



**BARTLETT**

**ENGINEERING CALCULATION**

Calculation Number: ENG-HB-004

Revision Number: 0

Calculation Title: Humboldt Bay Building Surface Derived Concentration  
Guideline Levels

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## 1.0 PURPOSE

The purpose of this calculation is to develop building surface derived concentration guideline levels (DCGLs) to support final status surveys at the Humboldt Bay site. This calculation is part of the scope of work defined in Contract No. GT012 3500895165.

## 2.0 APPLICABILITY

This calculation addresses only the development of building surface DCGLs for Humboldt Bay.

## 3.0 REFERENCES

- 3.1 Bartlett Engineering Procedure ENG-AP-02, *Verification of Software Operability*
- 3.2 *User's Manual for RESRAD-Build Version 3.0*, June 2003 (ANL/EAD/03-1)
- 3.3 Bartlett Engineering Calculation ENG-HB-002, *RESRAD-Build Input Parameter Sensitivity Analysis – Humboldt Bay*
- 3.4 NUREG/CR-5512, *Residual Radioactive Contamination from Decommissioning*
  - Volume 1: *Technical Basis for Translating Contamination Levels to Annual Total Effective Dose Equivalent*, Oct. 1992 (PNL-7994)
  - Volume 3: *Parameter Analysis, Draft Report for Comment*, Oct. 1999 (SAND99-2148)
- 3.5 NUREG/CR-6697, *Development of Probabilistic RESRAD 6.0 and RESRAD-Build 3.0 Computer Codes*, Nov. 2000 (ANL/EAD/TM-98)
- 3.6 NUREG/CR-6755, *Technical Basis for Calculating Radiation Doses for the Building Occupancy Scenario Using the Probabilistic RESRAD-Build 3.0 Code*, Feb. 2002 (ANL/EAD/TM/02-1)
- 3.7 NUREG-1727, *NMSS Decommissioning Standard Review Plan*, Sept. 2000

## 4.0 METHOD OF CALCULATION

The operability of the RESRAD-Build code was verified on each computer used for code executions in accordance with Engineering procedure ENG-AP-02, *Verification of Software Operability* [ref. 3.1]. The RESRAD-Build user's manual [ref. 3.2] provided guidance for code operation.

Version 3.5 of the RESRAD-Build code was used to calculate building surface DCGL values. The RESRAD-Build computer code is a pathway analysis model designed to evaluate the potential radiological dose incurred by an individual who works in a building contaminated with radioactive material. The exposure scenario modeled in this calculation is the building renovation scenario. The exposure pathways considered are (i) direct external exposure from the source (i.e., radioactive material deposited on the floor, walls, and ceiling), (ii) external exposure from deposited material, (iii) external exposure due to air submersion, (iv) exposure

due to inhalation of airborne radioactive material, (v) ingestion of radioactive material directly from the sources and material deposited on the surfaces.

The RESRAD-Build code requires input for numerous parameters in order to calculate the dose via various exposure pathways to a hypothetical individual working in a building contaminated with radioactive material. Bartlett Engineering Calculation ENG-HB-002 [ref. 3.3] documents the selection process and sensitivity analyses performed for these numerous parameters; this calculation incorporates those results. The sensitivity analyses performed for the building renovation scenario input parameters identified four sensitive input parameters (i.e., parameters whose values greatly influence the calculated dose) for that scenario: deposition velocity, resuspension rate, time for source removal, and room air exchange rate. All other input parameters for the building renovation scenario were non-sensitive.

In order to support the development of building surface DCGLs, Bartlett Engineering Calculation ENG-HB-002 [ref. 3.3] provided recommendations for reasonably conservative values for the sensitive parameters: 25<sup>th</sup> and 75<sup>th</sup> percentiles of the input parameter distributions. Use of 25<sup>th</sup> and 75<sup>th</sup> percentiles values provides assurance that the DCGL calculations take into account the uncertainties associated with these sensitive input parameters. The input values used in this calculation are consistent with both the selected scenario and the results of the sensitivity analyses.

RESRAD-Build version 3.5 code runs were performed for each of the radionuclides-of-concern (ROCs) for the Humboldt Bay site. Because each radionuclide was entered at a concentration of 1.0 pCi/m<sup>2</sup> and RESRAD-Build code calculates the annual dose associated with that contamination level, the RESRAD-Build results (i.e., mrem/y per 1.0 pCi/m<sup>2</sup>) were used as a dose conversion factor (DCF) to obtain building surface DCGL values that corresponded to the targeted acceptance criterion, 25 mrem/y. This was accomplished using the following conversions:

The targeted acceptance criterion, 25 mrem/y, divided by the RESRAD-Build DCF, mrem/y per pCi/m<sup>2</sup> = the DCGL in units of pCi/m<sup>2</sup> corresponding to 25 mrem/y.

The next step was to convert the 25-mrem/y DCGL values (in units of pCi/m<sup>2</sup>) to practical values (in units of dpm/100cm<sup>2</sup>) that would support decommissioning and final status survey activities:

25-mrem/y DCGL (in pCi/m<sup>2</sup>) • (2.22 dpm/1 pCi) • (1m/100cm)<sup>2</sup> • 100 = 25-mrem/y DCGL in units of dpm/100cm<sup>2</sup>

## 5.0 ASSUMPTIONS AND INPUT

### 5.1 Assumptions

- Building Occupancy Scenario description: The RESRAD-Build code v3.5 was used to model (through use of input parameter values) the building occupancy scenario defined in NUREG/CR-5512, volume 1 [ref. 3.5]. The following exposure pathways are assumed active: (i) direct external exposure from the source (i.e., residual radioactive material on the floor, walls, and ceiling), (ii) external exposure from deposited airborne material, (iii) external exposure due to air submersion, (iv) exposure due to inhalation of airborne radioactive material, (v) ingestion of radioactive material directly from the sources and material deposited on the surfaces.

- Twenty-two ROCs are identified for the Humboldt Bay: Am-241, C-14, Cm243/244/245/246, Co-60, Cs-137, Eu-152, Eu-154, H-3, I-129, Nb-94, Ni-59, Ni-63, Np-237, Pu-238/239/240/241, Sr-90, and Tc-99.
- The hypothetical individual occupies a room and performs work-related activities inside the building for a full occupational year (assumed equivalent to 97.5 twenty-four hours days [ref.3.5]).
- Conservative breathing rate equal to 45.6 m<sup>3</sup>/d, a rate appropriate for moderate to heavy activity [ref. 3.6].
- The dimensions assumed for the General Office Building (selected as a representative room for the Humboldt Bay site) are shown in Figure 1.

## 5.2 Input

- Table 1 summarizes the classification, prioritization, values and their bases for all input parameters.
- Values from NUREG/CR-5512, volume 3 [ref. 3.5], NUREG/CR-6697 [ref. 3.6], NUREG/CR-6755 [ref. 3.7], or NUREG-1727 [ref. 3.8] were assigned for the following scenario-defined parameters:
  - Exposure duration: 365.25 d
  - Indoor fraction: 0.267 (= 97.5 work d/y divided by 365.25 d/y)
  - Breathing rate: 45.6 m<sup>3</sup>/d (= 24h x 1.9 m<sup>3</sup>/h, a rate appropriate for moderate to heavy activity [ref. 3.6]).
  - Receptor location (center of room): 4.24m, 2.82m, 1.0m
  - Indirect ingestion rate: 1.1E-04 m<sup>2</sup>/h
  - Air fraction: 0.07 for all nuclides except H-3; 1.0 for H-3
  - Removable fraction: 0.1
- Site-specific information (i.e., room dimensions) was used as the basis in calculations (see section 6.0) of values for the following parameters:
  - Room area
  - Room height
  - Receptor location
  - Location of center of source
  - Source length
  - Source area
- 25<sup>th</sup> or 75<sup>th</sup> percentile values from Bartlett Engineering Calculation ENG-HB-002 [ref. 3.3] were used as input for the sensitive parameters: deposition velocity, resuspension rate, time for source removal, and room air exchange rate. Table 1 shows these values.

Table 1: Percentile values for sensitive input parameters  
(data taken from Table 5 in Reference. 3.3)

Parameter <sup>a</sup>	Percentile Value		
	25th	50th	75th
UD	1.51790E-05	8.52364E-05	4.78217E-04
DKSUS	6.70403E-10	1.79444E-08	4.87543E-07
RFO(1)	1.82493E+04	3.30569E+04	5.26952E+04
RFO(2)	1.82301E+04	3.32029E+04	5.27188E+04
RFO(3)	1.81302E+04	3.30489E+04	5.27756E+04
RFO(4)	1.82071E+04	3.30410E+04	5.27269E+04
RFO(5)	1.80948E+04	3.31085E+04	5.27132E+04
RFO(6)	1.82466E+04	3.30500E+04	5.26222E+04
LAMBDAT	8.35789E-01	1.51522E+00	2.72646E+00

<sup>a</sup> RFO(#) = source removal time (for source number), UD = deposition velocity, DKSUS = resuspension rate, and LAMBDAT = room air exchange rate.

**Note:** The parameters, deposition velocity (UD) and the resuspension rate (DKSUS), were not identified as sensitive for all sources of Co-60, Eu-152, and Eu-154 in the sensitivity analysis (see Table 4 in reference 3.3). The 75<sup>th</sup> percentile values were used as conservative input for all Co-60, Eu-152, and Eu-154 sources because only RESRAD-Build accepts and applies a single input value for these parameters to all sources.

## 6.0 CALCULATIONS AND RESULTS

6.1 Room dimensions: The dimensions of a representative room are shown in Figure 1. Table 2 shows the unit conversion for the room dimensions and the area associated with each source (i.e., floor, walls, and ceiling).

6.2 Direct ingestion rate ( $h^{-1}$ ) is calculated from the indirect ingestion rate from NUREG/CR-6755 [ref. 3.7],  $1.1E-04 \text{ m}^2/h$ , and the total source area,  $118.36 \text{ m}^2$ , as follows:

$$(1.1E-04 \text{ m}^2/h)/(118.03 \text{ m}^2) = 9.32E-07 \text{ h}^{-1}$$

6.3 Location of the center of source: The center of each source was determined based on the representative room dimensions. The locations were determined as the mid-point of the dimension values for the X, Y, and Z-axes. Table 3 presents the locations for the center of the sources.

6.4 RESRAD-Build v3.4 results: Table 4 (pages 9 through 14) summarizes the input used in each RESRAD-Build code execution.

6.4.1 Each of the radionuclides listed in section 5.1 was evaluated using an initial concentration of  $1.0 \text{ pCi/m}^2$  in separate code executions.

6.4.2 Several evaluation times (t) were used to identify the approximate time of maximum dose. For all ROCs except Pu-241, the maximum dose occurred in the first time interval (0-1 year; see Ref. 3.3). For Pu-241, the

maximum dose may occur at a later time. Therefore, multiple time intervals were used for Pu-241 to assure that the maximum dose was used to develop the DCGL value. RESRAD-Build results at the various time intervals are summarized below in Table 5.

