56E-06	4.97E-02	9.31E-25	5.61E-01
Total	9.67E-01	8.87E-03	5.56E-06	4.97E-02	9.31E-25	5.61E-01

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 16 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD Family\BUILD\site1.bld

Evaluation Time: 0.00000000E+00 years

Nuclide Detail of Doses

[urem]

Source: 1

Nuclide	Receptor	Total
	1	
PU-241		
FU-241	1.15E-01	1.15E-01
AM-241	5.62E-03	5.62E-03
NP-237	7.70E-10	7.70E-10
U-233	9.74E-17	9.74E-17
TH-229	2.87E-20	2.87E-20
AM-241		
AM-241	1.41E-01	1.41E-01
NP-237	2.89E-08	2.89E-08
U-233	4.87E-15	4.87E-15
TH-229	1.79E-18	1.79E-18
PU-240		
FU-240	4.88E-02	4.88E-02
U-236	1.01E-10	1.01E-10
TH-232	1.97E-20	1.97E-20
TH-228	1.30E-23	1.30E-23
RA-228	1.47E-22	1.47E-22
PU-239		
FU-239	4.88E-02	4.88E-02
U-235	4.04E-12	4.04E-12
PA-231	5.06E-16	5.06E-16
AC-227	8.74E-18	8.74E-18
PU-238		
FU-238	1.32E-01	1.32E-01
U-234	3.18E-08	3.18E-08
TH-230	2.16E-13	2.16E-13
RA-226	3.92E-17	3.92E-17
PB-210	4.35E-19	4.35E-19
CS-137		
CS-137	1.16E+01	1.16E+01
CS-134		
CS-134	1.02E-02	1.02E-02
SR-90		
SR-90	3.27E-01	3.27E-01
CO-60		
CO-60	1.05E+00	1.05E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 17 \*\*  
 Title : 319 m2 Room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\site1.bld  
 Evaluation Time: 0.00000000E+00 years

Source: 2

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.81E-02	3.81E-02
AM-241	1.86E-03	1.86E-03
NP-237	2.50E-10	2.50E-10
U-233	3.23E-17	3.23E-17
TH-229	9.37E-21	9.37E-21
AM-241		
AM-241	4.67E-02	4.67E-02
NP-237	9.38E-09	9.38E-09
U-233	1.62E-15	1.62E-15
TH-229	5.84E-19	5.84E-19
PU-240		
PU-240	1.62E-02	1.62E-02
U-236	3.34E-11	3.34E-11
TH-232	6.56E-21	6.56E-21
TH-228	2.87E-24	2.87E-24
RA-228	3.46E-23	3.46E-23
PU-239		
PU-239	1.62E-02	1.62E-02
U-235	1.16E-12	1.16E-12
PA-231	1.68E-16	1.68E-16
AC-227	2.88E-18	2.88E-18
PU-238		
PU-238	4.40E-02	4.40E-02
U-234	1.06E-08	1.06E-08
TH-230	7.17E-14	7.17E-14
RA-226	7.99E-18	7.99E-18
PB-210	1.45E-19	1.45E-19
CS-137		
CS-137	1.23E+00	1.23E+00
CS-134		
CS-134	9.69E-04	9.69E-04
SR-90		
SR-90	1.06E-01	1.06E-01
CO-60		
CO-60	9.04E-02	9.04E-02

Source: 3

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.81E-02	3.81E-02

**\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 18 \*\***

**Title : 319 m<sup>2</sup> Room**

**Input File : C:\Program Files\RESRAD Family\BUILD\site1.bld**

**Evaluation Time: 0.00000000E+00 years**

AM-241	1.86E-03	1.86E-03
NP-237	2.50E-10	2.50E-10
U-233	3.23E-17	3.23E-17
TH-229	9.37E-21	9.37E-21
AM-241		
AM-241	4.67E-02	4.67E-02
NP-237	9.38E-09	9.38E-09
U-233	1.62E-15	1.62E-15
TH-229	5.84E-19	5.84E-19
PU-240		
PU-240	1.62E-02	1.62E-02
U-236	3.34E-11	3.34E-11
TH-232	6.56E-21	6.56E-21
TH-228	2.87E-24	2.87E-24
RA-228	3.46E-23	3.46E-23
PU-239		
PU-239	1.62E-02	1.62E-02
U-235	1.16E-12	1.16E-12
PA-231	1.68E-16	1.68E-16
AC-227	2.88E-18	2.88E-18
PU-238		
PU-238	4.40E-02	4.40E-02
U-234	1.06E-08	1.06E-08
TH-230	7.17E-14	7.17E-14
RA-226	7.99E-18	7.99E-18
FB-210	1.45E-19	1.45E-19
CS-137		
CS-137	1.23E+00	1.23E+00
CS-134		
CS-134	9.69E-04	9.69E-04
SR-90		
SR-90	1.06E-01	1.06E-01
CO-60		
CO-60	9.04E-02	9.04E-02

Source: 4

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.81E-02	3.81E-02
AM-241	1.86E-03	1.86E-03
NP-237	2.50E-10	2.50E-10
U-233	3.23E-17	3.23E-17
TH-229	9.37E-21	9.37E-21
AM-241		
AM-241	4.67E-02	4.67E-02
NP-237	9.38E-09	9.38E-09
U-233	1.62E-15	1.62E-15
TH-229	5.84E-19	5.84E-19

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 19 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD Family\BUILD\sitel.bld

Evaluation Time: 0.0000000E+00 years

PU-240		
FU-240	1.62E-02	1.62E-02
U-236	3.34E-11	3.34E-11
TH-232	6.56E-21	6.56E-21
TH-228	2.87E-24	2.87E-24
RA-228	3.46E-23	3.46E-23
PU-239		
FU-239	1.62E-02	1.62E-02
U-235	1.16E-12	1.16E-12
PA-231	1.68E-16	1.68E-16
AC-227	2.88E-18	2.88E-18
PU-238		
FU-238	4.40E-02	4.40E-02
U-234	1.06E-08	1.06E-08
TH-230	7.17E-14	7.17E-14
RA-226	7.99E-18	7.99E-18
PB-210	1.45E-19	1.45E-19
CS-137		
CS-137	1.23E+00	1.23E+00
CS-134		
CS-134	9.69E-04	9.69E-04
SR-90		
SR-90	1.06E-01	1.06E-01
CO-60		
CO-60	9.04E-02	9.04E-02

Source: 5

Nuclide	Receptor	Total
	1	
PU-241		
FU-241	3.81E-02	3.81E-02
AM-241	1.86E-03	1.86E-03
NP-237	2.50E-10	2.50E-10
U-233	3.23E-17	3.23E-17
TH-229	9.37E-21	9.37E-21
AM-241		
AM-241	4.67E-02	4.67E-02
NP-237	9.38E-09	9.38E-09
U-233	1.62E-15	1.62E-15
TH-229	5.84E-19	5.84E-19
PU-240		
FU-240	1.62E-02	1.62E-02
U-236	3.34E-11	3.34E-11
TH-232	6.56E-21	6.56E-21
TH-228	2.87E-24	2.87E-24
RA-228	3.46E-23	3.46E-23
PU-239		
FU-239	1.62E-02	1.62E-02
U-235	1.16E-12	1.16E-12

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

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\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 20 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD Family\BUILD\sitel.bld

Evaluation Time: 0.00000000E+00 years

PA-231	1.68E-16	1.68E-16
AC-227	2.88E-18	2.88E-18
PU-238		
FU-238	4.40E-02	4.40E-02
U-234	1.06E-08	1.06E-08
TH-230	7.17E-14	7.17E-14
RA-226	7.99E-18	7.99E-18
PB-210	1.45E-19	1.45E-19
CS-137		
CS-137	1.23E+00	1.23E+00
CS-134		
CS-134	9.69E-04	9.69E-04
SR-90		
SR-90	1.06E-01	1.06E-01
CO-60		
CO-60	9.04E-02	9.04E-02

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 14:51:06 Page: 21 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\site1.bld

Full Summary

```

=====
=====
RESRAD-BUILD Dose (Time) Tables
=====
=====

```

Receptor Dose Received for the Exposure Duration

(mrem)

Evaluation Time [yr]

0.00E+00

1 1.98E+01

Receptor Dose/Yr Averaged Over Exposure Duration

(mrem/yr)

Evaluation Time [yr]

0.00E+00

1 1.98E+01



**\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 1 \*\***

**Title : 319 m2 Room**

**Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld**

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**RESRAD-BUILD Table of Contents**

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\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 2 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling\_bld

```

=====
=====
RESRAD-BUILD Input Parameters
=====
=====
    
```

```

Number of Sources : 6
Number of Receptors: 1
Total Time : 3.650000E+02 days
Fraction Inside : 2.670000E-01
    
```

===== Receptor Information =====

Receptor	Room	x [m]	y [m]	z [m]	FracTime	Inhalation [m3/day]	Ingestion(Dust) [m2/hr]
1	1	5.000	5.000	1.000	1.000	3.57E+01	1.61E-04

===== Receptor-Source Shielding Relationship =====

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete
1	2	2.40E+00	0.00E+00	Concrete
1	3	2.40E+00	0.00E+00	Concrete
1	4	2.40E+00	0.00E+00	Concrete
1	5	2.40E+00	0.00E+00	Concrete
1	6	2.40E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 3 \*\*  
Title : 319 m2 Room  
Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bl

===== Building Information =====

Building Air Exchange Rate: 8.35E-01 1/hr

Height [m]	Air Exchanges [m3/hr]	
Area [m2]		
	*****	
	*	*
	*	*
	*	*
H1: 3.000	* Room 1	* ← Q01: 2.50E+02
	* LAMBDA: 8.35E-01	* Q10 : 2.50E+02
Area 100.000	*	*
	*	*
	*****	

Deposition velocity: 4.78E-04 [m/s] Resuspension Rate: 1.33E-09 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 4 \*\*  
 Title : 319 m2 Room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld

==== Source Information =====

Source: 1

Location:: Room : 1 x: 5.00 y: 5.00 z: 0.00[m]  
 Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:1.00E+01 Direction: z  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]  
 Radon Release Fraction: 0.000E+00

Contamination::

Naclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.770E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.887E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 5 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld

Source: 2

Location:: Room : 1 x: 0.00 y: 5.00 z: 0.00[m]  
Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: x  
Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]  
Fraction released to air: 5.170E-01  
Removable fraction: 1.000E-01  
Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: ICRP 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.770E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.856E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
BB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 6 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld

Source: 3

Location:: Room : 1 x: 5.00 y: 0.00 z: 0.00[m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Naclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.770E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.276E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 7 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld

Source: 4

Location:: Room : 1 x: 10.00 y: 5.00 z: 0.00[m]  
Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: x  
Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]  
Fraction released to air: 5.170E-01  
Removable fraction: 1.000E-01  
Time to Remove: 5.280E+04 [day]  
  
Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: ICR 13 Morbidity

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
FU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.770E+03	1.640E-03	2.000E-01	4.304E-05
FU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
FU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
FU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 8 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld

Source: 5

Location:: Room : 1 x: 5.00 y: 10.00 z: 0.00[m]  
Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FCR 13 Morbidity)

	[dpm/m2]	Ingestion [rem/dpm]	Inhalation [rem/dpm]	Submersion [rem/yr/ (dpm/m3)]
FU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.770E+03	1.640E-03	2.000E-01	4.304E-05
FU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
FU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
FU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
U-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.327E-01	4.528E-07
TH-230	0.000E+00	2.468E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
PA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
PA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03



\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 9 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling\_bld