6.5 The maximum doses shown in bold font in Table 5 were used to as the radionuclide-specific conversion factor (CF) for developing the DCGL values, which are presented in Table 6.

6.5.1 Column 2 in Table 6 presents the annual dose associated with a concentration of 1.0 pCi/m<sup>2</sup> as calculated using the RESRAD-Build code. These results were used as radionuclide-specific conversion factors (CF) with units of mrem/y per pCi/m<sup>2</sup>. For each radionuclide, DCGL values corresponding to the acceptance criterion, 25 mrem/y (designated as DCGL<sub>25</sub>), were calculated as follows:

(15 mrem/y) divided by the radionuclide-specific CF = DCGL<sub>25</sub> (pCi/m<sup>2</sup>)

The resulting DCGL<sub>15</sub> values are shown in column 3 of Table 6.

The following hand calculations verify the operation of the spreadsheet:

H-3: (25 mrem/y)/(2.98E-09 mrem/y per pCi/m<sup>2</sup>) = 8.39E+09 pCi/m<sup>2</sup>

Cs137: (25 mrem/y)/(1.15E-05 mrem/y per pCi/m<sup>2</sup>) = 2.10E+06 pCi/m<sup>2</sup>

6.5.2 Column 3 of Table 6 presents the conversions of the DCGL<sub>25</sub> values to practical values with units of dpm/100cm<sup>2</sup> (designated in Table 6 as DCGL<sub>w</sub>). These DCGL<sub>w</sub> values would support decommissioning and final status surveys at the Humboldt Bay site.

DCGL<sub>25</sub>, pCi/m<sup>2</sup> • (2.22 dpm/1pCi) • (1m<sup>2</sup>/10000cm<sup>2</sup>) • 100 = DCGL<sub>w</sub>, dpm/100cm<sup>2</sup>

The following hand calculations verify the operation of the spreadsheet:

Sr-90: (2.10E+06)(2.22)(1/10000)(100) = 4.66E+04 dpm/100cm<sup>2</sup>

Pu-239: (1.69E+05)(2.22)(1/10000)(100) = 3.75E+03 dpm/100cm<sup>2</sup>

6.6 For practical application, the DCGL<sub>w</sub> values were rounded down to 2 significant digits. Table 7 presents the rounded DCGL<sub>w</sub> values.

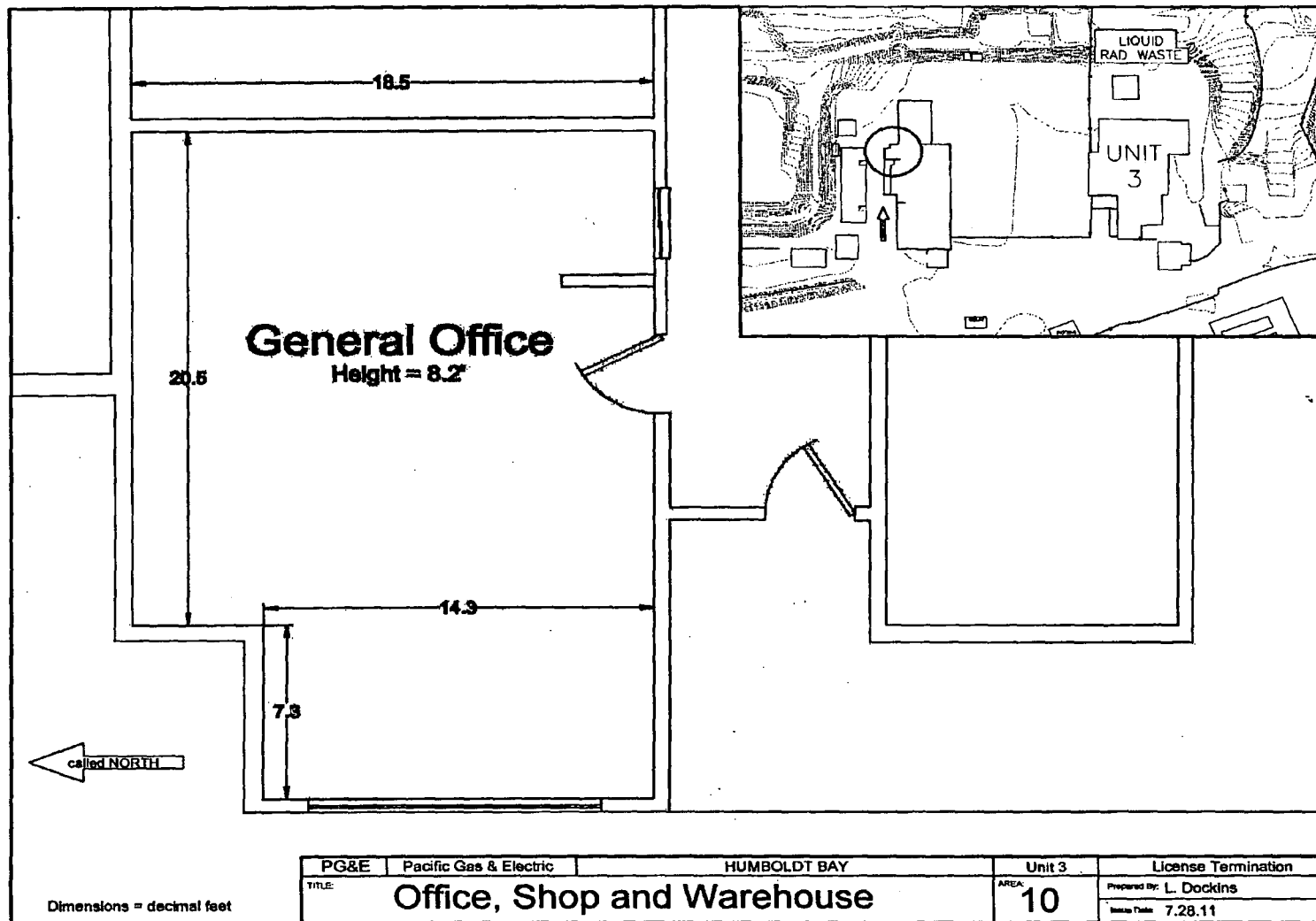


Figure 1: Dimensions of Humboldt Bay General Office Building Room

Table 2: Representative Room Dimensions  
(Based on dimensions provided in Figure 1)

Source No.	Description	Recorded Dimension (ft) <sup>a</sup>	m <sup>b</sup>	m <sup>2</sup>
1	floor	N/A		47.77
2	north wall	27.8	8.47	21.09
3	east wall	18.5	5.64	14.04
4	south wall	27.8	8.47	21.09
5	west wall	18.5	5.64	14.04
	wall height	8.17	2.49	
total source area:				118.03

<sup>a</sup> Recorded length and width dimensions for representative room (see Figure 1).

<sup>b</sup> Feet to meter conversion factor: 1ft = 0.3048m.

Table 3: Location of Center of Sources

Source No.	Source Description	Location of Center of Source (m)		
		X-axis	Y-axis	Z-axis
1	floor	4.24	2.82	0.00
2	north wall	4.24	0.00	1.25
3	east wall	0.00	2.82	1.25
4	south wall	4.24	5.64	1.25
5	west wall	8.47	2.82	1.25
6	ceiling	4.24	2.82	2.49



**Table 4: RESRAD-Build Input Parameter Values for DCGLs**

Parameter	Type <sup>a</sup>	Nuclide	Treatment <sup>b</sup>	Value/Distribution	Value Reference Source
Exposure Duration (d)	B	All	D	365	NUREG/CR-5512, Vol.3,section 5.2.1
Indoor Fraction	B	All	D	0.267	NUREG/CR-5512, Vol.3,section 5.2.2.9
Evaluation Time (y)	P	All	D	1, 5 (1, 5, 10, 25, 50, 100 for Pu-241)	Use of 1y provides doses at t=0y and t=1y; multiple input applied to verify time of peak dose
Number of Rooms	P	All	D	1	NUREG/CR-5512
Deposition Velocity (m/s)	P	Am-241, Cm-243, Cm-244, Cm-245, Cm-246, Np-237, Pu-238, Pu-239, Pu-240, and Pu-241	D	1.5179E-05	25 <sup>th</sup> percentile value
		C-14, Co-60, Cs-137, Eu-152, Eu-154, H-3, I-129, Nb-94, Ni-59, Ni-63, Sr-90, and Tc-99	D	4.78217E-04	75 <sup>th</sup> percentile value
Resuspension Rate (s <sup>-1</sup> )	P	Am-241, Cm-243, Cm-244, Np-237, Pu-238, Pu-239, Pu-240, and Pu-241	D	1.79444E-08	50 <sup>th</sup> percentile value
		C-14, Cm-245, Cm-246, Co-60, Cs-137, Eu-152, Eu-154, H-3, I-129, Nb-94, Ni-59, Ni-63, Sr-90, and Tc-99	D	6.70403E-10	25 <sup>th</sup> percentile value
Air Exchange Rate for Room (h <sup>-1</sup> )	P	All	D	8.35789E-01	25 <sup>th</sup> percentile value
Room Area (m <sup>2</sup> )	P	All	D	47.77	Humboldt Bay-specific data (General Office Building)
Room Height (m)	P	All	D	2.49	Humboldt Bay-specific data (General Office Building)
Time Fraction	B	All	D	1	NUREG/CR-5512
Inhalation Rate (m <sup>3</sup> /d)	M	All	D	45.6	Conservative inhalation rate for moderate to heavy activities - NUREG/CR-6697, Attachment C, section 5.1; NUREG/CR-5512, vol. 3, section 5.3.4
Indirect Ingestion Rate (m <sup>2</sup> /h)	B	All	D	0.0001	NUREG/CR6755
Receptor Location	B	All	D	4.24, 2.82,1.0	NUREG/CR-5512; site-specific room dimensions (General Office Building)
Shielding Thickness (cm)	P	All	D	0	Site-specific model-no shielding assumed
Shielding Density (g/cm <sup>3</sup> )	P	All	D	2.4	RESRAD-Build default value for concrete – not used in DCGL calculations
Shielding Material	P	All	D	concrete	Default input – not used in DCGL calculations
Number of Sources	P	All		6	Modeling for representative room (includes floor, 4 walls, and ceiling)

**Table 4: RESRAD-Build Input Parameter Values for DCGLs**

Parameter	Type <sup>a</sup>	Nuclide	Treatment <sup>b</sup>	Value/Distribution	Value Reference Source
External Dose Conversion Factor, (mrem/y per pCi/cm <sup>2</sup> )	M	All	D	RESRAD-Build library	FGR12
Air Submersion Dose Conversion Factor, (mrem/y per pCi/m <sup>3</sup> )	M	All	D	RESRAD-Build library	FGR12
Inhalation Dose Conversion Factor, (mrem/pCi)	M	All	D	RESRAD-Build library	FGR11
Ingestion Dose Conversion Factor, (mrem/pCi)	M	All	D	RESRAD-Build library	FGR11
<b>Source 1: Floor</b>					
Type	P	All		area	NUREG/CR-5512
Direction	P	All		Z	NUREG/CR-5512
Location of Center of Source: x,y,z (m)	P	All	D	4.24, 2.82, 0.0	site-specific data – center of floor based on dimensions for General Office Building room
Source length X-axis (m)	P	All	D	8.47	site-specific data based on dimensions for General Office Building room
Source length Y-axis (m)	P	All	D	5.64	site-specific data based on dimensions for General Office Building room
Area (m <sup>2</sup> )	P	All	D	---	Source length inputs used
Air Fraction	B	H-3 All others	D	1.0 0.07	NUREG/CR-6697, Att. C Section 8.6
Direct Ingestion (h <sup>-1</sup> )	B	All	D	9.32E-7	NUREG/CR6755, A.3.3
Removable Fraction	P	All	D	0.1	NUREG-1727, Table C.7.1; NUREG/CR-6755, section 3.5
Time for Source Removal (d)	P	C-14, Co-60, Cs-137, Eu-152, Eu-154, I-129, and Nb-94	D	52695.2	75 <sup>th</sup> percentile value
		Sr-90 and Tc-99	D	33056.9	50 <sup>th</sup> percentile value
		Am-241, Cm-243, Cm-244, Cm-245, Cm-246, H-3, Ni-59, Ni-63, Np-237, Pu-238, Pu-239, Pu-240, and Pu-241	D	18249.3	25 <sup>th</sup> percentile value
Radionuclide Concentration (pCi/m <sup>2</sup> )	P	All	D	1.0	-
<b>Source 2: North Wall</b>					
Type	P	3		Area	NUREG/CR-5512

**Table 4: RESRAD-Build Input Parameter Values for DCGLs**

Parameter	Type <sup>a</sup>	Nuclide	Treatment <sup>b</sup>	Value/Distribution	Value Reference Source
Direction	P	3		X	NUREG/CR-5512
Location of Center of Source: x,y,z (m)	P	3	D	4.24, 0.0, 1.25	site-specific data – center of floor based on dimensions for General Office Building room
Source length Y-axis (m)	P	2	D	8.47	site-specific data based on dimensions for General Office Building room
Source length Z-axis (m)	P	2	D	2.49	site-specific data based on dimensions for General Office Building room
Area (m <sup>2</sup> )	P	2	D	---	Source length inputs used
Air Fraction	B	H-3 All others	D	1.0 0.07	NUREG/CR-6697, Att. C Section 8.6
Direct Ingestion (h <sup>-1</sup> )	B	2	D	9.32E-7	NUREG/CR6755, A.3.3
Removable Fraction	P	1	D	0.1	NUREG-1727, Table C.7.1; NUREG/CR-6755, section 3.5
Time for Source Removal (d)	P	C-14, Co-60, Cs-137, Eu-152, Eu-154, and I-129	D	52718.8	75 <sup>th</sup> percentile value
		Nb-94, Sr-90, and Tc-99	D	33202.9	50 <sup>th</sup> percentile value
		Am-241, Cm-243, Cm-244, Cm-245, Cm-246, H-3, Ni-59, Ni-63, Np-237, Pu-238, Pu-239, Pu-240, and Pu-241	D	18230.1	25 <sup>th</sup> percentile value
Radionuclide Concentration (pCi/m <sup>2</sup> )	P	2	D	1.0	-
<b>Source 3: East Wall</b>					
Type	P	3		Area	NUREG/CR-5512
Direction	P	3		Y	NUREG/CR-5512
Location of Center of Source: x,y,z (m)	P	3	D	0.00, 2.82, 1.25	site-specific data – center of floor based on dimensions for General Office Building room
Source length X-axis (m)	P	2	D	5.64	site-specific data based on dimensions for General Office Building room
Source length Z-axis (m)	P	2	D	2.49	site-specific data based on dimensions for General Office Building room
Area (m <sup>2</sup> )	P	2	D	---	Source length inputs used

**Table 4: RESRAD-Build Input Parameter Values for DCGLs**

Parameter	Type <sup>a</sup>	Nuclide	Treatment <sup>b</sup>	Value/Distribution	Value Reference Source
Air Fraction	B	H-3 All others	D	1.0 0.07	NUREG/CR-6697, Att. C Section 8.6
Direct Ingestion (h <sup>-1</sup> )	B	2	D	9.32E-7	NUREG/CR6755, A.3.3
Removable Fraction	P	1	D	0.1	NUREG-1727, Table C.7.1; NUREG/CR-6755, section 3.5
Time for Source Removal (d)	P	C-14, Co-60, Cs-137, I-129, and Tc-99	D	52775.6	75 <sup>th</sup> percentile value
		Eu-152, Eu-154, and Sr-90	D	33048.9	50 <sup>th</sup> percentile value
		Am-241, Cm-243, Cm-244, Cm-245, Cm-246, H-3, Nb-94, Ni-59, Ni-63, Np-237, Pu-238, Pu-239, Pu-240, and Pu-241	D	18130.2	25 <sup>th</sup> percentile value
Radionuclide Concentration (pCi/m <sup>2</sup> )	P	2	D	1.0	-
<b>Source 4: South Wall</b>					
Type	P	3		area	NUREG/CR-5512
Direction	P	3		X	NUREG/CR-5512
Location of Center of Source: x,y,z (m)	P	3	D	4.24, 5.64, 1.25	site-specific data – center of floor based on dimensions for General Office Building room
Source length Y-axis (m)	P	2	D	8.47	site-specific data based on dimensions for General Office Building room
Source length Z-axis (m)	P	2	D	2.49	site-specific data based on dimensions for General Office Building room
Area (m <sup>2</sup> )	P	2	D	---	Source length inputs used
Air Fraction	B	H-3 All others	D	1.0 0.07	NUREG/CR-6697, Att. C Section 8.6
Direct Ingestion (h <sup>-1</sup> )	B	2	D	9.32E-7	NUREG/CR6755, A.3.3
Removable Fraction	P	1	D	0.1	NUREG-1727, Table C.7.1; NUREG/CR-6755, section 3.5

Table 4: RESRAD-Build Input Parameter Values for DCGLs					
Parameter	Type <sup>a</sup>	Nuclide	Treatment <sup>b</sup>	Value/Distribution	Value Reference Source
Time for Source Removal (d)	P	C-14, Co-60, Cs-137, Eu-154, I-129, and Tc-99	D	52726.9	75 <sup>th</sup> percentile value
		Nb-94 and Sr-90	D	33041.0	50 <sup>th</sup> percentile value
		Am-241, Cm-243, Cm-244, Cm-245, Cm-246, Eu-152, H-3, Ni-59, Ni-63, Np-237, Pu-238, Pu-239, Pu-240, and Pu-241	D	18207.1	25 <sup>th</sup> percentile value
Radionuclide Concentration (pCi/m <sup>2</sup> )	P	2	D	1.0	-
Source 5: West Wall					
Type	P	3		area	NUREG/CR-5512
Direction	P	3		Y	NUREG/CR-5512
Location of Center of Source: x,y,z (m)	P	3	D	8.47, 2.82, 1.25	site-specific data – center of floor based on dimensions for General Office Building room
Source length X-axis (m)	P	2	D	5.64	site-specific data based on dimensions for General Office Building room
Source length Z-axis (m)	P	2	D	2.49	site-specific data based on dimensions for General Office Building room
Area (m <sup>2</sup> )	P	2	D	---	Source length inputs used
Air Fraction	B	H-3	D	1.0	NUREG/CR-6697, Att. C Section 8.6
		All others		0.07	
Direct Ingestion (h <sup>-1</sup> )	B	2	D	9.32E-7	NUREG/CR6755, A.3.3
Removable Fraction	P	1	D	0.1	NUREG-1727, Table C.7.1; NUREG/CR-6755, section 3.5
Time for Source Removal (d)	P	C-14, Co-60, Cs-137, I-129, and Tc-99	D	52713.2	75 <sup>th</sup> percentile value
		Eu-152, Eu-154, and Sr-90	D	33108.5	50 <sup>th</sup> percentile value
		Am-241, Cm-243, Cm-244, Cm-245, Cm-246, H-3, Nb-94, Ni-59, Ni-63, Np-237, Pu-238, Pu-239, Pu-240, and Pu-241	D	18094.8	25 <sup>th</sup> percentile value
Radionuclide Concentration (pCi/m <sup>2</sup> )	P	2	D	1.0	-

**Table 4: RESRAD-Build Input Parameter Values for DCGLs**

Parameter	Type <sup>a</sup>	Nuclide	Treatment <sup>b</sup>	Value/Distribution	Value Reference Source
<b>Source 6: Ceiling</b>					
Type	P	3		area	NUREG/CR-5512
Direction	P	3		Y	NUREG/CR-5512
Location of Center of Source: x,y,z (m)	P	3	D	4.24, 2.82, 2.49	site-specific data – center of floor based on dimensions for General Office Building room
Source length X-axis (m)	P	2	D	8.47	site-specific data based on dimensions for General Office Building room
Source length Z-axis (m)	P	2	D	5.64	site-specific data based on dimensions for General Office Building room
Area (m <sup>2</sup> )	P	2	D	---	Source length inputs used
Air Fraction	B	H-3 All others	D	1.0 0.07	NUREG/CR-6697, Att. C Section 8.6
Direct Ingestion (h <sup>-1</sup> )	B	2	D	9.32E-7	NUREG/CR6755, A.3.3
Removable Fraction	P	1	D	0.1	NUREG-1727, Table C.7.1; NUREG/CR-6755, section 3.5
Time for Source Removal (d)	P	C-14, Co-60, Cs-137, Eu-152, Eu-154, I-129, and Nb-94	D	52622.2	75 <sup>th</sup> percentile value
		Sr-90 and Tc-99	D	33050.0	50 <sup>th</sup> percentile value
		Am-241, Cm-243, Cm-244, Cm-245, Cm-246, H-3, Ni-59, Ni-63, Np-237, Pu-238, Pu-239, Pu-240, and Pu-241	D	18246.6	25 <sup>th</sup> percentile value
Radionuclide Concentration (pCi/m <sup>2</sup> )	P	2	D	1.0	-

<sup>a</sup> P = physical, B = behavioral, M = metabolic; (see NUREG/CR-6697, Attachment B, Table 4.)