Source: 6

Location:: Room : 1 x: 5.00 y: 10.00 z: 3.00[m]  
Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:1.00E+01 Direction: z  
Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]  
Fraction released to air: 5.170E-01  
Removable fraction: 1.000E-01  
Time to Remove: 5.280E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[dpm/m2]	Ingestion [mrem/dpm]	Inhalation [mrem/dpm]	Submersion [mrem/yr/ (dpm/m3)]
PU-241	2.420E+05	3.081E-05	3.716E-03	1.151E-08
AM-241	4.770E+03	1.640E-03	2.000E-01	4.304E-05
PU-240	1.700E+03	1.595E-03	1.932E-01	2.499E-07
PU-239	1.700E+03	1.595E-03	1.932E-01	2.231E-07
PU-238	5.340E+03	1.441E-03	1.766E-01	2.567E-07
NP-237	0.000E+00	2.002E-03	2.432E-01	5.461E-04
U-236	0.000E+00	1.212E-04	5.631E-02	2.636E-07
U-235	0.000E+00	1.204E-04	5.541E-02	4.063E-04
U-234	0.000E+00	1.275E-04	5.946E-02	4.014E-07
V-233	0.000E+00	1.302E-04	6.081E-02	8.576E-07
PA-231	0.000E+00	4.775E-03	5.766E-01	9.049E-05
TH-232	0.000E+00	1.230E-03	7.387E-01	4.588E-07
TH-230	0.000E+00	2.462E-04	1.468E-01	9.155E-07
TH-229	0.000E+00	1.814E-03	9.768E-01	7.842E-04
TH-228	0.000E+00	3.642E-04	1.556E-01	4.224E-03
AC-227	0.000E+00	6.665E-03	3.029E+00	9.734E-04
RA-228	0.000E+00	6.496E-04	2.287E-03	2.515E-03
RA-226	0.000E+00	5.950E-04	3.871E-03	4.663E-03
PB-210	0.000E+00	2.422E-03	6.214E-03	4.698E-06
CS-137	3.820E+06	2.252E-05	1.437E-05	1.434E-03
CS-134	1.500E+03	3.302E-05	2.081E-05	3.983E-03
SR-90	3.800E+05	6.883E-05	5.894E-04	1.039E-05
CO-60	9.430E+04	1.212E-05	9.865E-05	6.629E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 10 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld

Evaluation Time: 0.00000000E+00 years

```

=====
Assesment for Time: 1
Time =0.00E+00 yr
=====

```

=====  
Source Information  
=====

Source: 1

Location:: Room : 1 x: 5.00 y: 5.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:1.00E+01 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 6.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.770E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	HP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	FB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 11 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld

Evaluation Time: 0.00000000E+00 years

Source: 2

Location:: Room : 1 x: 0.00 y: 5.00 z: 0.00 [m]  
 Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: x  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.770E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 12 \*\*  
 Title : 319 m2 Room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld  
 Evaluation Time: 0.00000000E+00 years

Source: 3

Location:: Room : 1 x: 5.00 y: 0.00 z: 0.00 [m]  
 Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 3.450E-07 [1/hr]  
 Fraction released to air: 5.170E-01  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.770E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	FR-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 13 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.kld

Evaluation Time: 0.00000000E+00 years

Source: 4

Location:: Room : 1 x: 10.00 y: 5.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: x

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.770E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-226	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	8.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 14 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD Family\BUILD\room+ceiling.bld

Evaluation Time: 0.00000000E+00 years

Source: 5

Location:: Room : 1 x: 5.00 y: 10.00 z: 0.00 [m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:3.00E+00 Direction: y

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.770E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 15 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld

Evaluation Time: 0.00000000E+00 years

Source: 6

Location:: Room : 1 x: 5.00 y: 10.00 z: 3.00 [m]

Geometry:: Type: Area Length[m]:1.00E+01 Width[m]:1.00E+01 Direction: z

Pathway ::

Direct Ingestion Rate: 3.450E-07 [1/hr]

Fraction released to air: 5.170E-01

Removable fraction: 1.000E-01

Time to Remove: 5.280E+04 [day]

Contamination::	Nuclide	Concentration [dpm/m2]
	PU-241	2.420E+05
	AM-241	4.770E+03
	PU-240	1.700E+03
	PU-239	1.700E+03
	PU-238	5.340E+03
	NP-237	0.000E+00
	U-236	0.000E+00
	U-235	0.000E+00
	U-234	0.000E+00
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	CS-137	3.820E+06
	CS-134	1.500E+03
	SR-90	3.800E+05
	CO-60	9.430E+04

**\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 16 \*\***  
**Title : 319 m2 Room**  
**Input File : C:\Program Files\RESRAD Family\BUILD\room+ceiling.bld**  
**Evaluation Time: 0.0000000E+00 years**

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**RESRAD-BUILD Dose Tables**

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**Source Contributions to Receptor Doses**

[mrem]

	Source	Source	Source	Source	Source	Source	Total
	1	2	3	4	5	6	
Receptor 1	1.22E+01	1.33E+00	1.33E+00	1.33E+00	1.33E+00	5.63E+00	2.31E+01
Total	1.22E+01	1.33E+00	1.33E+00	1.33E+00	1.33E+00	5.63E+00	2.31E+01



\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 17 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld

Evaluation Time: 0.00000000E+00 years

Pathway Detail of Doses

[mrem]

Source: 1		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	1.07E+01	3.03E-02	2.07E-05	1.89E-01	3.45E-24	1.30E+00
Total		1.07E+01	3.03E-02	2.07E-05	1.89E-01	3.45E-24	1.30E+00

Source: 2		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	8.71E-01	9.10E-03	6.20E-06	5.68E-02	1.04E-24	3.91E-01
Total		8.71E-01	9.10E-03	6.20E-06	5.68E-02	1.04E-24	3.91E-01

Source: 3		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	8.71E-01	9.10E-03	6.20E-06	5.68E-02	1.04E-24	3.91E-01
Total		8.71E-01	9.10E-03	6.20E-06	5.68E-02	1.04E-24	3.91E-01

Source: 4		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	8.71E-01	9.10E-03	6.20E-06	5.68E-02	1.04E-24	3.91E-01
Total		8.71E-01	9.10E-03	6.20E-06	5.68E-02	1.04E-24	3.91E-01

Source: 5		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	8.71E-01	9.10E-03	6.20E-06	5.68E-02	1.04E-24	3.91E-01
Total		8.71E-01	9.10E-03	6.20E-06	5.68E-02	1.04E-24	3.91E-01

Source: 6		External	Deposition	Immersion	Inhalation	Radon	Ingestion
Receptor	1	4.10E+00	3.03E-02	2.07E-05	1.89E-01	3.45E-24	1.30E+00
Total		4.10E+00	3.03E-02	2.07E-05	1.89E-01	3.45E-24	1.30E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 18 \*\*  
 Title : 319 m2 Room  
 Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld  
 Evaluation Time: 0.00000000E+00 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	1.00E-01	1.00E-01
AM-241	5.31E-03	5.31E-03
HP-237	7.31E-10	7.31E-10
U-233	1.08E-16	1.08E-16
TH-229	3.22E-20	3.22E-20
AM-241		
AM-241	1.33E-01	1.33E-01
HP-237	2.73E-08	2.73E-08
U-233	5.36E-15	5.36E-15
TH-229	1.99E-18	1.99E-18
PU-240		
PU-240	4.63E-02	4.63E-02
U-236	1.12E-10	1.12E-10
TH-232	2.24E-20	2.24E-20
TH-228	1.23E-23	1.23E-23
RA-228	1.20E-22	1.20E-22
PU-239		
PU-239	4.64E-02	4.64E-02
U-235	4.34E-12	4.34E-12
PA-231	4.81E-16	4.81E-16
AC-227	9.03E-18	9.03E-18
PU-238		
PU-238	1.23E-01	1.23E-01
U-234	3.53E-08	3.53E-08
TH-230	2.45E-13	2.45E-13
RA-226	3.41E-17	3.41E-17
PB-210	3.34E-19	3.34E-19
CS-137		
CS-137	1.05E+01	1.05E+01
CS-134		
CS-134	9.29E-03	9.29E-03
SR-90		
SR-90	2.57E-01	2.57E-01
CO-60		
CO-60	9.60E-01	9.60E-01

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 19 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld

Evaluation Time: 0.00000000E+00 years

Source: 2

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.01E-02	3.01E-02
AM-241	1.58E-03	1.58E-03
NP-237	2.14E-10	2.14E-10
U-233	3.24E-17	3.24E-17
TH-229	9.51E-21	9.51E-21
AM-241		
AM-241	3.96E-02	3.96E-02
NP-237	8.00E-09	8.00E-09
U-233	1.61E-15	1.61E-15
TH-229	5.89E-19	5.89E-19
PU-240		
PU-240	1.39E-02	1.39E-02
U-236	3.35E-11	3.35E-11
TH-232	6.73E-21	6.73E-21
TH-228	2.54E-24	2.54E-24
RA-228	2.44E-23	2.44E-23
PU-239		
PU-239	1.39E-02	1.39E-02
U-235	1.15E-12	1.15E-12
PA-231	1.44E-16	1.44E-16
AC-227	2.69E-18	2.69E-18
PU-238		
PU-238	3.67E-02	3.67E-02
U-234	1.06E-08	1.06E-08
TH-230	7.35E-14	7.35E-14
RA-226	6.17E-18	6.17E-18
PB-210	1.00E-19	1.00E-19
CS-137		
CS-137	1.04E+00	1.04E+00
CS-134		
CS-134	8.35E-04	8.35E-04
SR-90		
SR-90	7.49E-02	7.49E-02
CO-60		
CO-60	8.05E-02	8.05E-02

Source: 3

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.01E-02	3.01E-02

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 20 +  
Title : 319 m2 Room  
Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld  
Evaluation Time: 0.00000000E+00 years

AM-241	1.58E-03	1.58E-03
NP-237	2.14E-10	2.14E-10
U-233	3.24E-17	3.24E-17
TH-229	9.51E-21	9.51E-21
AM-241		
AM-241	3.96E-02	3.96E-02
NP-237	8.00E-09	8.00E-09
U-233	1.61E-15	1.61E-15
TH-229	5.89E-19	5.89E-19
PU-240		
PU-240	1.39E-02	1.39E-02
U-236	3.35E-11	3.35E-11
TH-232	6.73E-21	6.73E-21
TH-228	2.54E-24	2.54E-24
PA-228	2.44E-23	2.44E-23
PU-239		
PU-239	1.39E-02	1.39E-02
U-235	1.15E-12	1.15E-12
PA-231	1.44E-16	1.44E-16
AC-227	2.69E-18	2.69E-18
PU-238		
PU-238	3.67E-02	3.67E-02
U-234	1.06E-08	1.06E-08
TH-230	7.35E-14	7.35E-14
PA-226	6.17E-18	6.17E-18
PE-210	1.00E-19	1.00E-19
CS-137		
CS-137	1.04E+00	1.04E+00
CS-134		
CS-134	8.35E-04	8.35E-04
SR-90		
SR-90	7.49E-02	7.49E-02
CO-60		
CO-60	8.05E-02	8.05E-02

Source: 4

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.01E-02	3.01E-02
AM-241	1.58E-03	1.58E-03
NP-237	2.14E-10	2.14E-10
U-233	3.24E-17	3.24E-17
TH-229	9.51E-21	9.51E-21
AM-241		
AM-241	3.96E-02	3.96E-02
NP-237	8.00E-09	8.00E-09
U-233	1.61E-15	1.61E-15
TH-229	5.89E-19	5.89E-19

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 21 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD Family\BUILD\room+ceiling\_bld

Evaluation Time: 0.00000000E+00 years

PU-240		
PU-240	1.39E-02	1.39E-02
U-236	3.35E-11	3.35E-11
TH-232	6.73E-21	6.73E-21
TH-228	2.54E-24	2.54E-24
RA-228	2.44E-23	2.44E-23
PU-239		
PU-239	1.39E-02	1.39E-02
U-235	1.15E-12	1.15E-12
PA-231	1.44E-16	1.44E-16
AC-227	2.69E-18	2.69E-18
PU-238		
PU-238	3.67E-02	3.67E-02
U-234	1.06E-08	1.06E-08
TH-230	7.35E-14	7.35E-14
RA-226	6.17E-18	6.17E-18
PB-210	1.00E-19	1.00E-19
CS-187		
CS-187	1.04E+00	1.04E+00
CS-134		
CS-134	8.35E-04	8.35E-04
SR-90		
SR-90	7.49E-02	7.49E-02
CO-60		
CO-60	8.05E-02	8.05E-02

Source: 5

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	3.01E-02	3.01E-02
AM-241	1.58E-03	1.58E-03
NP-237	2.14E-10	2.14E-10
U-233	3.24E-17	3.24E-17
TH-229	9.51E-21	9.51E-21
AM-241		
AM-241	3.96E-02	3.96E-02
NP-237	8.00E-09	8.00E-09
U-233	1.61E-15	1.61E-15
TH-229	5.89E-19	5.89E-19
PU-240		
PU-240	1.39E-02	1.39E-02
U-236	3.35E-11	3.35E-11
TH-232	6.73E-21	6.73E-21
TH-228	2.54E-24	2.54E-24
RA-228	2.44E-23	2.44E-23
PU-239		
PU-239	1.39E-02	1.39E-02
U-235	1.15E-12	1.15E-12