<sup>b</sup> D = deterministic

Table 5: Maximum Dose at Various Evaluation Times

ROC	Maximum dose (mrem) at evaluation time:						
	0y	1y	5y	10y	25y	50y	100y
Am-241	<b>1.84E-04</b>	1.81E-04	1.69E-04	---	---	---	---
C-14	<b>7.90E-08</b>	7.84E-08	7.63E-08	---	---	---	---
Cm-243	<b>1.27E-04</b>	1.22E-04	1.05E-04	---	---	---	---
Cm-244	<b>9.98E-05</b>	9.47E-05	7.65E-05	---	---	---	---
Cm-245	<b>2.48E-04</b>	2.45E-04	2.34E-04	---	---	---	---
Cm-246	<b>2.04E-04</b>	2.01E-04	1.90E-04	---	---	---	---
Co-60	<b>4.09E-05</b>	3.58E-05	2.11E-05	---	---	---	---
Cs-137	<b>1.19E-05</b>	1.16E-05	1.05E-05	---	---	---	---
Eu-152	<b>2.02E-05</b>	1.92E-05	1.55E-05	---	---	---	---
Eu-154	<b>2.15E-05</b>	1.98E-05	1.44E-05	---	---	---	---
H-3	<b>3.01E-09</b>	2.80E-09	2.10E-09	---	---	---	---
I-129	<b>1.12E-05</b>	1.12E-05	1.09E-05	---	---	---	---
Nb-94	<b>2.86E-05</b>	2.86E-05	2.85E-05	---	---	---	---
Ni-59	<b>8.77E-09</b>	8.62E-09	8.01E-09	---	---	---	---
Ni-63	<b>2.28E-08</b>	2.22E-08	1.99E-08	---	---	---	---
Np-237	<b>2.27E-04</b>	2.24E-04	2.11E-04	---	---	---	---
Pu-238	<b>1.60E-04</b>	1.57E-04	1.43E-04	---	---	---	---
Pu-239	<b>1.78E-04</b>	1.75E-04	1.65E-04	---	---	---	---
Pu-240	<b>1.78E-04</b>	1.75E-04	1.65E-04	---	---	---	---
Pu-241	3.49E-06	3.56E-06	3.75E-06	<b>3.83E-06</b>	3.35E-06	1.93E-08	1.95E-08
Sr-90	<b>5.71E-06</b>	5.52E-06	4.80E-06	---	---	---	---
Tc-99	<b>5.76E-08</b>	5.71E-08	5.50E-08	---	---	---	---

Table 6: Radionuclide-Specific DCGL Values

Nuclide	DCGL Value Development:		
	CF (mrem/y per 1pCi/m <sup>2</sup> )	DCGL <sub>25</sub> (pCi/m <sup>2</sup> )	DCGL <sub>w</sub> (dpm/100cm <sup>2</sup> )
Am-241	1.84E-04	1.36E+05	3.02E+03
C-14	7.90E-08	3.16E+08	7.03E+06
Cm-243	1.27E-04	1.97E+05	4.37E+03
Cm-244	9.98E-05	2.51E+05	5.56E+03
Cm-245	2.48E-04	1.01E+05	2.24E+03
Cm-246	2.04E-04	1.23E+05	2.72E+03
Co-60	4.09E-05	6.11E+05	1.36E+04
Cs-137	1.19E-05	2.10E+06	4.66E+04
Eu-152	2.02E-05	1.24E+06	2.75E+04
Eu-154	2.15E-05	1.16E+06	2.58E+04
H-3	3.01E-09	8.31E+09	1.84E+08
I-129	1.12E-05	2.23E+06	4.96E+04
Nb-94	2.86E-05	8.74E+05	1.94E+04
Ni-59	8.77E-09	2.85E+09	6.33E+07
Ni-63	2.28E-08	1.10E+09	2.43E+07
Np-237	2.27E-04	1.10E+05	2.44E+03
Pu-238	1.60E-04	1.56E+05	3.47E+03
Pu-239	1.78E-04	1.40E+05	3.12E+03
Pu-240	1.78E-04	1.40E+05	3.12E+03
Pu-241	3.83E-06	6.53E+06	1.45E+05
Sr-90	5.71E-06	4.38E+06	9.72E+04
Tc-99	5.76E-08	4.34E+08	9.64E+06



Table 7: Building Surface DCGL<sub>w</sub> Values by Radionuclide

Nuclide	Building Surface DCGL <sub>w</sub> (dpm/100cm <sup>2</sup> )
Am-241	3.0E+03
C-14	7.0E+06
Cm-243	4.3E+03
Cm-244	5.5E+03
Cm-245	2.2E+03
Cm-246	2.7E+03
Co-60	1.3E+04
Cs-137	4.6E+04
Eu-152	2.7E+04
Eu-154	2.5E+04
H-3	1.8E+08
I-129	4.9E+04
Nb-94	1.9E+04
Ni-59	6.3E+07
Ni-63	2.4E+07
Np-237	2.4E+03
Pu-238	3.4E+03
Pu-239	3.1E+03
Pu-240	3.1E+03
Pu-241	1.4E+05
Sr-90	9.7E+04
Tc-99	9.6E+06

Appendix A  
Selected Pages from RESRAD-Build Reports

## Am-241 Results:

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 09:56:59 Page: 1 \*\*  
Title : Humboldt Bay DCGL\_Am241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Am241.bld

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\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 09:56:59 Page: 2 \*\*  
Title : Humboldt Bay DCGL\_Am241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Am241.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	4.240	2.820	1.000	1.000	4.56E+01	1.10E-04

### Receptor-Source Shielding Relationship

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 09:56:59 Page: 3 \*\*  
Title : Humboldt Bay DCGL\_Am241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Am241.bld

### Building Information

Building Air Exchange Rate: 8.36E-01 1/hr

Height[m]	Air Exchanges [m3/hr]
Area [m2]	
H1: 2.490	Room 1
Area 47.770	LAMBDA: 8.36E-01

<=Q01: 9.94E+01  
Q10 : 9.94E+01

Deposition velocity: 1.52E-05 [m/s] Resuspension Rate: 1.79E-08 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 09:56:59 Page: 4 \*\*

Title : Humboldt Bay DCGL\_Am241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Am241.bld

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
AM-241	1.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
AM-241	1.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 09:56:59 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Am241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Am241.bld

U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
AM-241	1.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
AM-241	1.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 09:56:59 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Am241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Am241.bld

TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03
--------	-----------	-----------	-----------	-----------

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]

Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
AM-241	1.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
AM-241	1.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 09:56:59 Page: 7 \*\*  
Title : Humboldt Bay DCGL\_Am241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Am241.bld  
Evaluation Time: 0.00000000E+00 years

=====

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

=====

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
AM-241 1.000E+00  
NP-237 0.000E+00  
U-233 0.000E+00  
TH-229 0.000E+00

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
AM-241 1.000E+00  
NP-237 0.000E+00  
U-233 0.000E+00  
TH-229 0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 09:56:59 Page: 8 \*\*  
Title : Humboldt Bay DCGL\_Am241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Am241.bld  
Evaluation Time: 0.00000000E+00 years

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x

Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	AM-241	1.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	AM-241	1.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 09:56:59 Page: 9 \*\*  
Title : Humboldt Bay DCGL-Am241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Am241.bld  
Evaluation Time: 0.0000000E+00 years

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	AM-241	1.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	AM-241	1.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 09:56:59 Page: 10 \*\*  
Title : Humboldt Bay DCGL-Am241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Am241.bld  
Evaluation Time: 0.0000000E+00 years

=====

RESRAD-BUILD Dose Tables

=====

Source Contributions to Receptor Doses

=====

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	5.30E-05	2.33E-05	1.55E-05	2.33E-05	1.55E-05	5.29E-05	1.84E-04
Total	5.30E-05	2.33E-05	1.55E-05	2.33E-05	1.55E-05	5.29E-05	1.84E-04

```

** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:06:30 Page: 1 **
Title : Humboldt Bay DCGL_C14
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-C14.bld

```

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```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:06:30 Page: 2 **
Title : Humboldt Bay DCGL_C14
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-C14.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

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

Receptor	Source	Density [g/cm <sup>3</sup> ]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:06:30 Page: 3 **
Title : Humboldt Bay DCGL_C14
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-C14.bld
```

```
===== Building Information =====
```

Building Air Exchange Rate: 8.36E-01 1/hr

```

Height[m]      Air Exchanges [m3/hr]
Area [m2].
*****
*
*
*
*
H1:   2.490    *          Room 1          *   <=Q01: 9.94E+01
*             *          LAMBDA: 8.36E-01 *       Q10 : 9.94E+01
*
*
Area  47.770  *****

```

Deposition velocity: 4.78E-04 [m/s]    Resuspension Rate: 6.70E-10 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:06:30 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_C14  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-C14.bld

\*\*\*\*\* Source Information \*\*\*\*\*

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.270E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
C-14	1.000E+00	2.090E-06	2.090E-06	2.616E-08

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.272E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
C-14	1.000E+00	2.090E-06	2.090E-06	2.616E-08

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:06:30 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_C14  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-C14.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.278E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
C-14	1.000E+00	2.090E-06	2.090E-06	2.616E-08

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.273E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
C-14	1.000E+00	2.090E-06	2.090E-06	2.616E-08

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:06:30 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_C14  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-C14.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.271E+04 [day]



Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
C-14	1.000E+00	2.090E-06	2.090E-06	2.616E-08

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.262E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
C-14	1.000E+00	2.090E-06	2.090E-06	2.616E-08

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:06:30 Page: 7 \*\*  
Title : Humboldt Bay DCGL\_C14  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-C14.bld  
Evaluation Time: 0.00000000E+00 years

=====

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

=====

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.270E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
C-14 1.000E+00

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.272E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
C-14 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:06:30 Page: 8 \*\*  
Title : Humboldt Bay DCGL\_C14  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-C14.bld  
Evaluation Time: 0.00000000E+00 years

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.278E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
C-14 1.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.273E+04 [day]

Contamination:: Nuclide Concentration  
C-14 1.000E+00  
[pCi/m<sup>2</sup>]

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.271E+04 [day]

Contamination:: Nuclide Concentration  
C-14 1.000E+00  
[pCi/m<sup>2</sup>]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:06:30 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_C14  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-C14.bld  
Evaluation Time: 0.00000000E+00 years

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.262E+04 [day]

Contamination:: Nuclide Concentration  
C-14 1.000E+00  
[pCi/m<sup>2</sup>]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:06:30 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_C14  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-C14.bld  
Evaluation Time: 0.00000000E+00 years

```
=====
RESRAD-BUILD Dose Tables
=====
```

Source Contributions to Receptor Doses  
[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	2.28E-08	1.00E-08	6.67E-09	1.00E-08	6.67E-09	2.28E-08	7.90E-08
Total	2.28E-08	1.00E-08	6.67E-09	1.00E-08	6.67E-09	2.28E-08	7.90E-08

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:09:02 Page: 1 **
Title : Humboldt Bay DCGL_Cm243
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Cm243.bld
```

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```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:09:02 Page: 2 **
Title : Humboldt Bay DCGL_Cm243
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Cm243.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(bust) [m2/hr]
1	1	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

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

Receptor	Source	Density [g/cm <sup>3</sup> ]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:09:02 Page: 3 \*\*  
Title : Humboldt Bay DCGL\_Cm243  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm243.bld

```

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

```

Building Air Exchange Rate: 8.36E-01 1/hr

```

Height[m]      Air Exchanges [m3/hr]
Area [m2]
*****
*
*
*
H1:   2.490    *          <=Q01: 9.94E+01
*          *          Q10 : 9.94E+01
*   LAMBDA: 8.36E-01
*
Area 47.770   *
*
*****

```

Deposition velocity: 1.52E-05 [m/s]    Resuspension Rate: 1.79E-08 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:09:02 Page: 4 \*\*  
Title : Humboldt Bay DCGL-Cm243  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm243.bld

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
CM-243	1.000E+00	2.510E-03	3.070E-01	6.868E-04
PU-239	0.000E+00	3.540E-03	4.290E-01	4.952E-07
U-235	0.000E+00	2.673E-04	1.230E-01	9.019E-04
PA-231	0.000E+00	1.060E-02	1.280E+00	2.009E-04
AC-227	0.000E+00	1.480E-02	6.724E+00	2.161E-03

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
CM-243	1.000E+00	2.510E-03	3.070E-01	6.868E-04

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:09:02 Page: 5 \*\*  
Title : Humboldt Bay DCGL-Cm243  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm243.bld

PU-239	0.000E+00	3.540E-03	4.290E-01	4.952E-07
U-235	0.000E+00	2.673E-04	1.230E-01	9.019E-04
PA-231	0.000E+00	1.060E-02	1.280E+00	2.009E-04
AC-227	0.000E+00	1.480E-02	6.724E+00	2.161E-03

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
CM-243	1.000E+00	2.510E-03	3.070E-01	6.868E-04
PU-239	0.000E+00	3.540E-03	4.290E-01	4.952E-07
U-235	0.000E+00	2.673E-04	1.230E-01	9.019E-04
PA-231	0.000E+00	1.060E-02	1.280E+00	2.009E-04
AC-227	0.000E+00	1.480E-02	6.724E+00	2.161E-03

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:09:02 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Cm243  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm243.bld

CM-243	1.000E+00	2.510E-03	3.070E-01	6.868E-04
PU-239	0.000E+00	3.540E-03	4.290E-01	4.952E-07
U-235	0.000E+00	2.673E-04	1.230E-01	9.019E-04
PA-231	0.000E+00	1.060E-02	1.280E+00	2.009E-04
AC-227	0.000E+00	1.480E-02	6.724E+00	2.161E-03

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
CM-243	1.000E+00	2.510E-03	3.070E-01	6.868E-04
PU-239	0.000E+00	3.540E-03	4.290E-01	4.952E-07
U-235	0.000E+00	2.673E-04	1.230E-01	9.019E-04
PA-231	0.000E+00	1.060E-02	1.280E+00	2.009E-04
AC-227	0.000E+00	1.480E-02	6.724E+00	2.161E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:09:02 Page: 7 \*\*  
Title : Humboldt Bay DCGL\_Cm243  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm243.bld

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
CM-243	1.000E+00	2.510E-03	3.070E-01	6.868E-04
PU-239	0.000E+00	3.540E-03	4.290E-01	4.952E-07
U-235	0.000E+00	2.673E-04	1.230E-01	9.019E-04
PA-231	0.000E+00	1.060E-02	1.280E+00	2.009E-04
AC-227	0.000E+00	1.480E-02	6.724E+00	2.161E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:09:02 Page: 8 \*\*  
Title : Humboldt Bay DCGL\_Cm243  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm243.bld  
Evaluation Time: 0.00000000E+00 years

=====

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

=====

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m2]
	CM-243	1.000E+00
	PU-239	0.000E+00
	U-235	0.000E+00
	PA-231	0.000E+00
	AC-227	0.000E+00

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02

Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m <sup>2</sup> ]
	CM-243	1.000E+00
	PU-239	0.000E+00
	U-235	0.000E+00
	PA-231	0.000E+00
	AC-227	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:09:02 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Cm243  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm243.bld  
Evaluation Time: 0.0000000E+00 years

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m <sup>2</sup> ]
	CM-243	1.000E+00
	PU-239	0.000E+00
	U-235	0.000E+00
	PA-231	0.000E+00
	AC-227	0.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m <sup>2</sup> ]
	CM-243	1.000E+00
	PU-239	0.000E+00
	U-235	0.000E+00
	PA-231	0.000E+00
	AC-227	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:09:02 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Cm243  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm243.bld  
Evaluation Time: 0.0000000E+00 years

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m <sup>2</sup> ]
	CM-243	1.000E+00
	PU-239	0.000E+00
	U-235	0.000E+00
	PA-231	0.000E+00
	AC-227	0.000E+00

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m <sup>2</sup> ]
	CM-243	1.000E+00
	PU-239	0.000E+00
	U-235	0.000E+00
	PA-231	0.000E+00
	AC-227	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:09:02 Page: 11 \*\*  
Title : Humboldt Bay DCGL-Cm243  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm243.bld  
Evaluation Time: 0.00000000E+00 years

=====

=====	RESRAD-BUILD Dose Tables	=====
=====		=====

=====

Source Contributions to Receptor Doses							
[mrem]							
	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	3.69E-05	1.61E-05	1.07E-05	1.61E-05	1.07E-05	3.67E-05	1.27E-04
Total	3.69E-05	1.61E-05	1.07E-05	1.61E-05	1.07E-05	3.67E-05	1.27E-04

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:12:41 Page: 1 **
Title : Humboldt Bay DCGL_Cm244
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Cm244.bld
```

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```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:12:41 Page: 2 **
Title : Humboldt Bay DCGL_Cm244
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Cm244.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 [m3/day]	Inhalation Ingestion(Dust) [m2/hr]
1	1	4.240	2.820	1.000	1.000	4.56E+01 1.00E-04

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

Receptor	Source	Density [g/cm <sup>3</sup> ]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:12:41 Page: 3 **
Title : Humboldt Bay DCGL_Cm244
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Cm244.bld
```

```
===== Building Information =====
```

Building Air Exchange Rate: 8.36E-01 1/hr

```

Height[m]      Air Exchanges [m3/hr]
Area [m2]
*****
*
*
*
H1:   2.490    *          Room 1          <=Q01: 9.94E+01
*          LAMBDA: 8.36E-01              Q10 : 9.94E+01
*
Area  47.770  *
*****

```

Deposition velocity: 1.52E-05 [m/s]      Resuspension Rate: 1.79E-08 [1/s]



\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:12:41 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Cm244  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm244.bld

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-244	1.000E+00	2.020E-03	2.480E-01	5.735E-07
PU-240	0.000E+00	3.540E-03	4.290E-01	5.548E-07
U-236	0.000E+00	2.690E-04	1.250E-01	5.852E-07
TH-232	0.000E+00	2.730E-03	1.640E+00	1.018E-06
TH-228	0.000E+00	8.086E-04	3.454E-01	9.378E-03
RA-228	0.000E+00	1.442E-03	5.078E-03	5.583E-03

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
--	----------	-------------------------	--------------------------	--------------------------------------

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:12:41 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Cm244  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm244.bld

CM-244	1.000E+00	2.020E-03	2.480E-01	5.735E-07
PU-240	0.000E+00	3.540E-03	4.290E-01	5.548E-07
U-236	0.000E+00	2.690E-04	1.250E-01	5.852E-07
TH-232	0.000E+00	2.730E-03	1.640E+00	1.018E-06
TH-228	0.000E+00	8.086E-04	3.454E-01	9.378E-03
RA-228	0.000E+00	1.442E-03	5.078E-03	5.583E-03

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-244	1.000E+00	2.020E-03	2.480E-01	5.735E-07
PU-240	0.000E+00	3.540E-03	4.290E-01	5.548E-07
U-236	0.000E+00	2.690E-04	1.250E-01	5.852E-07
TH-232	0.000E+00	2.730E-03	1.640E+00	1.018E-06
TH-228	0.000E+00	8.086E-04	3.454E-01	9.378E-03
RA-228	0.000E+00	1.442E-03	5.078E-03	5.583E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:12:41 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Cm244  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm244.bld

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-244	1.000E+00	2.020E-03	2.480E-01	5.735E-07
PU-240	0.000E+00	3.540E-03	4.290E-01	5.548E-07
U-236	0.000E+00	2.690E-04	1.250E-01	5.852E-07
TH-232	0.000E+00	2.730E-03	1.640E+00	1.018E-06
TH-228	0.000E+00	8.086E-04	3.454E-01	9.378E-03
RA-228	0.000E+00	1.442E-03	5.078E-03	5.583E-03

Source: 5

Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-244	1.000E+00	2.020E-03	2.480E-01	5.735E-07
PU-240	0.000E+00	3.540E-03	4.290E-01	5.548E-07
U-236	0.000E+00	2.690E-04	1.250E-01	5.852E-07

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:12:41 Page: 7 \*\*  
Title : Humboldt Bay DCGL\_Cm244  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm244.bld

TH-232	0.000E+00	2.730E-03	1.640E+00	1.018E-06
TH-228	0.000E+00	8.086E-04	3.454E-01	9.378E-03
RA-228	0.000E+00	1.442E-03	5.078E-03	5.583E-03

Source: 6

Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-244	1.000E+00	2.020E-03	2.480E-01	5.735E-07
PU-240	0.000E+00	3.540E-03	4.290E-01	5.548E-07
U-236	0.000E+00	2.690E-04	1.250E-01	5.852E-07
TH-232	0.000E+00	2.730E-03	1.640E+00	1.018E-06
TH-228	0.000E+00	8.086E-04	3.454E-01	9.378E-03
RA-228	0.000E+00	1.442E-03	5.078E-03	5.583E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:12:41 Page: 8 \*\*  
Title : Humboldt Bay DCGL\_Cm244  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm244.bld  
Evaluation Time: 0.00000000E+00 years

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

#### Source Information

Source: 1

Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CM-244	1.000E+00
	PU-240	0.000E+00
	U-236	0.000E+00
	TH-232	0.000E+00
	TH-228	0.000E+00

RA-228 0.000E+00

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::	Nuclide	Concentration [pci/m2]
	CM-244	1.000E+00
	PU-240	0.000E+00
	U-236	0.000E+00
	TH-232	0.000E+00
	TH-228	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:12:41 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Cm244  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm244.bld  
Evaluation Time: 0.00000000E+00 years

RA-228 0.000E+00

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::	Nuclide	Concentration [pci/m2]
	CM-244	1.000E+00
	PU-240	0.000E+00
	U-236	0.000E+00
	TH-232	0.000E+00
	TH-228	0.000E+00
	RA-228	0.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::	Nuclide	Concentration [pci/m2]
	CM-244	1.000E+00
	PU-240	0.000E+00
	U-236	0.000E+00
	TH-232	0.000E+00
	TH-228	0.000E+00
	RA-228	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:12:41 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Cm244  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm244.bld  
Evaluation Time: 0.00000000E+00 years