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 22 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD Family\BUILD\room+ceiling\_bld

Evaluation Time: 0.00000000E+00 years

EA-231	1.44E-16	1.44E-16
AC-227	2.69E-18	2.69E-18
PU-238		
PU-238	3.67E-02	3.67E-02
U-234	1.06E-08	1.06E-08
TH-230	7.35E-14	7.35E-14
RA-226	6.17E-18	6.17E-18
PB-210	1.00E-19	1.00E-19
CS-137		
CS-137	1.04E+00	1.04E+00
CS-134		
CS-134	8.35E-04	8.35E-04
SR-90		
SR-90	7.49E-02	7.49E-02
CO-60		
CO-60	8.05E-02	8.05E-02

Source: 6

Nuclide	Receptor	Total
	1	
PU-241		
PU-241	1.00E-01	1.00E-01
AM-241	5.29E-03	5.29E-03
NP-237	7.17E-10	7.17E-10
U-233	1.08E-16	1.08E-16
TH-229	3.18E-20	3.18E-20
AM-241		
AM-241	1.32E-01	1.32E-01
NP-237	2.68E-08	2.68E-08
U-233	5.36E-15	5.36E-15
TH-229	1.97E-18	1.97E-18
PU-240		
PU-240	4.63E-02	4.63E-02
U-236	1.12E-10	1.12E-10
TH-232	2.24E-20	2.24E-20
TH-228	9.05E-24	9.05E-24
RA-228	8.74E-23	8.74E-23
PU-239		
PU-239	4.64E-02	4.64E-02
U-235	3.92E-12	3.92E-12
EA-231	4.80E-16	4.80E-16
AC-227	8.97E-18	8.97E-18
PU-238		
PU-238	1.22E-01	1.22E-01
U-234	3.52E-08	3.52E-08
TH-230	2.45E-13	2.45E-13
RA-226	2.27E-17	2.27E-17
PB-210	3.34E-19	3.34E-19
CS-137		

\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 23 \*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld

Evaluation Time: 0.00000000E+00 years

CS-137	4.54E+00	4.54E+00
CS-134		
CS-134	3.79E-03	3.79E-03
SR-90		
SR-90	2.51E-01	2.51E-01
CO-60		
CO-60	3.76E-01	3.76E-01

\*\*\* RESRAD-BUILD Dose Program Output, Version 3.3 02/21/06 15:14:05 Page: 24 \*\*\*

Title : 319 m2 Room

Input File : C:\Program Files\RESRAD\_Family\BUILD\room+ceiling.bld

Full Summary

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RESRAD-BUILD Dose (Time) Tables

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Receptor Dose Received for the Exposure Duration

(mrem)

Evaluation Time [yr]

0.00E+00

1 2.31E+01

Receptor Dose/Yr Averaged Over Exposure Duration

(mrem/yr)

Evaluation Time [yr]

0.00E+00

1 2.31E+01



**Attachment 8.3**

**Microshield Runs and Resulting Area Factors**

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

### Structure Surface Area Factors

#### Area Factors for 137 m<sup>2</sup> Survey Unit

Dose Rate	Area Factor	Area m <sup>2</sup>	Area Radius, m
6.93E-03	1.00E+00	137	6.91
6.23E-03	1.11E+00	100	5.64
5.74E-03	1.21E+00	75	4.89
5.05E-03	1.37E+00	50	3.99
3.92E-03	1.77E+00	25	2.82
3.14E-03	2.21E+00	15	2.19
2.55E-03	2.72E+00	10	1.78
1.70E-03	4.08E+00	5	1.26
4.88E-04	1.42E+01	1	0.56
2.65E-04	2.62E+01	0.5	0.40

#### Area Factors for 319 m<sup>2</sup> Survey Unit

Dose Rate	Area Factor	Area m <sup>2</sup>	Area Radius, m
8.22E-03	1.00E+00	319	10.08
7.82E-03	1.05 E+00	250	8.92
7.44E-03	1.11 E+00	200	7.98
6.93E-03	1.19 E+00	150	6.91
6.23E-03	1.32 E+00	100	5.64
5.74E-03	1.43 E+00	75	4.89
5.05E-03	1.63 E+00	50	3.99
3.92E-03	2.10 E+00	25	2.82
3.14E-03	2.62E+00	15	2.19
2.55E-03	3.22E+00	10	1.78
1.70E-03	4.84E+00	5	1.26
4.88E-04	1.68 E+01	1	0.56
2.65E-04	3.10E+01	0.5	0.40

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys at Rancho Seco Nuclear Generating Station

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date : February 21, 2006  
Run Time : 11:53:16 AM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 137 m<sup>2</sup> at <sup>Total</sup> Gross DCGL  
Description: Case 1 <sup>Feb 21 2006</sup>  
Geometry: 3 - Disk



Source Dimensions  
Radius 691.0 cm 22 ft 8.0 in

Dose Points  
# 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shield Name	Material	Density
Air Gap	Air	0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	3.2251e-007	1.1933e+004	2.1500e-007	7.9550e-003
Ba-137m	2.4408e-004	9.0308e+006	1.6271e-004	6.0203e+000
Co-60	6.3602e-006	2.3533e+005	4.2400e-006	1.5688e-001
Cs-134	1.0110e-007	3.7408e+003	6.7400e-008	2.4938e-003
Cs-137	2.5801e-004	9.5463e+006	1.7200e-004	6.3640e+000
Pu-238	3.6001e-007	1.3320e+004	2.4000e-007	8.8800e-003
Pu-239	1.1460e-007	4.2403e+003	7.6400e-008	2.8268e-003
Pu-240	1.1460e-007	4.2403e+003	7.6400e-008	2.8268e-003
Pu-241	1.6351e-005	6.0497e+005	1.0900e-005	4.0330e-001
Sr-90	3.2251e-007	1.1933e+004	2.1500e-007	7.9550e-003
Y-90	3.2251e-007	1.1933e+004	2.1500e-007	7.9550e-003

Bulldup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

Page : 2  
 DOS File : Case1  
 Run Date : February 21, 2006  
 Run Time : 11:53:16 AM  
 Duration : 00:00:00

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm <sup>2</sup> /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm <sup>2</sup> /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.03	5.322e+05	9.175e-03	1.051e-02	9.093e-05	1.042e-04
0.04	1.255e+05	2.986e-03	3.421e-03	1.320e-05	1.513e-05
0.05	2.225e+00	6.698e-08	7.657e-08	1.784e-10	2.040e-10
0.06	4.312e+03	1.568e-04	1.781e-04	3.114e-07	3.537e-07
0.1	2.018e+00	1.236e-07	1.361e-07	1.890e-10	2.082e-10
0.3	1.324e+00	2.473e-07	2.586e-07	4.692e-10	4.905e-10
0.5	5.462e+01	1.712e-05	1.765e-05	3.361e-08	3.465e-08
0.6	8.131e+06	3.066e+00	3.149e+00	5.985e-03	6.147e-03
0.8	3.521e+03	1.777e-03	1.816e-03	3.380e-06	3.453e-06
1.0	2.354e+05	1.489e-01	1.517e-01	2.745e-04	2.796e-04
1.5	2.354e+05	2.244e-01	2.274e-01	3.775e-04	3.827e-04
TOTALS:	9.267e+06	3.454e+00	3.544e+00	6.745e-03	6.933e-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date: February 21, 2006  
Run Time: 11:54:41 AM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 137 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 564.0 cm 18 ft 6.0 in

Dose Points  
# 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shields  
Shield Name Air Gap Material Air Density 0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Library : Grove

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	2.1486e-007	7.9497e+003	2.1500e-007	7.9550e-003
Ba-137m	1.6260e-004	6.0163e+006	1.6271e-004	6.0203e+000
Co-60	4.2372e-006	1.5677e+005	4.2400e-006	1.5688e-001
Cs-134	6.7355e-008	2.4921e+003	6.7400e-008	2.4938e-003
Cs-137	1.7188e-004	6.3597e+006	1.7200e-004	6.3640e+000
Pu-238	2.3984e-007	8.8740e+003	2.4000e-007	8.8800e-003
Pu-239	7.6349e-008	2.8249e+003	7.6400e-008	2.8268e-003
Pu-240	7.6349e-008	2.8249e+003	7.6400e-008	2.8268e-003
Pu-241	1.0893e-005	4.0303e+005	1.0900e-005	4.0330e-001
Sr-90	2.1486e-007	7.9497e+003	2.1500e-007	7.9550e-003
Y-90	2.1486e-007	7.9497e+003	2.1500e-007	7.9550e-003

Buildup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date: February 21, 2006  
 Run Time: 11:54:41 AM  
 Duration : 00:00:00

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm <sup>2</sup> /sec		<u>Exposure Rate</u> mR/hr	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.03	3.546e+05	8.355e-03	9.421e-03	8.281e-05	9.336e-05
0.04	8.363e+04	2.708e-03	3.054e-03	1.198e-05	1.350e-05
0.05	1.482e+00	6.068e-08	6.826e-08	1.616e-10	1.818e-10
0.06	2.872e+03	1.419e-04	1.587e-04	2.819e-07	3.153e-07
0.1	1.344e+00	1.117e-07	1.216e-07	1.709e-10	1.861e-10
0.3	8.822e-01	2.232e-07	2.321e-07	4.233e-10	4.403e-10
0.5	3.639e+01	1.544e-05	1.586e-05	3.030e-08	3.113e-08
0.6	5.417e+06	2.764e+00	2.830e+00	5.395e-03	5.523e-03
0.8	2.346e+03	1.601e-03	1.632e-03	3.045e-06	3.103e-06
1.0	1.568e+05	1.341e-01	1.363e-01	2.472e-04	2.513e-04
1.5	1.569e+05	2.020e-01	2.044e-01	3.398e-04	3.439e-04
TOTALS:	6.174e+06	3.113e+00	3.185e+00	6.080e-03	6.229e-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date: February 21, 2006  
Run Time: 11:55:04 AM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 137 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 489.0 cm 16 ft 0.5 in

Dose Points  
# 1 X 100 cm 0 cm 0 cm  
3 ft 3.4 in 0.0 in 0.0 in

Shields  
Shield Name Material Density  
Air Gap Air 0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Library : Grove

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	1.6151e-007	5.9760e+003	2.1500e-007	7.9550e-003
Ba-137m	1.2223e-004	4.5226e+006	1.6271e-004	6.0203e+000
Co-60	3.1852e-006	1.1785e+005	4.2400e-006	1.5688e-001
Cs-134	5.0632e-008	1.8734e+003	6.7400e-008	2.4938e-003
Cs-137	1.2921e-004	4.7808e+006	1.7200e-004	6.3640e+000
Pu-238	1.8029e-007	6.6708e+003	2.4000e-007	8.8800e-003
Pu-239	5.7393e-008	2.1236e+003	7.6400e-008	2.8268e-003
Pu-240	5.7393e-008	2.1236e+003	7.6400e-008	2.8268e-003
Pu-241	8.1883e-006	3.0297e+005	1.0900e-005	4.0330e-001
Sr-90	1.6151e-007	5.9760e+003	2.1500e-007	7.9550e-003
Y-90	1.6151e-007	5.9760e+003	2.1500e-007	7.9550e-003

Bulldup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date : February 21, 2006  
 Run Time : 11:55:04 AM  
 Duration : 00:00:00

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.03	2.665e+05	7.762e-03	8.667e-03	7.693e-05	8.590e-05
0.04	6.287e+04	2.510e-03	2.802e-03	1.110e-05	1.239e-05
0.05	1.114e+00	5.619e-08	6.259e-08	1.497e-10	1.667e-10
0.06	2.159e+03	1.313e-04	1.456e-04	2.609e-07	2.891e-07
0.1	1.010e+00	1.033e-07	1.117e-07	1.581e-10	1.709e-10
0.3	6.632e-01	2.062e-07	2.137e-07	3.911e-10	4.054e-10
0.5	2.735e+01	1.425e-05	1.461e-05	2.798e-08	2.868e-08
0.6	4.072e+06	2.551e+00	2.607e+00	4.980e-03	5.089e-03
0.8	1.763e+03	1.478e-03	1.503e-03	2.811e-06	2.860e-06
1.0	1.179e+05	1.238e-01	1.256e-01	2.281e-04	2.315e-04
1.5	1.179e+05	1.863e-01	1.884e-01	3.135e-04	3.169e-04
<b>TOTALS:</b>	<b>4.641e+06</b>	<b>2.873e+00</b>	<b>2.934e+00</b>	<b>5.613e-03</b>	<b>5.739e-03</b>



TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys at Rancho Seco Nuclear Generating Station

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date: February 21, 2006  
Run Time: 11:55:26 AM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 137 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 399.0 cm 13 ft 1.1 in

Dose Points  
# 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shields  
Shield Name Air Gap Material Air Density 0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Library : Grove

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	1.0753e-007	3.9787e+003	2.1500e-007	7.9550e-003
Ba-137m	8.1380e-005	3.0110e+006	1.6271e-004	6.0203e+000
Co-60	2.1206e-006	7.8463e+004	4.2400e-006	1.5688e-001
Cs-134	3.3710e-008	1.2473e+003	6.7400e-008	2.4938e-003
Cs-137	8.6025e-005	3.1829e+006	1.7200e-004	6.3640e+000
Pu-238	1.2003e-007	4.4413e+003	2.4000e-007	8.8800e-003
Pu-239	3.8211e-008	1.4138e+003	7.6400e-008	2.8268e-003
Pu-240	3.8211e-008	1.4138e+003	7.6400e-008	2.8268e-003
Pu-241	5.4516e-006	2.0171e+005	1.0900e-005	4.0330e-001
Sr-90	1.0753e-007	3.9787e+003	2.1500e-007	7.9550e-003
Y-90	1.0753e-007	3.9787e+003	2.1500e-007	7.9550e-003

Buildup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date : February 21, 2006  
 Run Time : 11:55:26 AM  
 Duration : 00:00:00

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.03	1.775e+05	6.902e-03	7.613e-03	6.841e-05	7.545e-05
0.04	4.186e+04	2.225e-03	2.454e-03	9.842e-06	1.085e-05
0.05	7.418e-01	4.975e-08	5.475e-08	1.325e-10	1.459e-10
0.06	1.438e+03	1.162e-04	1.273e-04	2.309e-07	2.529e-07
0.1	6.727e-01	9.135e-08	9.789e-08	1.398e-10	1.498e-10
0.3	4.415e-01	1.820e-07	1.879e-07	3.453e-10	3.565e-10
0.5	1.821e+01	1.258e-05	1.286e-05	2.469e-08	2.523e-08
0.6	2.711e+06	2.251e+00	2.294e+00	4.393e-03	4.478e-03
0.8	1.174e+03	1.303e-03	1.323e-03	2.478e-06	2.517e-06
1.0	7.850e+04	1.091e-01	1.105e-01	2.011e-04	2.038e-04
1.5	7.850e+04	1.642e-01	1.658e-01	2.762e-04	2.789e-04
<b>TOTALS:</b>	3.090e+06	2.534e+00	2.582e+00	4.951e-03	5.050e-03

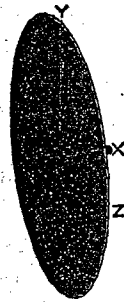
TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date: February 21, 2006  
Run Time: 11:55:45 AM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 137 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 282.0 cm 9 ft 3.0 in

Dose Points  
# 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shield Name	Shields	Material	Density
Air Gap		Air	0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	5.3714e-008	1.9874e+003	2.1500e-007	7.9550e-003
Ba-137m	4.0651e-005	1.5041e+006	1.6271e-004	6.0203e+000
Co-60	1.0593e-006	3.9194e+004	4.2400e-006	1.5688e-001
Cs-134	1.6839e-008	6.2303e+002	6.7400e-008	2.4938e-003
Cs-137	4.2971e-005	1.5899e+006	1.7200e-004	6.3640e+000
Pu-238	5.9960e-008	2.2185e+003	2.4000e-007	8.8800e-003
Pu-239	1.9087e-008	7.0623e+002	7.6400e-008	2.8268e-003
Pu-240	1.9087e-008	7.0623e+002	7.6400e-008	2.8268e-003
Pu-241	2.7232e-006	1.0076e+005	1.0900e-005	4.0330e-001
Sr-90	5.3714e-008	1.9874e+003	2.1500e-007	7.9550e-003
Y-90	5.3714e-008	1.9874e+003	2.1500e-007	7.9550e-003

Bulldup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date : February 21, 2006  
 Run Time : 11:55:45 AM  
 Duration : 00:00:00

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.03	8.864e+04	5.429e-03	5.888e-03	5.380e-05	5.835e-05
0.04	2.091e+04	1.743e-03	1.889e-03	7.708e-06	8.356e-06
0.05	3.705e-01	3.891e-08	4.211e-08	1.036e-10	1.122e-10
0.06	7.181e+02	9.083e-05	9.793e-05	1.804e-07	1.945e-07
0.1	3.360e-01	7.129e-08	7.548e-08	1.091e-10	1.155e-10
0.3	2.206e-01	1.418e-07	1.455e-07	2.689e-10	2.761e-10
0.5	9.096e+00	9.786e-06	9.964e-06	1.921e-08	1.956e-08
0.6	1.354e+06	1.751e+00	1.779e+00	3.417e-03	3.472e-03
0.8	5.865e+02	1.013e-03	1.026e-03	1.927e-06	1.952e-06
1.0	3.921e+04	8.480e-02	8.573e-02	1.563e-04	1.580e-04
1.5	3.921e+04	1.275e-01	1.286e-01	2.146e-04	2.163e-04
<b>TOTALS:</b>	<b>1.543e+06</b>	<b>1.971e+00</b>	<b>2.002e+00</b>	<b>3.852e-03</b>	<b>3.915e-03</b>

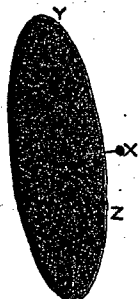
TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date: February 21, 2006  
Run Time: 11:56:05 AM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 137 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 219.0 cm 7 ft 2.2 in

Dose Points  
# 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shield Name	Material	Density
Air Gap	Air	0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	3.2395e-008	1.1986e+003	2.1500e-007	7.9550e-003
Ba-137m	2.4516e-005	9.0711e+005	1.6271e-004	6.0203e+000
Co-60	6.3886e-007	2.3638e+004	4.2400e-006	1.5688e-001
Cs-134	1.0155e-008	3.7575e+002	6.7400e-008	2.4938e-003
Cs-137	2.5916e-005	9.5889e+005	1.7200e-004	6.3640e+000
Pu-238	3.6162e-008	1.3380e+003	2.4000e-007	8.8800e-003
Pu-239	1.1511e-008	4.2593e+002	7.6400e-008	2.8268e-003
Pu-240	1.1511e-008	4.2593e+002	7.6400e-008	2.8268e-003
Pu-241	1.6423e-006	6.0767e+004	1.0900e-005	4.0330e-001
Sr-90	3.2395e-008	1.1986e+003	2.1500e-007	7.9550e-003
Y-90	3.2395e-008	1.1986e+003	2.1500e-007	7.9550e-003

Buildup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

Page : 2  
 DOS File : Case1  
 Run Date : February 21, 2006  
 Run Time : 11:56:05 AM  
 Duration : 00:00:00

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm <sup>2</sup> /sec		<u>Exposure Rate</u> mR/hr	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.03	5.346e+04	4.389e-03	4.715e-03	4.350e-05	4.673e-05
0.04	1.261e+04	1.406e-03	1.509e-03	6.217e-06	6.676e-06
0.05	2.235e-01	3.135e-08	3.361e-08	8.352e-11	8.955e-11
0.06	4.331e+02	7.316e-05	7.818e-05	1.453e-07	1.553e-07
0.1	2.027e-01	5.737e-08	6.034e-08	8.777e-11	9.231e-11
0.3	1.330e-01	1.140e-07	1.166e-07	2.162e-10	2.212e-10
0.5	5.486e+00	7.863e-06	7.989e-06	1.543e-08	1.568e-08
0.6	8.167e+05	1.406e+00	1.426e+00	2.745e-03	2.784e-03
0.8	3.537e+02	8.137e-04	8.228e-04	1.548e-06	1.565e-06
1.0	2.365e+04	6.810e-02	6.875e-02	1.255e-04	1.267e-04
1.5	2.365e+04	1.024e-01	1.031e-01	1.723e-04	1.735e-04
TOTALS:	9.308e+05	1.584e+00	1.605e+00	3.094e-03	3.139e-03

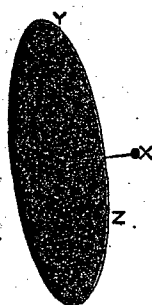
TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
 at Rancho Seco Nuclear Generating Station

MicroShield v5.05 (5.05-00488)  
 Sacramento Municipal Utility District

Page : 1  
 DOS File : Case1  
 Run Date: February 21, 2006  
 Run Time: 11:56:26 AM  
 Duration : 00:00:00

File Ref: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 By: \_\_\_\_\_  
 Checked: \_\_\_\_\_

Case Title: 137 m2 at Gross DCGL  
 Description: Case 1  
 Geometry: 3 - Disk



Source Dimensions  
 Radius 178.0 cm 5 ft 10.1 in

Dose Points  
 # 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shield Name	Material	Density
Air Gap	Air	0.00122

Source Input  
 Grouping Method : Standard Indices  
 Number of Groups : 25  
 Lower Energy Cutoff : 0.015  
 Photons < 0.015 : Excluded

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	2.1401e-008	7.9183e+002	2.1500e-007	7.9550e-003
Ba-137m	1.6196e-005	5.9925e+005	1.6271e-004	6.0203e+000
Co-60	4.2204e-007	1.5616e+004	4.2400e-006	1.5688e-001
Cs-134	6.7089e-009	2.4823e+002	6.7400e-008	2.4938e-003
Cs-137	1.7121e-005	6.3346e+005	1.7200e-004	6.3640e+000
Pu-238	2.3889e-008	8.8390e+002	2.4000e-007	8.8800e-003
Pu-239	7.6047e-009	2.8137e+002	7.6400e-008	2.8268e-003
Pu-240	7.6047e-009	2.8137e+002	7.6400e-008	2.8268e-003
Pu-241	1.0850e-006	4.0144e+004	1.0900e-005	4.0330e-001
Sr-90	2.1401e-008	7.9183e+002	2.1500e-007	7.9550e-003
Y-90	2.1401e-008	7.9183e+002	2.1500e-007	7.9550e-003

Buildup  
 The material reference is : Air Gap

Integration Parameters  
 Radial 20  
 Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date: February 21, 2006  
 Run Time: 11:56:26 AM  
 Duration : 00:00:00

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.03	3.532e+04	3.586e-03	3.828e-03	3.554e-05	3.793e-05
0.04	8.330e+03	1.147e-03	1.223e-03	5.071e-06	5.411e-06
0.05	1.476e-01	2.556e-08	2.723e-08	6.808e-11	7.254e-11
0.06	2.861e+02	5.962e-05	6.333e-05	1.184e-07	1.258e-07
0.1	1.339e-01	4.673e-08	4.893e-08	7.149e-11	7.485e-11
0.3	8.787e-02	9.275e-08	9.473e-08	1.759e-10	1.797e-10
0.5	3.624e+00	6.397e-06	6.491e-06	1.256e-08	1.274e-08
0.6	5.395e+05	1.144e+00	1.159e+00	2.233e-03	2.262e-03
0.8	2.337e+02	6.618e-04	6.686e-04	1.259e-06	1.272e-06
1.0	1.562e+04	5.538e-02	5.587e-02	1.021e-04	1.030e-04
1.5	1.562e+04	8.325e-02	8.379e-02	1.401e-04	1.410e-04
<b>TOTALS:</b>	6.149e+05	1.288e+00	1.304e+00	2.517e-03	2.551e-03



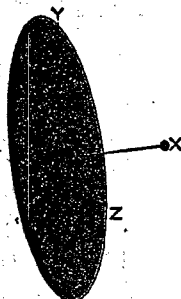
TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date: February 21, 2006  
Run Time: 11:56:43 AM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 137 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 126.0 cm 4 ft 1.6 in

Dose Points  
# 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shield Name	Material	Density
Air Gap	Air	0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Nuclide	curies	becquerels	uCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	1.0723e-008	3.9676e+002	2.1500e-007	7.9550e-003
Ba-137m	8.1154e-006	3.0027e+005	1.6271e-004	6.0203e+000
Co-60	2.1147e-007	7.8245e+003	4.2400e-006	1.5688e-001
Cs-134	3.3616e-009	1.2438e+002	6.7400e-008	2.4938e-003
Cs-137	8.5787e-006	3.1741e+005	1.7200e-004	6.3640e+000
Pu-238	1.1970e-008	4.4290e+002	2.4000e-007	8.8800e-003
Pu-239	3.8105e-009	1.4099e+002	7.6400e-008	2.8268e-003
Pu-240	3.8105e-009	1.4099e+002	7.6400e-008	2.8268e-003
Pu-241	5.4365e-007	2.0115e+004	1.0900e-005	4.0330e-001
Sr-90	1.0723e-008	3.9676e+002	2.1500e-007	7.9550e-003
Y-90	1.0723e-008	3.9676e+002	2.1500e-007	7.9550e-003

Buildup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date: February 21, 2006  
 Run Time: 11:56:43 AM  
 Duration : 00:00:00

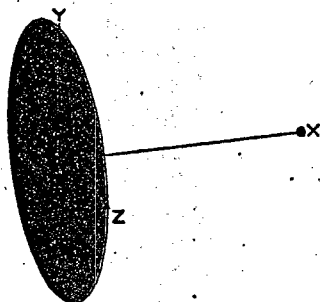
<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.03	1.770e+04	2.405e-03	2.547e-03	2.383e-05	2.524e-05
0.04	4.174e+03	7.674e-04	8.124e-04	3.394e-06	3.593e-06
0.05	7.397e-02	1.709e-08	1.807e-08	4.553e-11	4.814e-11
0.06	1.434e+02	3.986e-05	4.203e-05	7.917e-08	8.348e-08
0.1	6.709e-02	3.123e-08	3.251e-08	4.777e-11	4.974e-11
0.3	4.403e-02	6.191e-08	6.307e-08	1.174e-10	1.196e-10
0.5	1.816e+00	4.269e-06	4.323e-06	8.379e-09	8.486e-09
0.6	2.703e+05	7.633e-01	7.719e-01	1.490e-03	1.507e-03
0.8	1.171e+02	4.415e-04	4.454e-04	8.397e-07	8.472e-07
1.0	7.828e+03	3.694e-02	3.722e-02	6.808e-05	6.861e-05
1.5	7.828e+03	5.551e-02	5.582e-02	9.339e-05	9.392e-05
TOTALS:	3.081e+05	8.594e-01	8.688e-01	1.680e-03	1.699e-03

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date: February 21, 2006  
Run Time: 11:56:59 AM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 137 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 56.0 cm 1 ft 10.0 in

Dose Points  
# 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shield Name	Shields Material	Density
Air Gap	Air	0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	2.1182e-009	7.8373e+001	2.1500e-007	7.9550e-003
Ba-137m	1.6030e-006	5.9313e+004	1.6271e-004	6.0203e+000
Co-60	4.1773e-008	1.5456e+003	4.2400e-006	1.5688e-001
Cs-134	6.6403e-010	2.4569e+001	6.7400e-008	2.4938e-003
Cs-137	1.6945e-006	6.2698e+004	1.7200e-004	6.3640e+000
Pu-238	2.3645e-009	8.7486e+001	2.4000e-007	8.8800e-003
Pu-239	7.5270e-010	2.7850e+001	7.6400e-008	2.8268e-003
Pu-240	7.5270e-010	2.7850e+001	7.6400e-008	2.8268e-003
Pu-241	1.0739e-007	3.9733e+003	1.0900e-005	4.0330e-001
Sr-90	2.1182e-009	7.8373e+001	2.1500e-007	7.9550e-003
Y-90	2.1182e-009	7.8373e+001	2.1500e-007	7.9550e-003

Bulldup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

Page : 2  
 DOS File : Case1.  
 Run Date: February 21, 2006  
 Run Time: 11:56:59 AM  
 Duration : 00:00:00

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm <sup>2</sup> /sec		<u>Exposure Rate</u> mR/hr	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.03	3.496e+03	6.957e-04	7.299e-04	6.895e-06	7.234e-06
0.04	8.245e+02	2.215e-04	2.323e-04	9.795e-07	1.027e-06
0.05	1.461e-02	4.929e-09	5.164e-09	1.313e-11	1.376e-11
0.06	2.832e+01	1.149e-05	1.201e-05	2.282e-08	2.385e-08
0.1	1.325e-02	8.993e-09	9.302e-09	1.376e-11	1.423e-11
0.3	8.697e-03	1.781e-08	1.809e-08	3.379e-11	3.432e-11
0.5	3.587e-01	1.227e-06	1.241e-06	2.409e-09	2.435e-09
0.6	5.340e+04	2.195e-01	2.215e-01	4.283e-04	4.324e-04
0.8	2.313e+01	1.269e-04	1.278e-04	2.413e-07	2.432e-07
1.0	1.546e+03	1.061e-02	1.068e-02	1.957e-05	1.969e-05
1.5	1.546e+03	1.595e-02	1.602e-02	2.683e-05	2.696e-05
TOTALS:	6.086e+04	2.471e-01	2.493e-01	4.829e-04	4.875e-04

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

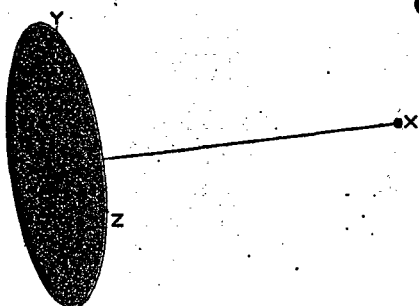
PAGE 188 OF 215

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date: February 21, 2006  
Run Time: 11:57:16 AM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 137 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 40.0 cm 1 ft 3.7 in

Dose Points  
# 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shield Name	Material	Density
Air Gap	Air	0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Library : Grove

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	1.0807e-009	3.9986e+001	2.1500e-007	7.9550e-003
Ba-137m	8.1788e-007	3.0262e+004	1.6271e-004	6.0203e+000
Co-60	2.1313e-008	7.8856e+002	4.2400e-006	1.5688e-001
Cs-134	3.3879e-010	1.2535e+001	6.7400e-008	2.4938e-003
Cs-137	8.6457e-007	3.1989e+004	1.7200e-004	6.3640e+000
Pu-238	1.2064e-009	4.4636e+001	2.4000e-007	8.8800e-003
Pu-239	3.8403e-010	1.4209e+001	7.6400e-008	2.8268e-003
Pu-240	3.8403e-010	1.4209e+001	7.6400e-008	2.8268e-003
Pu-241	5.4789e-008	2.0272e+003	1.0900e-005	4.0330e-001
Sr-90	1.0807e-009	3.9986e+001	2.1500e-007	7.9550e-003
Y-90	1.0807e-009	3.9986e+001	2.1500e-007	7.9550e-003

Buildup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date : February 21, 2006  
 Run Time : 11:57:16 AM  
 Duration : 00:00:00

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.03	1.783e+03	3.790e-04	3.971e-04	3.757e-06	3.935e-06
0.04	4.207e+02	1.206e-04	1.263e-04	5.335e-07	5.587e-07
0.05	7.455e-03	2.684e-09	2.808e-09	7.150e-12	7.480e-12
0.06	1.445e+01	6.256e-06	6.530e-06	1.243e-08	1.297e-08
0.1	6.761e-03	4.896e-09	5.059e-09	7.491e-12	7.740e-12
0.3	4.437e-03	9.696e-09	9.843e-09	1.839e-11	1.867e-11
0.5	1.830e-01	6.681e-07	6.750e-07	1.311e-09	1.325e-09
0.6	2.724e+04	1.194e-01	1.205e-01	2.331e-04	2.353e-04
0.8	1.180e+01	6.906e-05	6.956e-05	1.314e-07	1.323e-07
1.0	7.889e+02	5.777e-03	5.813e-03	1.065e-05	1.071e-05
1.5	7.889e+02	8.679e-03	8.719e-03	1.460e-05	1.467e-05
<b>TOTALS:</b>	<b>3.105e+04</b>	<b>1.345e-01</b>	<b>1.357e-01</b>	<b>2.628e-04</b>	<b>2.653e-04</b>

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date : February 21, 2006  
Run Time : 11:59:58 AM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 319 m<sup>2</sup> at <sup>Total</sup> Gross DCGL  
Description: Case <sup>10/21/06</sup>  
Geometry: 3 - Disk



Source Dimensions  
Radius 1.0e+3 cm 32 ft 9.7 in

Dose Points  
# 1 X 100 cm 0 cm 0 cm  
3 ft 3.4 in 0.0 in 0.0 in

Shields  
Shield Name Material Density  
Air Gap Air 0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded  
Library : Grove

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	6.7544e-007	2.4991e+004	2.1500e-007	7.9550e-003
Ba-137m	5.1117e-004	1.8913e+007	1.6271e-004	6.0203e+000
Co-60	1.3320e-005	4.9285e+005	4.2400e-006	1.5688e-001
Cs-134	2.1174e-007	7.8345e+003	6.7400e-008	2.4938e-003
Cs-137	5.4035e-004	1.9993e+007	1.7200e-004	6.3640e+000
Pu-238	7.5398e-007	2.7897e+004	2.4000e-007	8.8800e-003
Pu-239	2.4002e-007	8.8807e+003	7.6400e-008	2.8268e-003
Pu-240	2.4002e-007	8.8807e+003	7.6400e-008	2.8268e-003
Pu-241	3.4243e-005	1.2670e+006	1.0900e-005	4.0330e-001
Sr-90	6.7544e-007	2.4991e+004	2.1500e-007	7.9550e-003
Y-90	6.7544e-007	2.4991e+004	2.1500e-007	7.9550e-003

Buildup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date: February 21, 2006  
 Run Time: 11:59:58 AM  
 Duration : 00:00:00

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.03	1.115e+06	1.056e-02	1.253e-02	1.047e-04	1.242e-04
0.04	2.629e+05	3.466e-03	4.120e-03	1.533e-05	1.822e-05
0.05	4.659e+00	7.802e-08	9.249e-08	2.078e-10	2.464e-10
0.06	9.030e+03	1.829e-04	2.151e-04	3.633e-07	4.273e-07
0.1	4.226e+00	1.445e-07	1.634e-07	2.211e-10	2.500e-10
0.3	2.773e+00	2.906e-07	3.074e-07	5.512e-10	5.832e-10
0.5	1.144e+02	2.016e-05	2.095e-05	3.956e-08	4.113e-08
0.6	1.703e+07	3.612e+00	3.736e+00	7.050e-03	7.293e-03
0.8	7.375e+03	2.095e-03	2.153e-03	3.985e-06	4.095e-06
1.0	4.931e+05	1.757e-01	1.798e-01	3.239e-04	3.315e-04
1.5	4.931e+05	2.650e-01	2.696e-01	4.459e-04	4.537e-04
<b>TOTALS:</b>	1.941e+07	4.069e+00	4.205e+00	7.944e-03	8.225e-03



TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys at Rancho Seco Nuclear Generating Station

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date : February 21, 2006  
Run Time : 12:01:07 PM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 319 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 892.0 cm 29 ft 3.2 in

Dose Points  
# 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shields  
Shield Name Air Gap Material Air Density 0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Library : Grove

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	5.3743e-007	1.9885e+004	2.1500e-007	7.9550e-003
Ba-137m	4.0672e-004	1.5049e+007	1.6271e-004	6.0203e+000
Co-60	1.0599e-005	3.9215e+005	4.2400e-006	1.5688e-001
Cs-134	1.6848e-007	6.2336e+003	6.7400e-008	2.4938e-003
Cs-137	4.2994e-004	1.5908e+007	1.7200e-004	6.3640e+000
Pu-238	5.9992e-007	2.2197e+004	2.4000e-007	8.8800e-003
Pu-239	1.9097e-007	7.0660e+003	7.6400e-008	2.8268e-003
Pu-240	1.9097e-007	7.0660e+003	7.6400e-008	2.8268e-003
Pu-241	2.7246e-005	1.0081e+006	1.0900e-005	4.0330e-001
Sr-90	5.3743e-007	1.9885e+004	2.1500e-007	7.9550e-003
Y-90	5.3743e-007	1.9885e+004	2.1500e-007	7.9550e-003