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::	Nuclide	Concentration [pci/m2]
	CM-244	1.000E+00
	PU-240	0.000E+00
	U-236	0.000E+00
	TH-232	0.000E+00
	TH-228	0.000E+00
	RA-228	0.000E+00

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01

Time to Remove: 1.825E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m <sup>2</sup> ]
	CM-244	1.000E+00
	PU-240	0.000E+00
	U-236	0.000E+00
	TH-232	0.000E+00
	TH-228	0.000E+00
	RA-228	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:12:41 Page: 11 \*\*  
Title : Humboldt Bay DCGL\_Cm244  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm244.bld  
Evaluation Time: 0.0000000E+00 years

```

=====
RESRAD-BUILD Dose Tables
=====

```

Source Contributions to Receptor Doses

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	2.87E-05	1.27E-05	8.46E-06	1.27E-05	8.47E-06	2.87E-05	9.98E-05
Total	2.87E-05	1.27E-05	8.46E-06	1.27E-05	8.47E-06	2.87E-05	9.98E-05

## Cm-245 Results:

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:16:05 Page: 1 \*\*  
Title : Humboldt Bay DCGL\_Cm245  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm245.bld

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Dose by Pathway Detail.....	12
Dose by Nuclide Detail.....	13
For time = 1.00E+00 yr	
Time Specific Parameters.....	15
Receptor-Source Dose Summary.....	18
Dose by Pathway Detail.....	19
Dose by Nuclide Detail.....	20
For time = 5.00E+00 yr	
Time Specific Parameters.....	22
Receptor-Source Dose Summary.....	25
Dose by Pathway Detail.....	26
Dose by Nuclide Detail.....	27
Full Summary.....	29

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:16:05 Page: 2 \*\*  
Title : Humboldt Bay DCGL\_Cm245  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm245.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

### Receptor-Source Shielding Relationship

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:16:05 Page: 3 \*\*  
Title : Humboldt Bay DCGL\_Cm245  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm245.bld

### Building Information

Building Air Exchange Rate: 8.36E-01 1/hr

Height[m]	Area [m2]	Air Exchanges [m3/hr]
H1: 2.490	Area 47.770	Room 1 LAMBDA: 8.36E-01

<=Q01: 9.94E+01  
Q10 : 9.94E+01

Deposition velocity: 1.52E-05 [m/s]    Resuspension Rate: 6.70E-10 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:16:05 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Cm245  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm245.bld

==== Source Information =====

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-245	1.000E+00	3.740E-03	4.550E-01	4.625E-04
PU-241	0.000E+00	6.840E-05	8.250E-03	2.555E-08
AM-241	0.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-245	1.000E+00	3.740E-03	4.550E-01	4.625E-04
PU-241	0.000E+00	6.840E-05	8.250E-03	2.555E-08
AM-241	0.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:16:05 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Cm245  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm245.bld

CM-245	1.000E+00	3.740E-03	4.550E-01	4.625E-04
PU-241	0.000E+00	6.840E-05	8.250E-03	2.555E-08
AM-241	0.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-245	1.000E+00	3.740E-03	4.550E-01	4.625E-04
PU-241	0.000E+00	6.840E-05	8.250E-03	2.555E-08
AM-241	0.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:16:05 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Cm245  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm245.bld

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-245	1.000E+00	3.740E-03	4.550E-01	4.625E-04
PU-241	0.000E+00	6.840E-05	8.250E-03	2.555E-08
AM-241	0.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-245	1.000E+00	3.740E-03	4.550E-01	4.625E-04
PU-241	0.000E+00	6.840E-05	8.250E-03	2.555E-08
AM-241	0.000E+00	3.640E-03	4.440E-01	9.554E-05

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:16:05 Page: 7 \*\*  
Title : Humboldt Bay DCGL-Cm245  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm245.bld

NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-245	1.000E+00	3.740E-03	4.550E-01	4.625E-04
PU-241	0.000E+00	6.840E-05	8.250E-03	2.555E-08
AM-241	0.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:16:05 Page: 8 \*\*  
Title : Humboldt Bay DCGL-Cm245  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm245.bld  
Evaluation Time: 0.0000000E+00 years

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

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CM-245	1.000E+00
	PU-241	0.000E+00
	AM-241	0.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]

Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m <sup>2</sup> ]
	CM-245	1.000E+00
	PU-241	0.000E+00
	AM-241	0.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:16:05 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Cm245  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm245.bld  
Evaluation Time: 0.0000000E+00 years

TH-229 0.000E+00

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m <sup>2</sup> ]
	CM-245	1.000E+00
	PU-241	0.000E+00
	AM-241	0.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m <sup>2</sup> ]
	CM-245	1.000E+00
	PU-241	0.000E+00
	AM-241	0.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:16:05 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Cm245  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm245.bld  
Evaluation Time: 0.0000000E+00 years

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m <sup>2</sup> ]
	CM-245	1.000E+00
	PU-241	0.000E+00
	AM-241	0.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]



Contamination::	Nuclide	Concentration
		[pCi/m <sup>2</sup> ]
	CM-245	1.000E+00
	PU-241	0.000E+00
	AM-241	0.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:16:05 Page: 11 \*\*  
 Title : Humboldt Bay DCGL\_Cm245  
 Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm245.bld  
 Evaluation Time: 0.0000000E+00 years

RESRAD-BUILD Dose Tables

Source Contributions to Receptor Doses  
[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	8.02E-05	2.90E-05	1.80E-05	2.90E-05	1.80E-05	7.34E-05	2.48E-04
Total	8.02E-05	2.90E-05	1.80E-05	2.90E-05	1.80E-05	7.34E-05	2.48E-04

## Cm-246 Results:

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:20:05 Page: 1 \*\*  
Title : Humboldt Bay DCGL\_Cm246  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm246.bld

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\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:20:05 Page: 2 \*\*  
Title : Humboldt Bay DCGL\_Cm246  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm246.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

Receptor-Source Shielding Relationship

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:20:05 Page: 3 \*\*  
Title : Humboldt Bay DCGL\_Cm246  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm246.bld

Building Information

Building Air Exchange Rate: 8.36E-01 1/hr

Height[m]	Area [m2]	Air Exchanges [m3/hr]
H1: 2.490	Area 47.770	Room 1 LAMBDA: 8.36E-01

<=Q01: 9.94E+01  
Q10 : 9.94E+01

Deposition velocity: 1.52E-05 [m/s] Resuspension Rate: 6.70E-10 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:20:05 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Cm246  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm246.bld

Source Information

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination:: Nuclide Concentration	Dose Conversion Factor (Library: FGR 11)
[pCi/m2]	Ingestion [mrem/pCi] Inhalation [mrem/pCi] Submersion [mrem/yr/ [pCi/m3]]
CM-246 1.000E+00	3.700E-03 4.510E-01 5.209E-07

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)			
Nuclide	Concentration	Ingestion	Inhalation	Submersion	
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]	
CM-246	1.000E+00	3.700E-03	4.510E-01	5.209E-07	

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:20:05 Page: 5 \*\*  
Title : Humboldt Bay DCGL-Cm246  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm246.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)			
Nuclide	Concentration	Ingestion	Inhalation	Submersion	
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]	
CM-246	1.000E+00	3.700E-03	4.510E-01	5.209E-07	

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)			
Nuclide	Concentration	Ingestion	Inhalation	Submersion	
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]	
CM-246	1.000E+00	3.700E-03	4.510E-01	5.209E-07	

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:20:05 Page: 6 \*\*  
Title : Humboldt Bay DCGL-Cm246  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm246.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)			
Nuclide	Concentration	Ingestion	Inhalation	Submersion	
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]	
CM-246	1.000E+00	3.700E-03	4.510E-01	5.209E-07	

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)			
Nuclide	Concentration	Ingestion	Inhalation	Submersion	
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]	
CM-246	1.000E+00	3.700E-03	4.510E-01	5.209E-07	

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:20:05 Page: 7 \*\*  
Title : Humboldt Bay DCGL-Cm246  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm246.bld  
Evaluation Time: 0.00000000E+00 years

=====

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

=====

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m2]
	CM-246	1.000E+00

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m2]
	CM-246	1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:20:05 Page: 8 \*\*  
Title : Humboldt Bay DCGL\_Cm246  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm246.bld  
Evaluation Time: 0.0000000E+00 years

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m2]
	CM-246	1.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m2]
	CM-246	1.000E+00

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m2]
	CM-246	1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:20:05 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Cm246  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm246.bld  
Evaluation Time: 0.0000000E+00 years

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01

Time to Remove: 1.825E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m<sup>2</sup>]  
CM-246 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:20:05 Page: 10 \*\*  
Title : Humboldt Bay DCGL-Cm246  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cm246.bld  
Evaluation Time: 0.0000000E+00 years

=====

RESRAD-BUILD Dose Tables
--------------------------

=====

Source Contributions to Receptor Doses  
[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	6.14E-05	2.52E-05	1.64E-05	2.52E-05	1.64E-05	5.93E-05	2.04E-04
Total	6.14E-05	2.52E-05	1.64E-05	2.52E-05	1.64E-05	5.93E-05	2.04E-04

## Co-60 Results:

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:22:41 Page: 1 \*\*  
Title : Humboldt Bay DCGL\_Co60  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Co60.bld

=====

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\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:22:41 Page: 2 \*\*  
Title : Humboldt Bay DCGL\_Co60  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Co60.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

=== Receptor-Source Shielding Relationship ===

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:22:41 Page: 3 \*\*  
Title : Humboldt Bay DCGL\_Co60  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Co60.bld

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

Building Air Exchange Rate: 8.36E-01 1/hr

Height[m]	Area [m2]	Air Exchanges [m3/hr]
*****		
* * * * *		
H1: 2.490		Room 1 <=Q01: 9.94E+01
		Q10 : 9.94E+01
Area 47.770		LAMBDA: 8.36E-01
* * * * *		

Deposition velocity: 4.78E-04 [m/s] Resuspension Rate: 6.70E-10 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:22:41 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Co60  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Co60.bld

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.270E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ [pCi/m3]]
CO-60	1.000E+00	2.690E-05	2.190E-04	1.472E-02

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.272E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ [pCi/m3]]
CO-60	1.000E+00	2.690E-05	2.190E-04	1.472E-02

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:22:41 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Co60  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Co60.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.278E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ [pCi/m3]]
CO-60	1.000E+00	2.690E-05	2.190E-04	1.472E-02

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.273E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ [pCi/m3]]
CO-60	1.000E+00	2.690E-05	2.190E-04	1.472E-02

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:22:41 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Co60  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Co60.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.271E+04 [day]



Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CO-60	1.000E+00	2.690E-05	2.190E-04	1.472E-02

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.262E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CO-60	1.000E+00	2.690E-05	2.190E-04	1.472E-02

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:22:41 Page: 7 \*\*  
Title : Humboldt Bay DCGL\_Co60  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-co60.bld  
Evaluation Time: 0.00000000E+00 years