Bulldup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date : February 21, 2006  
 Run Time : 12:01:07 PM  
 Duration : 00:00:00

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.03	8.869e+05	1.015e-02	1.190e-02	1.006e-04	1.180e-04
0.04	2.092e+05	3.322e-03	3.899e-03	1.469e-05	1.725e-05
0.05	3.707e+00	7.469e-08	8.745e-08	1.990e-10	2.330e-10
0.06	7.185e+03	1.750e-04	2.034e-04	3.476e-07	4.040e-07
0.1	3.362e+00	1.382e-07	1.548e-07	2.114e-10	2.369e-10
0.3	2.207e+00	2.773e-07	2.922e-07	5.261e-10	5.544e-10
0.5	9.101e+01	1.923e-05	1.993e-05	3.774e-08	3.912e-08
0.6	1.355e+07	3.444e+00	3.554e+00	6.723e-03	6.938e-03
0.8	5.868e+03	1.997e-03	2.048e-03	3.799e-06	3.896e-06
1.0	3.923e+05	1.675e-01	1.711e-01	3.087e-04	3.154e-04
1.5	3.923e+05	2.525e-01	2.566e-01	4.248e-04	4.317e-04
<b>TOTALS:</b>	1.544e+07	3.880e+00	4.000e+00	7.576e-03	7.824e-03

MicroShield v5.05 (5.05-00488)  
 Sacramento Municipal Utility District

Page : 1  
 DOS File : Case1  
 Run Date: February 21, 2006  
 Run Time: 12:01:24 PM  
 Duration : 00:00:00

File Ref: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 By: \_\_\_\_\_  
 Checked: \_\_\_\_\_

Case Title: 319 m2 at Gross DCGL  
 Description: Case 1  
 Geometry: 3 - Disk



Source Dimensions  
 Radius 798.0 cm 26 ft 2.2 in

Dose Points  
 # 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shields  
 Shield Name Material Density  
 Air Gap Air 0.00122

Source Input  
 Grouping Method : Standard Indices  
 Number of Groups : 25  
 Lower Energy Cutoff : 0.015  
 Photons < 0.015 : Excluded

Library : Grove

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	4.3012e-007	1.5915e+004	2.1500e-007	7.9550e-003
Ba-137m	3.2552e-004	1.2044e+007	1.6271e-004	6.0203e+000
Co-60	8.4825e-006	3.1385e+005	4.2400e-006	1.5688e-001
Cs-134	1.3484e-007	4.9890e+003	6.7400e-008	2.4938e-003
Cs-137	3.4410e-004	1.2732e+007	1.7200e-004	6.3640e+000
Pu-238	4.8014e-007	1.7765e+004	2.4000e-007	8.8800e-003
Pu-239	1.5284e-007	5.6552e+003	7.6400e-008	2.8268e-003
Pu-240	1.5284e-007	5.6552e+003	7.6400e-008	2.8268e-003
Pu-241	2.1806e-005	8.0683e+005	1.0900e-005	4.0330e-001
Sr-90	4.3012e-007	1.5915e+004	2.1500e-007	7.9550e-003
Y-90	4.3012e-007	1.5915e+004	2.1500e-007	7.9550e-003

Bulldup  
 The material reference is : Air Gap

Integration Parameters  
 Radial 20  
 Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date: February 21, 2006  
 Run Time: 12:01:24 PM  
 Duration : 00:00:00

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm <sup>2</sup> /sec		<u>Exposure Rate</u> mR/hr	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.03	7.098e+05	9.734e-03	1.129e-02	9.647e-05	1.119e-04
0.04	1.674e+05	3.177e-03	3.688e-03	1.405e-05	1.631e-05
0.05	2.967e+00	7.137e-08	8.264e-08	1.901e-10	2.201e-10
0.06	5.750e+03	1.671e-04	1.922e-04	3.320e-07	3.817e-07
0.1	2.691e+00	1.318e-07	1.466e-07	2.017e-10	2.242e-10
0.3	1.766e+00	2.643e-07	2.775e-07	5.014e-10	5.264e-10
0.5	7.284e+01	1.831e-05	1.894e-05	3.594e-08	3.717e-08
0.6	1.084e+07	3.280e+00	3.377e+00	6.402e-03	6.592e-03
0.8	4.696e+03	1.902e-03	1.947e-03	3.617e-06	3.703e-06
1.0	3.140e+05	1.594e-01	1.626e-01	2.938e-04	2.998e-04
1.5	3.140e+05	2.403e-01	2.439e-01	4.042e-04	4.103e-04
<b>TOTALS:</b>	1.236e+07	3.695e+00	3.801e+00	7.215e-03	7.435e-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys at Rancho Seco Nuclear Generating Station

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date : February 21, 2006  
Run Time : 12:01:42 PM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 319 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 691.0 cm 22 ft 8.0 in

Dose Points  
# 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shields  
Shield Name Material Density  
Air Gap Air 0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Library : Grove

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	3.2251e-007	1.1933e+004	2.1500e-007	7.9550e-003
Ba-137m	2.4408e-004	9.0308e+006	1.6271e-004	6.0203e+000
Co-60	6.3602e-006	2.3533e+005	4.2400e-006	1.5688e-001
Cs-134	1.0110e-007	3.7408e+003	6.7400e-008	2.4938e-003
Cs-137	2.5801e-004	9.5463e+006	1.7200e-004	6.3640e+000
Pu-238	3.6001e-007	1.3320e+004	2.4000e-007	8.8800e-003
Pu-239	1.1460e-007	4.2403e+003	7.6400e-008	2.8268e-003
Pu-240	1.1460e-007	4.2403e+003	7.6400e-008	2.8268e-003
Pu-241	1.6351e-005	6.0497e+005	1.0900e-005	4.0330e-001
Sr-90	3.2251e-007	1.1933e+004	2.1500e-007	7.9550e-003
Y-90	3.2251e-007	1.1933e+004	2.1500e-007	7.9550e-003

Bulldup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date : February 21, 2006  
 Run Time : 12:01:42 PM  
 Duration : 00:00:00

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm <sup>2</sup> /sec		<u>Exposure Rate</u> mR/hr	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.03	5.322e+05	9.175e-03	1.051e-02	9.093e-05	1.042e-04
0.04	1.255e+05	2.986e-03	3.421e-03	1.320e-05	1.513e-05
0.05	2.225e+00	6.698e-08	7.657e-08	1.784e-10	2.040e-10
0.06	4.312e+03	1.568e-04	1.781e-04	3.114e-07	3.537e-07
0.1	2.018e+00	1.236e-07	1.361e-07	1.890e-10	2.082e-10
0.3	1.324e+00	2.473e-07	2.586e-07	4.692e-10	4.905e-10
0.5	5.462e+01	1.712e-05	1.765e-05	3.361e-08	3.465e-08
0.6	8.131e+06	3.066e+00	3.149e+00	5.985e-03	6.147e-03
0.8	3.521e+03	1.777e-03	1.816e-03	3.380e-06	3.453e-06
1.0	2.354e+05	1.489e-01	1.517e-01	2.745e-04	2.796e-04
1.5	2.354e+05	2.244e-01	2.274e-01	3.775e-04	3.827e-04
<b>TOTALS:</b>	9.267e+06	3.454e+00	3.544e+00	6.745e-03	6.933e-03

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date: February 21, 2006  
Run Time: 12:01:58 PM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 319 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 564.0 cm 18 ft 6.0 in

Dose Points  
# 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shield Name	Material	Density
Air Gap	Air	0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	2.1486e-007	7.9497e+003	2.1500e-007	7.9550e-003
Ba-137m	1.6260e-004	6.0163e+006	1.6271e-004	6.0203e+000
Co-60	4.2372e-006	1.5677e+005	4.2400e-006	1.5688e-001
Cs-134	6.7355e-008	2.4921e+003	6.7400e-008	2.4938e-003
Cs-137	1.7188e-004	6.3597e+006	1.7200e-004	6.3640e+000
Pu-238	2.3984e-007	8.8740e+003	2.4000e-007	8.8800e-003
Pu-239	7.6349e-008	2.8249e+003	7.6400e-008	2.8268e-003
Pu-240	7.6349e-008	2.8249e+003	7.6400e-008	2.8268e-003
Pu-241	1.0893e-005	4.0303e+005	1.0900e-005	4.0330e-001
Sr-90	2.1486e-007	7.9497e+003	2.1500e-007	7.9550e-003
Y-90	2.1486e-007	7.9497e+003	2.1500e-007	7.9550e-003

Bulldup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date: February 21, 2006  
 Run Time: 12:01:58 PM  
 Duration : 00:00:00

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.03	3.546e+05	8.355e-03	9.421e-03	8.281e-05	9.336e-05
0.04	8.363e+04	2.708e-03	3.054e-03	1.198e-05	1.350e-05
0.05	1.482e+00	6.068e-08	6.826e-08	1.616e-10	1.818e-10
0.06	2.872e+03	1.419e-04	1.587e-04	2.819e-07	3.153e-07
0.1	1.344e+00	1.117e-07	1.216e-07	1.709e-10	1.861e-10
0.3	8.822e-01	2.232e-07	2.321e-07	4.233e-10	4.403e-10
0.5	3.639e+01	1.544e-05	1.586e-05	3.030e-08	3.113e-08
0.6	5.417e+06	2.764e+00	2.830e+00	5.395e-03	5.523e-03
0.8	2.346e+03	1.601e-03	1.632e-03	3.045e-06	3.103e-06
1.0	1.568e+05	1.341e-01	1.363e-01	2.472e-04	2.513e-04
1.5	1.569e+05	2.020e-01	2.044e-01	3.398e-04	3.439e-04
<b>TOTALS:</b>	6.174e+06	3.113e+00	3.185e+00	6.080e-03	6.229e-03



TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys at Rancho Seco Nuclear Generating Station

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date: February 21, 2006  
Run Time: 12:02:16 PM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 319 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 489.0 cm 16 ft 0.5 in

Dose Points  
# 1 X 100 cm 0 cm 0 cm  
3 ft 3.4 in 0.0 in 0.0 in

Shields  
Shield Name Material Density  
Air Gap Air 0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Library : Grove

Nuclide	curies	becquerels	μCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	1.6151e-007	5.9760e+003	2.1500e-007	7.9550e-003
Ba-137m	1.2223e-004	4.5226e+006	1.6271e-004	6.0203e+000
Co-60	3.1852e-006	1.1785e+005	4.2400e-006	1.5688e-001
Cs-134	5.0632e-008	1.8734e+003	6.7400e-008	2.4938e-003
Cs-137	1.2921e-004	4.7808e+006	1.7200e-004	6.3640e+000
Pu-238	1.8029e-007	6.6708e+003	2.4000e-007	8.8800e-003
Pu-239	5.7393e-008	2.1236e+003	7.6400e-008	2.8268e-003
Pu-240	5.7393e-008	2.1236e+003	7.6400e-008	2.8268e-003
Pu-241	8.1883e-006	3.0297e+005	1.0900e-005	4.0330e-001
Sr-90	1.6151e-007	5.9760e+003	2.1500e-007	7.9550e-003
Y-90	1.6151e-007	5.9760e+003	2.1500e-007	7.9550e-003

Bulldup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date: February 21, 2006  
 Run Time: 12:02:16 PM  
 Duration : 00:00:00

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u>		<u>Exposure Rate</u> <u>mR/hr</u>	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.03	2.665e+05	7.762e-03	8.667e-03	7.693e-05	8.590e-05
0.04	6.287e+04	2.510e-03	2.802e-03	1.110e-05	1.239e-05
0.05	1.114e+00	5.619e-08	6.259e-08	1.497e-10	1.667e-10
0.06	2.159e+03	1.313e-04	1.456e-04	2.609e-07	2.891e-07
0.1	1.010e+00	1.033e-07	1.117e-07	1.581e-10	1.709e-10
0.3	6.632e-01	2.062e-07	2.137e-07	3.911e-10	4.054e-10
0.5	2.735e+01	1.425e-05	1.461e-05	2.798e-08	2.868e-08
0.6	4.072e+06	2.551e+00	2.607e+00	4.980e-03	5.089e-03
0.8	1.763e+03	1.478e-03	1.503e-03	2.811e-06	2.860e-06
1.0	1.179e+05	1.238e-01	1.256e-01	2.281e-04	2.315e-04
1.5	1.179e+05	1.863e-01	1.884e-01	3.135e-04	3.169e-04
<b>TOTALS:</b>	4.641e+06	2.873e+00	2.934e+00	5.613e-03	5.739e-03