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

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.270E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CO-60	1.000E+00

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.272E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CO-60	1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:22:41 Page: 8 \*\*  
Title : Humboldt Bay DCGL\_Co60  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-co60.bld  
Evaluation Time: 0.00000000E+00 years

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.278E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CO-60	1.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.273E+04 [day]

Contamination:: Nuclide Concentration  
CO-60 1.000E+00  
[pCi/m2]

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.271E+04 [day]

Contamination:: Nuclide Concentration  
CO-60 1.000E+00  
[pCi/m2]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:22:41 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Co60  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Co60.bld  
Evaluation Time: 0.0000000E+00 years

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.262E+04 [day]

Contamination:: Nuclide Concentration  
CO-60 1.000E+00  
[pCi/m2]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:22:41 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Co60  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Co60.bld  
Evaluation Time: 0.0000000E+00 years

```
=====
RESRAD-BUILD Dose Tables
=====
```

Source Contributions to Receptor Doses  
[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	1.78E-05	3.50E-06	1.45E-06	3.50E-06	1.45E-06	1.32E-05	4.09E-05
Total	1.78E-05	3.50E-06	1.45E-06	3.50E-06	1.45E-06	1.32E-05	4.09E-05

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:25:02 Page: 1 **
Title : Humboldt Bay DCGL-Cs137
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Cs137.bld
```

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For time = 1.00E+00 yr	
Time Specific Parameters.....	14
Receptor-Source Dose Summary.....	17
Dose by Pathway Detail.....	18
Dose by Nuclide Detail.....	19
For time = 5.00E+00 yr	
Time Specific Parameters.....	21
Receptor-Source Dose Summary.....	24
Dose by Pathway Detail.....	25
Dose by Nuclide Detail.....	26
Full Summary.....	28

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:25:02 Page: 2 **
Title : Humboldt Bay DCGL-Cs137
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Cs137.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

### Receptor-Source Shielding Relationship

Receptor	Source	Density [g/cm <sup>3</sup> ]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:25:02 Page: 3 \*\*  
Title : Humboldt Bay DCGL-Cs137  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cs137.b1d

```
===== Building Information =====
```

Building Air Exchange Rate: 8.36E-01 1/hr

```

Height[m]      Air Exchanges [m3/hr]
Area [m2]
*****
*
*
*
H1:  2.490      *      Room  1      *      <=Q01: 9.94E+01
*      *      *      *      Q10 : 9.94E+01
Area 47.770      *      LAMBDA: 8.36E-01 *
*
*****
Deposition velocity: 4.78E-04 [m/s]  Resuspension Rate: 6.70E-10 [1/s]

```

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:25:02 Page: 4 \*\*  
Title : Humboldt Bay DCGL-Cs137  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cs137.bld

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.270E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
CS-137	1.000E+00	5.000E-05	3.190E-05	3.183E-03

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.272E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
CS-137	1.000E+00	5.000E-05	3.190E-05	3.183E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:25:02 Page: 5 \*\*  
Title : Humboldt Bay DCGL-Cs137  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cs137.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.278E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
CS-137	1.000E+00	5.000E-05	3.190E-05	3.183E-03

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.273E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
CS-137	1.000E+00	5.000E-05	3.190E-05	3.183E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:25:02 Page: 6 \*\*  
Title : Humboldt Bay DCGL-Cs137  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cs137.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.271E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CS-137	1.000E+00	5.000E-05	3.190E-05	3.183E-03

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.262E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CS-137	1.000E+00	5.000E-05	3.190E-05	3.183E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:25:02 Page: 7 \*\*  
Title : Humboldt Bay DCGL-Cs137  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cs137.bld  
Evaluation Time: 0.00000000E+00 years

=====

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

=====

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.270E+04 [day]

Contamination:: Nuclide Concentration  
CS-137 1.000E+00

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.272E+04 [day]

Contamination:: Nuclide Concentration  
CS-137 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:25:02 Page: 8 \*\*  
Title : Humboldt Bay DCGL-Cs137  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cs137.bld  
Evaluation Time: 0.00000000E+00 years

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.278E+04 [day]

Contamination:: Nuclide Concentration  
CS-137 1.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02

Removable fraction: 1.000E-01  
Time to Remove: 5.273E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CS-137	1.000E+00

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.271E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CS-137	1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:25:02 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Cs137  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cs137.bld  
Evaluation Time: 0.00000000E+00 years

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.262E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CS-137	1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:25:02 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Cs137  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Cs137.bld  
Evaluation Time: 0.00000000E+00 years

```

=====
RESRAD-BUILD Dose Tables
=====

```

#### Source Contributions to Receptor Doses [mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	4.93E-06	1.08E-06	4.99E-07	1.08E-06	5.00E-07	3.77E-06	1.19E-05
Total	4.93E-06	1.08E-06	4.99E-07	1.08E-06	5.00E-07	3.77E-06	1.19E-05

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:30:22 Page: 1 **
Title : Humboldt Bay DCGL_Eu152
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Eu152.bld
```

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```

** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:30:22 Page: 2 **
Title : Humboldt Bay DCGL_Eu152
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Eu152.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

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

Receptor	Source	Density [g/cm <sup>3</sup> ]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

```

** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:30:22 Page: 3 **
Title : Humboldt Bay DCGL_Eu152
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Eu152.bld

```

## ===== Building Information =====

```

Height[m]      Air Exchanges [m3/hr]
Area [m2]
*****
*
*
*
H1:   2.490    *          <=Q01: 9.94E+01
*           Room 1
*   LAMBDA: 8.36E-01        Q10 : 9.94E+01
*
Area 47.770    *
*
*****

```

Deposition velocity: 4.78E-04 [m/s]    Resuspension Rate: 6.70E-10 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:30:22 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Eu152  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu152.bld

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.270E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
GD-152	0.000E+00	1.610E-04	2.430E-01	0.000E+00
EU-152	1.000E+00	6.480E-06	2.210E-04	6.599E-03

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.272E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
GD-152	0.000E+00	1.610E-04	2.430E-01	0.000E+00
EU-152	1.000E+00	6.480E-06	2.210E-04	6.599E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:30:22 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Eu152  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu152.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.305E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
GD-152	0.000E+00	1.610E-04	2.430E-01	0.000E+00
EU-152	1.000E+00	6.480E-06	2.210E-04	6.599E-03

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
GD-152	0.000E+00	1.610E-04	2.430E-01	0.000E+00
EU-152	1.000E+00	6.480E-06	2.210E-04	6.599E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:30:22 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Eu152  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu152.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02



Removable fraction: 1.000E-01  
Time to Remove: 3.311E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
GD-152	0.000E+00	1.610E-04	2.430E-01	0.000E+00
EU-152	1.000E+00	6.480E-06	2.210E-04	6.599E-03

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.262E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
GD-152	0.000E+00	1.610E-04	2.430E-01	0.000E+00
EU-152	1.000E+00	6.480E-06	2.210E-04	6.599E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:30:22 Page: 7 \*\*  
Title : Humboldt Bay DCGL\_Eu152  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu152.bld  
Evaluation Time: 0.00000000E+00 years

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

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.270E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
GD-152 0.000E+00  
EU-152 1.000E+00

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.272E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
GD-152 0.000E+00  
EU-152 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:30:22 Page: 8 \*\*  
Title : Humboldt Bay DCGL\_Eu152  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu152.bld  
Evaluation Time: 0.00000000E+00 years

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.305E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
GD-152 0.000E+00

EU-152 1.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	GD-152	0.000E+00
	EU-152	1.000E+00

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.311E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	GD-152	0.000E+00
	EU-152	1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:30:22 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Eu152  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu152.bld  
Evaluation Time: 0.00000000E+00 years

GD-152 0.000E+00  
EU-152 1.000E+00

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.262E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	GD-152	0.000E+00
	EU-152	1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:30:22 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Eu152  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu152.bld  
Evaluation Time: 0.00000000E+00 years

```
=====
=====
=====
RESRAD-BUILD Dose Tables
=====
=====
```

Source Contributions to Receptor Doses  
=====

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	8.83E-06	1.72E-06	7.09E-07	1.72E-06	7.11E-07	6.52E-06	2.02E-05
Total	8.83E-06	1.72E-06	7.09E-07	1.72E-06	7.11E-07	6.52E-06	2.02E-05

## Eu-154 Results:

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:31:37 Page: 1 \*\*  
Title : Humboldt Bay DCGL\_Eu154  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu154.bld

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Dose by Pathway Detail.....	11
Dose by Nuclide Detail.....	12
For time = 1.00E+00 yr	
Time Specific Parameters.....	14
Receptor-Source Dose Summary.....	17
Dose by Pathway Detail.....	18
Dose by Nuclide Detail.....	19
For time = 5.00E+00 yr	
Time Specific Parameters.....	21
Receptor-Source Dose Summary.....	24
Dose by Pathway Detail.....	25
Dose by Nuclide Detail.....	26
Full Summary.....	28

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:31:37 Page: 2 \*\*  
Title : Humboldt Bay DCGL\_Eu154  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu154.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

### Receptor-Source Shielding Relationship

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:31:37 Page: 3 \*\*  
Title : Humboldt Bay DCGL\_Eu154  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu154.bld

### Building Information

Building Air Exchange Rate: 8.36E-01 1/hr

Height[m]	Area [m2]	Air Exchanges [m3/hr]
H1: 2.490	Area 47.770	<p>*****</p> <p>Room 1</p> <p>LAMBDA: 8.36E-01</p> <p>*****</p>

<=Q01: 9.94E+01  
Q10 : 9.94E+01

Deposition velocity: 4.78E-04 [m/s]      Resuspension Rate: 6.70E-10 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:31:37 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Eu154  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu154.bld

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.270E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
EU-154	1.000E+00	9.550E-06	2.860E-04	7.172E-03

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.272E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
EU-154	1.000E+00	9.550E-06	2.860E-04	7.172E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:31:37 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Eu154  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu154.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.305E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
EU-154	1.000E+00	9.550E-06	2.860E-04	7.172E-03

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.273E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
EU-154	1.000E+00	9.550E-06	2.860E-04	7.172E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:31:37 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Eu154  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu154.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.311E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
EU-154	1.000E+00	9.550E-06	2.860E-04	7.172E-03

Source: 6

Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.262E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
EU-154	1.000E+00	9.550E-06	2.860E-04	7.172E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:31:37 Page: 7 \*\*  
Title : Humboldt Bay DCGL\_Eu154  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu154.bld  
Evaluation Time: 0.00000000E+00 years

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

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

Source: 1

Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.270E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	EU-154	1.000E+00

Source: 2

Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.272E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	EU-154	1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:31:37 Page: 8 \*\*  
Title : Humboldt Bay DCGL\_Eu154  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu154.bld  
Evaluation Time: 0.00000000E+00 years

Source: 3

Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.305E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	EU-154	1.000E+00