**MicroShield v5.05 (5.05-00488)**  
**Sacramento Municipal Utility District**

Page : 1  
DOS File : Case1  
Run Date : February 21, 2006  
Run Time : 12:02:34 PM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

**Case Title: 319 m2 at Gross DCGL**  
**Description: Case 1**  
**Geometry: 3 - Disk**



**Source Dimensions**  
Radius 399.0 cm 13 ft 1.1 in

**Dose Points**  
# 1 X 100 cm 3 ft 3.4 in  
Y 0 cm 0.0 in  
Z 0 cm 0.0 in

**Shields**  
Shield Name Material Density  
Air Gap Air 0.00122

**Source Input**  
**Grouping Method : Standard Indices**  
**Number of Groups : 25**  
**Lower Energy Cutoff : 0.015**  
**Photons < 0.015 : Excluded**

**Library : Grove**

<u>Nuclide</u>	<u>curies</u>	<u>becquerels</u>	<u>µCi/cm<sup>2</sup></u>	<u>Bq/cm<sup>2</sup></u>
Am-241	1.0753e-007	3.9787e+003	2.1500e-007	7.9550e-003
Ba-137m	8.1380e-005	3.0110e+006	1.6271e-004	6.0203e+000
Co-60	2.1206e-006	7.8463e+004	4.2400e-006	1.5688e-001
Cs-134	3.3710e-008	1.2473e+003	6.7400e-008	2.4938e-003
Cs-137	8.6025e-005	3.1829e+006	1.7200e-004	6.3640e+000
Pu-238	1.2003e-007	4.4413e+003	2.4000e-007	8.8800e-003
Pu-239	3.8211e-008	1.4138e+003	7.6400e-008	2.8268e-003
Pu-240	3.8211e-008	1.4138e+003	7.6400e-008	2.8268e-003
Pu-241	5.4516e-006	2.0171e+005	1.0900e-005	4.0330e-001
Sr-90	1.0753e-007	3.9787e+003	2.1500e-007	7.9550e-003
Y-90	1.0753e-007	3.9787e+003	2.1500e-007	7.9550e-003

**Bulldup**  
**The material reference is : Air Gap**

**Integration Parameters**  
Radial 20  
Circumferential 20

**Results**

Page : 2  
 DOS File : Case1  
 Run Date: February 21, 2006  
 Run Time: 12:02:34 PM  
 Duration : 00:00:00

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.03	1.775e+05	6.902e-03	7.613e-03	6.841e-05	7.545e-05
0.04	4.186e+04	2.225e-03	2.454e-03	9.842e-06	1.085e-05
0.05	7.418e-01	4.975e-08	5.475e-08	1.325e-10	1.459e-10
0.06	1.438e+03	1.162e-04	1.273e-04	2.309e-07	2.529e-07
0.1	6.727e-01	9.135e-08	9.789e-08	1.398e-10	1.498e-10
0.3	4.415e-01	1.820e-07	1.879e-07	3.453e-10	3.565e-10
0.5	1.821e+01	1.258e-05	1.286e-05	2.469e-08	2.523e-08
0.6	2.711e+06	2.251e+00	2.294e+00	4.393e-03	4.478e-03
0.8	1.174e+03	1.303e-03	1.323e-03	2.478e-06	2.517e-06
1.0	7.850e+04	1.091e-01	1.105e-01	2.011e-04	2.038e-04
1.5	7.850e+04	1.642e-01	1.658e-01	2.762e-04	2.789e-04
<b>TOTALS:</b>	<b>3.090e+06</b>	<b>2.534e+00</b>	<b>2.582e+00</b>	<b>4.951e-03</b>	<b>5.050e-03</b>

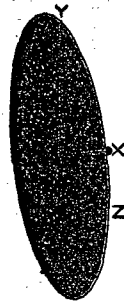
TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date : February 21, 2006  
Run Time : 12:02:54 PM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 319 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 282.0 cm 9 ft 3.0 in

Dose Points  
# 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shields  
Shield Name Material Density  
Air Gap Air 0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Library : Grove

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	5.3714e-008	1.9874e+003	2.1500e-007	7.9550e-003
Ba-137m	4.0651e-005	1.5041e+006	1.6271e-004	6.0203e+000
Co-60	1.0593e-006	3.9194e+004	4.2400e-006	1.5688e-001
Cs-134	1.6839e-008	6.2303e+002	6.7400e-008	2.4938e-003
Cs-137	4.2971e-005	1.5899e+006	1.7200e-004	6.3640e+000
Pu-238	5.9960e-008	2.2185e+003	2.4000e-007	8.8800e-003
Pu-239	1.9087e-008	7.0623e+002	7.6400e-008	2.8268e-003
Pu-240	1.9087e-008	7.0623e+002	7.6400e-008	2.8268e-003
Pu-241	2.7232e-006	1.0076e+005	1.0900e-005	4.0330e-001
Sr-90	5.3714e-008	1.9874e+003	2.1500e-007	7.9550e-003
Y-90	5.3714e-008	1.9874e+003	2.1500e-007	7.9550e-003

Buildup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

Page : 2  
 DOS File : Case1  
 Run Date: February 21, 2006  
 Run Time: 12:02:54 PM  
 Duration : 00:00:00

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u>		<u>Exposure Rate</u> <u>mR/hr</u>	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.03	8.864e+04	5.429e-03	5.888e-03	5.380e-05	5.835e-05
0.04	2.091e+04	1.743e-03	1.889e-03	7.708e-06	8.356e-06
0.05	3.705e-01	3.891e-08	4.211e-08	1.036e-10	1.122e-10
0.06	7.181e+02	9.083e-05	9.793e-05	1.804e-07	1.945e-07
0.1	3.360e-01	7.129e-08	7.548e-08	1.091e-10	1.155e-10
0.3	2.206e-01	1.418e-07	1.455e-07	2.689e-10	2.761e-10
0.5	9.096e+00	9.786e-06	9.964e-06	1.921e-08	1.956e-08
0.6	1.354e+06	1.751e+00	1.779e+00	3.417e-03	3.472e-03
0.8	5.865e+02	1.013e-03	1.026e-03	1.927e-06	1.952e-06
1.0	3.921e+04	8.480e-02	8.573e-02	1.563e-04	1.580e-04
1.5	3.921e+04	1.275e-01	1.286e-01	2.146e-04	2.163e-04
<b>TOTALS:</b>	<b>1.543e+06</b>	<b>1.971e+00</b>	<b>2.002e+00</b>	<b>3.852e-03</b>	<b>3.915e-03</b>

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

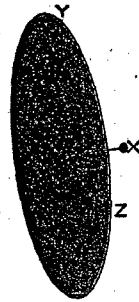
PAGE 206 OF 215

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date : February 21, 2006  
Run Time : 12:03:09 PM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 319 m2 at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 219.0 cm 7 ft 2.2 in

Dose Points  
# 1 X 100 cm 0 cm 0 cm  
3 ft 3.4 in 0.0 in 0.0 in

Shields  
Shield Name Material Density  
Air Gap Air 0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Library : Grove

Nuclide	curies	becquerels	uCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	3.2395e-008	1.1986e+003	2.1500e-007	7.9550e-003
Ba-137m	2.4516e-005	9.0711e+005	1.6271e-004	6.0203e+000
Co-60	6.3886e-007	2.3638e+004	4.2400e-006	1.5688e-001
Cs-134	1.0155e-008	3.7575e+002	6.7400e-008	2.4938e-003
Cs-137	2.5916e-005	9.5889e+005	1.7200e-004	6.3640e+000
Pu-238	3.6162e-008	1.3380e+003	2.4000e-007	8.8800e-003
Pu-239	1.1511e-008	4.2593e+002	7.6400e-008	2.8268e-003
Pu-240	1.1511e-008	4.2593e+002	7.6400e-008	2.8268e-003
Pu-241	1.6423e-006	6.0767e+004	1.0900e-005	4.0330e-001
Sr-90	3.2395e-008	1.1986e+003	2.1500e-007	7.9550e-003
Y-90	3.2395e-008	1.1986e+003	2.1500e-007	7.9550e-003

Bulldup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date: February 21, 2006  
 Run Time: 12:03:09 PM  
 Duration : 00:00:00

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm <sup>2</sup> /sec		<u>Exposure Rate</u> mR/hr	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.03	5.346e+04	4.389e-03	4.715e-03	4.350e-05	4.673e-05
0.04	1.261e+04	1.406e-03	1.509e-03	6.217e-06	6.676e-06
0.05	2.235e-01	3.135e-08	3.361e-08	8.352e-11	8.955e-11
0.06	4.331e+02	7.316e-05	7.818e-05	1.453e-07	1.553e-07
0.1	2.027e-01	5.737e-08	6.034e-08	8.777e-11	9.231e-11
0.3	1.330e-01	1.140e-07	1.166e-07	2.162e-10	2.212e-10
0.5	5.486e+00	7.863e-06	7.989e-06	1.543e-08	1.568e-08
0.6	8.167e+05	1.406e+00	1.426e+00	2.745e-03	2.784e-03
0.8	3.537e+02	8.137e-04	8.228e-04	1.548e-06	1.565e-06
1.0	2.365e+04	6.810e-02	6.875e-02	1.255e-04	1.267e-04
1.5	2.365e+04	1.024e-01	1.031e-01	1.723e-04	1.735e-04
<b>TOTALS:</b>	9.308e+05	1.584e+00	1.605e+00	3.094e-03	3.139e-03

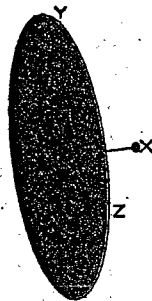


MicroShield v5.05 (5.05-00488)  
 Sacramento Municipal Utility District

Page : 1  
 DOS File : Case1  
 Run Date : February 21, 2006  
 Run Time : 12:03:26 PM  
 Duration : 00:00:00

File Ref: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 By: \_\_\_\_\_  
 Checked: \_\_\_\_\_

Case Title: 319 m2 at Gross DCGL  
 Description: Case 1  
 Geometry: 3 - Disk



Source Dimensions  
 Radius 178.0 cm 5 ft 10.1 in

Dose Points  
 # 1 X 100 cm 0 cm 0 cm  
 3 ft 3.4 in 0.0 in 0.0 in

Shields  
 Shield Name Material Density  
 Air Gap Air 0.00122

Source Input  
 Grouping Method : Standard Indices  
 Number of Groups : 25  
 Lower Energy Cutoff : 0.015  
 Photons < 0.015 : Excluded  
 Library : Grove

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	2.1401e-008	7.9183e+002	2.1500e-007	7.9550e-003
Ba-137m	1.6196e-005	5.9925e+005	1.6271e-004	6.0203e+000
Co-60	4.2204e-007	1.5616e+004	4.2400e-006	1.5688e-001
Cs-134	6.7089e-009	2.4823e+002	6.7400e-008	2.4938e-003
Cs-137	1.7121e-005	6.3346e+005	1.7200e-004	6.3640e+000
Pu-238	2.3889e-008	8.8390e+002	2.4000e-007	8.8800e-003
Pu-239	7.6047e-009	2.8137e+002	7.6400e-008	2.8268e-003
Pu-240	7.6047e-009	2.8137e+002	7.6400e-008	2.8268e-003
Pu-241	1.0850e-006	4.0144e+004	1.0900e-005	4.0330e-001
Sr-90	2.1401e-008	7.9183e+002	2.1500e-007	7.9550e-003
Y-90	2.1401e-008	7.9183e+002	2.1500e-007	7.9550e-003

Bulldup  
 The material reference is : Air Gap

Integration Parameters  
 Radial 20  
 Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date: February 21, 2006  
 Run Time: 12:03:26 PM  
 Duration : 00:00:00

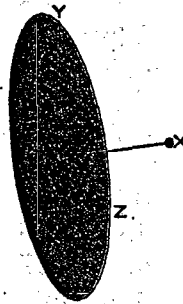
<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm <sup>2</sup> /sec		<u>Exposure Rate</u> mR/hr	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.03	3.532e+04	3.586e-03	3.828e-03	3.554e-05	3.793e-05
0.04	8.330e+03	1.147e-03	1.223e-03	5.071e-06	5.411e-06
0.05	1.476e-01	2.556e-08	2.723e-08	6.808e-11	7.254e-11
0.06	2.861e+02	5.962e-05	6.333e-05	1.184e-07	1.258e-07
0.1	1.339e-01	4.673e-08	4.893e-08	7.149e-11	7.485e-11
0.3	8.787e-02	9.275e-08	9.473e-08	1.759e-10	1.797e-10
0.5	3.624e+00	6.397e-06	6.491e-06	1.256e-08	1.274e-08
0.6	5.395e+05	1.144e+00	1.159e+00	2.233e-03	2.262e-03
0.8	2.337e+02	6.618e-04	6.686e-04	1.259e-06	1.272e-06
1.0	1.562e+04	5.538e-02	5.587e-02	1.021e-04	1.030e-04
1.5	1.562e+04	8.325e-02	8.379e-02	1.401e-04	1.410e-04
<b>TOTALS:</b>	<b>6.149e+05</b>	<b>1.288e+00</b>	<b>1.304e+00</b>	<b>2.517e-03</b>	<b>2.551e-03</b>

MicroShield v5.05 (5.05-00488)  
 Sacramento Municipal Utility District

Page : 1  
 DOS File : Case1  
 Run Date : February 21, 2006  
 Run Time : 12:03:44 PM  
 Duration : 00:00:00

File Ref: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 By: \_\_\_\_\_  
 Checked: \_\_\_\_\_

Case Title: 319 m2 at Gross DCGL  
 Description: Case 1  
 Geometry: 3 - Disk



Source Dimensions  
 Radius 126.0 cm 4 ft 1.6 in

Dose Points  
 # 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shield Name	Material	Density
Air Gap	Air	0.00122

Source Input  
 Grouping Method : Standard Indices  
 Number of Groups : 25  
 Lower Energy Cutoff : 0.015  
 Photons < 0.015 : Excluded

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	1.0723e-008	3.9676e+002	2.1500e-007	7.9550e-003
Ba-137m	8.1154e-006	3.0027e+005	1.6271e-004	6.0203e+000
Co-60	2.1147e-007	7.8245e+003	4.2400e-006	1.5688e-001
Cs-134	3.3616e-009	1.2438e+002	6.7400e-008	2.4938e-003
Cs-137	8.5787e-006	3.1741e+005	1.7200e-004	6.3640e+000
Pu-238	1.1970e-008	4.4290e+002	2.4000e-007	8.8800e-003
Pu-239	3.8105e-009	1.4099e+002	7.6400e-008	2.8268e-003
Pu-240	3.8105e-009	1.4099e+002	7.6400e-008	2.8268e-003
Pu-241	5.4365e-007	2.0115e+004	1.0900e-005	4.0330e-001
Sr-90	1.0723e-008	3.9676e+002	2.1500e-007	7.9550e-003
Y-90	1.0723e-008	3.9676e+002	2.1500e-007	7.9550e-003

Bulldup  
 The material reference is : Air Gap

Integration Parameters  
 Radial 20  
 Circumferential 20

Results

Page : 2  
 DOS File : Case1  
 Run Date : February 21, 2006  
 Run Time : 12:03:44 PM  
 Duration : 00:00:00

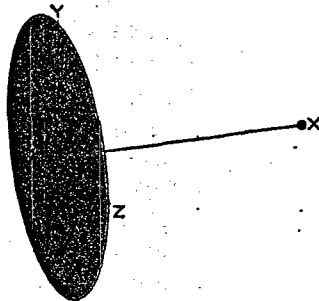
<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u>		<u>Exposure Rate</u> <u>mR/hr</u>	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.03	1.770e+04	2.405e-03	2.547e-03	2.383e-05	2.524e-05
0.04	4.174e+03	7.674e-04	8.124e-04	3.394e-06	3.593e-06
0.05	7.397e-02	1.709e-08	1.807e-08	4.553e-11	4.814e-11
0.06	1.434e+02	3.986e-05	4.203e-05	7.917e-08	8.348e-08
0.1	6.709e-02	3.123e-08	3.251e-08	4.777e-11	4.974e-11
0.3	4.403e-02	6.191e-08	6.307e-08	1.174e-10	1.196e-10
0.5	1.816e+00	4.269e-06	4.323e-06	8.379e-09	8.486e-09
0.6	2.703e+05	7.633e-01	7.719e-01	1.490e-03	1.507e-03
0.8	1.171e+02	4.415e-04	4.454e-04	8.397e-07	8.472e-07
1.0	7.828e+03	3.694e-02	3.722e-02	6.808e-05	6.861e-05
1.5	7.828e+03	5.551e-02	5.582e-02	9.339e-05	9.392e-05
<b>TOTALS:</b>	<b>3.081e+05</b>	<b>8.594e-01</b>	<b>8.688e-01</b>	<b>1.680e-03</b>	<b>1.699e-03</b>

**MicroShield v5.05 (5.05-00488)**  
**Sacramento Municipal Utility District**

Page : 1  
DOS File : Case1  
Run Date: February 21, 2006  
Run Time: 12:04:01 PM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

**Case Title: 319 m<sup>2</sup> at Gross DCGL**  
**Description: Case 1**  
**Geometry: 3 - Disk**



**Source Dimensions**  
Radius 56.0 cm 1 ft 10.0 in

**Dose Points**

#	X	Y	Z
# 1	100 cm 3 ft 3.4 in	0 cm 0.0 in	0 cm 0.0 in

**Shields**

Shield Name	Material	Density
Air Gap	Air	0.00122

**Source Input**  
**Grouping Method : Standard Indices**  
**Number of Groups : 25**  
**Lower Energy Cutoff : 0.015**  
**Photons < 0.015 : Excluded**

**Library : Grove**

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	2.1182e-009	7.8373e+001	2.1500e-007	7.9550e-003
Ba-137m	1.6030e-006	5.9313e+004	1.6271e-004	6.0203e+000
Co-60	4.1773e-008	1.5456e+003	4.2400e-006	1.5688e-001
Cs-134	6.6403e-010	2.4569e+001	6.7400e-008	2.4938e-003
Cs-137	1.6945e-006	6.2698e+004	1.7200e-004	6.3640e+000
Pu-238	2.3645e-009	8.7486e+001	2.4000e-007	8.8800e-003
Pu-239	7.5270e-010	2.7850e+001	7.6400e-008	2.8268e-003
Pu-240	7.5270e-010	2.7850e+001	7.6400e-008	2.8268e-003
Pu-241	1.0739e-007	3.9733e+003	1.0900e-005	4.0330e-001
Sr-90	2.1182e-009	7.8373e+001	2.1500e-007	7.9550e-003
Y-90	2.1182e-009	7.8373e+001	2.1500e-007	7.9550e-003

**Bulldup**  
**The material reference is : Air Gap**

**Integration Parameters**

Radial	20
Circumferential	20

**Results**

Page : 2  
 DOS File : Case1  
 Run Date : February 21, 2006  
 Run Time : 12:04:01 PM  
 Duration : 00:00:00

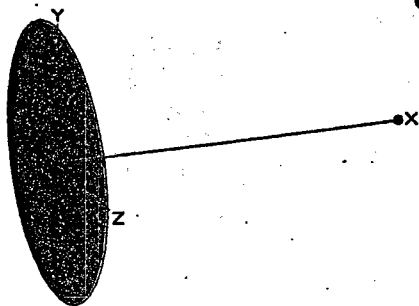
<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm<sup>2</sup>/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.03	3.496e+03	6.957e-04	7.299e-04	6.895e-06	7.234e-06
0.04	8.245e+02	2.215e-04	2.323e-04	9.795e-07	1.027e-06
0.05	1.461e-02	4.929e-09	5.164e-09	1.313e-11	1.376e-11
0.06	2.832e+01	1.149e-05	1.201e-05	2.282e-08	2.385e-08
0.1	1.325e-02	8.993e-09	9.302e-09	1.376e-11	1.423e-11
0.3	8.697e-03	1.781e-08	1.809e-08	3.379e-11	3.432e-11
0.5	3.587e-01	1.227e-06	1.241e-06	2.409e-09	2.435e-09
0.6	5.340e+04	2.195e-01	2.215e-01	4.283e-04	4.324e-04
0.8	2.313e+01	1.269e-04	1.278e-04	2.413e-07	2.432e-07
1.0	1.546e+03	1.061e-02	1.068e-02	1.957e-05	1.969e-05
1.5	1.546e+03	1.595e-02	1.602e-02	2.683e-05	2.696e-05
TOTALS:	6.086e+04	2.471e-01	2.493e-01	4.829e-04	4.875e-04

MicroShield v5.05 (5.05-00488)  
Sacramento Municipal Utility District

Page : 1  
DOS File : Case1  
Run Date : February 21, 2006  
Run Time : 12:04:15 PM  
Duration : 00:00:00

File Ref: \_\_\_\_\_  
Date: \_\_\_\_\_  
By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Case Title: 319 m<sup>2</sup> at Gross DCGL  
Description: Case 1  
Geometry: 3 - Disk



Source Dimensions  
Radius 40.0 cm 1 ft 3.7 in

Dose Points  
# 1 X 100 cm 3 ft 3.4 in Y 0 cm 0.0 in Z 0 cm 0.0 in

Shields  
Shield Name Material Density  
Air Gap Air 0.00122

Source Input  
Grouping Method : Standard Indices  
Number of Groups : 25  
Lower Energy Cutoff : 0.015  
Photons < 0.015 : Excluded

Nuclide	curies	becquerels	µCi/cm <sup>2</sup>	Bq/cm <sup>2</sup>
Am-241	1.0807e-009	3.9986e+001	2.1500e-007	7.9550e-003
Ba-137m	8.1788e-007	3.0262e+004	1.6271e-004	6.0203e+000
Co-60	2.1313e-008	7.8856e+002	4.2400e-006	1.5688e-001
Cs-134	3.3879e-010	1.2535e+001	6.7400e-008	2.4938e-003
Cs-137	8.6457e-007	3.1989e+004	1.7200e-004	6.3640e+000
Pu-238	1.2064e-009	4.4636e+001	2.4000e-007	8.8800e-003
Pu-239	3.8403e-010	1.4209e+001	7.6400e-008	2.8268e-003
Pu-240	3.8403e-010	1.4209e+001	7.6400e-008	2.8268e-003
Pu-241	5.4789e-008	2.0272e+003	1.0900e-005	4.0330e-001
Sr-90	1.0807e-009	3.9986e+001	2.1500e-007	7.9550e-003
Y-90	1.0807e-009	3.9986e+001	2.1500e-007	7.9550e-003

Bulldup  
The material reference is : Air Gap

Integration Parameters  
Radial 20  
Circumferential 20

Results

TITLE: Use of a Survey Unit Size of 319 m<sup>2</sup> For Class One Structure Surveys  
at Rancho Seco Nuclear Generating Station

Page : 2  
 DOS File : Case1  
 Run Date : February 21, 2006  
 Run Time : 12:04:15 PM  
 Duration : 00:00:00

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm <sup>2</sup> /sec		<u>Exposure Rate</u> mR/hr	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.03	1.783e+03	3.790e-04	3.971e-04	3.757e-06	3.935e-06
0.04	4.207e+02	1.206e-04	1.263e-04	5.335e-07	5.587e-07
0.05	7.455e-03	2.684e-09	2.808e-09	7.150e-12	7.480e-12
0.06	1.445e+01	6.256e-06	6.530e-06	1.243e-08	1.297e-08
0.1	6.761e-03	4.896e-09	5.059e-09	7.491e-12	7.740e-12
0.3	4.437e-03	9.696e-09	9.843e-09	1.839e-11	1.867e-11
0.5	1.830e-01	6.681e-07	6.750e-07	1.311e-09	1.325e-09
0.6	2.724e+04	1.194e-01	1.205e-01	2.331e-04	2.353e-04
0.8	1.180e+01	6.906e-05	6.956e-05	1.314e-07	1.323e-07
1.0	7.889e+02	5.777e-03	5.813e-03	1.065e-05	1.071e-05
1.5	7.889e+02	8.679e-03	8.719e-03	1.460e-05	1.467e-05
TOTALS:	3.105e+04	1.345e-01	1.357e-01	2.628e-04	2.653e-04