Source: 4

Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01

Time to Remove: 5.273E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m<sup>2</sup>]  
EU-154 1.000E+00

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.311E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m<sup>2</sup>]  
EU-154 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:31:37 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Eu154  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu154.bld  
Evaluation Time: 0.00000000E+00 years

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.262E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m<sup>2</sup>]  
EU-154 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:31:37 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Eu154  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Eu154.bld  
Evaluation Time: 0.00000000E+00 years

```
=====
RESRAD-BUILD Dose Tables
=====
```

Source Contributions to Receptor Doses  
[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	9.36E-06	1.83E-06	7.56E-07	1.83E-06	7.58E-07	6.92E-06	2.15E-05
Total	9.36E-06	1.83E-06	7.56E-07	1.83E-06	7.58E-07	6.92E-06	2.15E-05

### H-3 Results:

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:32:46 Page: 1 \*\*  
Title : Humboldt Bay DCGL\_H3  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-H3.bld

=====

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Dose by Nuclide Detail.....	26
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\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:32:46 Page: 2 \*\*  
Title : Humboldt Bay DCGL\_H3  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-H3.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

=== Receptor-Source Shielding Relationship ===

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:32:46 Page: 3 \*\*  
Title : Humboldt Bay DCGL\_H3  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-H3.bld

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

Building Air Exchange Rate: 8.36E-01 1/hr

Height[m]	Area [m2]	Air Exchanges [m3/hr]
H1: 2.490	47.770	<p>*****</p> <p>&lt;=Q01: 9.94E+01</p> <p>Q10 : 9.94E+01</p> <p>Room 1</p> <p>LAMBDA: 8.36E-01</p> <p>*****</p>

Deposition velocity: 4.78E-04 [m/s]    Resuspension Rate: 6.70E-10 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:32:46 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_H3  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-H3.bld

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 1.000E+00  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)  
[pCi/m2] Ingestion [mrem/pCi] Inhalation [mrem/pCi] Submersion [mrem/yr/(pCi/m3)]  
H-3 1.000E+00 6.400E-08 6.400E-08 3.866E-08

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 1.000E+00  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)  
[pCi/m2] Ingestion [mrem/pCi] Inhalation [mrem/pCi] Submersion [mrem/yr/(pCi/m3)]  
H-3 1.000E+00 6.400E-08 6.400E-08 3.866E-08

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:32:46 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_H3  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-H3.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 1.000E+00  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)  
[pCi/m2] Ingestion [mrem/pCi] Inhalation [mrem/pCi] Submersion [mrem/yr/(pCi/m3)]  
H-3 1.000E+00 6.400E-08 6.400E-08 3.866E-08

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 1.000E+00  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)  
[pCi/m2] Ingestion [mrem/pCi] Inhalation [mrem/pCi] Submersion [mrem/yr/(pCi/m3)]  
H-3 1.000E+00 6.400E-08 6.400E-08 3.866E-08

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:32:46 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_H3  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-H3.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 1.000E+00  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]



Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
H-3	1.000E+00	6.400E-08	6.400E-08	3.866E-08

Source: 6

Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
 Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 1.000E+00  
 Removable fraction: 1.000E-01  
 Time to Remove: 1.825E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
H-3	1.000E+00	6.400E-08	6.400E-08	3.866E-08

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:32:46 Page: 7 \*\*

Title : Humboldt Bay DCGL\_H3  
 Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-H3.bld  
 Evaluation Time: 0.00000000E+00 years

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

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

Source: 1

Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
 Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 1.000E+00  
 Removable fraction: 1.000E-01  
 Time to Remove: 1.825E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	H-3	1.000E+00

Source: 2

Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
 Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 1.000E+00  
 Removable fraction: 1.000E-01  
 Time to Remove: 1.823E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	H-3	1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:32:46 Page: 8 \*\*

Title : Humboldt Bay DCGL\_H3  
 Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-H3.bld  
 Evaluation Time: 0.00000000E+00 years

Source: 3

Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
 Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 1.000E+00  
 Removable fraction: 1.000E-01  
 Time to Remove: 1.813E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	H-3	1.000E+00

Source: 4

Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
 Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 1.000E+00

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	8.66E-10	3.82E-10	2.55E-10	3.82E-10	2.55E-10	8.66E-10	3.01E-09
Total	8.66E-10	3.82E-10	2.55E-10	3.82E-10	2.55E-10	8.66E-10	3.01E-09

## I-129 Results:

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:34:05 Page: 1 \*\*  
Title : Humboldt Bay DCGL\_I129  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-I129.bld

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Time Specific Parameters.....	14
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Dose by Nuclide Detail.....	19
For time = 5.00E+00 yr	
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Dose by Nuclide Detail.....	26
Full Summary.....	28

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:34:05 Page: 2 \*\*  
Title : Humboldt Bay DCGL\_I129  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-I129.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

### Receptor-Source Shielding Relationship

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:34:05 Page: 3 \*\*  
Title : Humboldt Bay DCGL\_I129  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-I129.bld

### Building Information

Building Air Exchange Rate: 8.36E-01 1/hr

Height[m]	Area [m2]	Air Exchanges [m3/hr]
H1: 2.490	Area 47.770	<p>*****</p> <p>Room 1 &lt;=Q01: 9.94E+01</p> <p>LAMBDA: 8.36E-01 Q10 : 9.94E+01</p> <p>*****</p>

Deposition velocity: 4.78E-04 [m/s] Resuspension Rate: 6.70E-10 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:34:05 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_I129  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-I129.bld

\*\*\*\*\* Source Information \*\*\*\*\*

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.270E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
I-129	1.000E+00	2.760E-04	1.740E-04	4.438E-05

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.272E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
I-129	1.000E+00	2.760E-04	1.740E-04	4.438E-05

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:34:05 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_I129  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-I129.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.278E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
I-129	1.000E+00	2.760E-04	1.740E-04	4.438E-05

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.273E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
I-129	1.000E+00	2.760E-04	1.740E-04	4.438E-05

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:34:05 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_I129  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-I129.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.271E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
I-129	1.000E+00 [pCi/m2]	2.760E-04	1.740E-04	4.438E-05

Source: 6  
 Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
 Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.262E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
I-129	1.000E+00 [pCi/m2]	2.760E-04	1.740E-04	4.438E-05

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:34:05 Page: 7 \*\*  
 Title : Humboldt Bay DCGL\_I129  
 Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-I129.bld  
 Evaluation Time: 0.00000000E+00 years

```

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

```

\*\*\*\*\* Source Information \*\*\*\*\*

Source: 1  
 Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
 Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.270E+04 [day]

Contamination::	Nuclide	Concentration
	I-129	1.000E+00 [pCi/m2]

Source: 2  
 Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
 Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.272E+04 [day]

Contamination::	Nuclide	Concentration
	I-129	1.000E+00 [pCi/m2]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:34:05 Page: 8 \*\*  
 Title : Humboldt Bay DCGL\_I129  
 Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-I129.bld  
 Evaluation Time: 0.00000000E+00 years

Source: 3  
 Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
 Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.278E+04 [day]

Contamination::	Nuclide	Concentration
	I-129	1.000E+00 [pCi/m2]

Source: 4  
 Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
 Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 5.273E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
I-129 1.000E+00

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.271E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
I-129 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:34:05 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_I129  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-I129.bld  
Evaluation Time: 0.0000000E+00 years

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.262E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
I-129 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:34:05 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_I129  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-I129.bld  
Evaluation Time: 0.0000000E+00 years

```

=====
=====
===          RESRAD-BUILD Dose Tables          ===
=====
=====

```

Source Contributions to Receptor Doses  
[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	3.33E-06	1.40E-06	9.10E-07	1.40E-06	9.11E-07	3.28E-06	1.12E-05
Total	3.33E-06	1.40E-06	9.10E-07	1.40E-06	9.11E-07	3.28E-06	1.12E-05

## Nb-94 Results:

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:36:17 Page: 1 \*\*  
Title : Humboldt Bay DCGL\_Nb94  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Nb94.bld

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\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:36:17 Page: 2 \*\*  
Title : Humboldt Bay DCGL\_Nb94  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Nb94.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

### Receptor-Source Shielding Relationship

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:36:17 Page: 3 \*\*  
Title : Humboldt Bay DCGL\_Nb94  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Nb94.bld

### Building Information

Building Air Exchange Rate: 8.36E-01 1/hr

Height[m]	Area [m2]	Air Exchanges [m3/hr]
H1: 2.490	47.770	Room 1 LAMBDA: 8.36E-01

Deposition velocity: 4.78E-04 [m/s] Resuspension Rate: 6.70E-10 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:36:17 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Nb94  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Nb94.bld

\*\*\*\*\* Source Information \*\*\*\*\*

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.270E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NB-94	1.000E+00	7.140E-06	4.140E-04	8.994E-03

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.320E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NB-94	1.000E+00	7.140E-06	4.140E-04	8.994E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:36:17 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Nb94  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Nb94.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NB-94	1.000E+00	7.140E-06	4.140E-04	8.994E-03

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.304E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NB-94	1.000E+00	7.140E-06	4.140E-04	8.994E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:36:17 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Nb94  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Nb94.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]



Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NB-94	1.000E+00	7.140E-06	4.140E-04	8.994E-03

Source: 6

Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.262E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NB-94	1.000E+00	7.140E-06	4.140E-04	8.994E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:36:17 Page: 7 \*\*

Title : Humboldt Bay DCGL\_Nb94  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Nb94.bld  
Evaluation Time: 0.00000000E+00 years

=====

Assessment for Time: 1

Time =0.00E+00 yr

=====

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

Source: 1

Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.270E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	NB-94	1.000E+00

Source: 2

Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.320E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	NB-94	1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:36:17 Page: 8 \*\*

Title : Humboldt Bay DCGL\_Nb94  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Nb94.bld  
Evaluation Time: 0.00000000E+00 years

Source: 3

Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	NB-94	1.000E+00

Source: 4

Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02

Removable fraction: 1.000E-01  
Time to Remove: 3.304E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
NB-94 1.000E+00

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
NB-94 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:36:17 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Nb94  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Nb94.bld  
Evaluation Time: 0.00000000E+00 years

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.262E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
NB-94 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:36:17 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Nb94  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Nb94.bld  
Evaluation Time: 0.00000000E+00 years

```
=====
=====
===          RESRAD-BUILD Dose Tables          ===
=====
=====
```

#### Source Contributions to Receptor Doses

		[mrem]						
		Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1		1.25E-05	2.44E-06	1.01E-06	2.44E-06	1.02E-06	9.21E-06	2.86E-05
Total		1.25E-05	2.44E-06	1.01E-06	2.44E-06	1.02E-06	9.21E-06	2.86E-05

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:37:29 Page: 1 **
Title : Humboldt Bay DCGL_Ni59
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Ni59.bld
```

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:37:29 Page: 2 **
Title : Humboldt Bay DCGL_Ni59
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Ni59.bld
```

```

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 [m2/day]	Inhalation [m2/hr]	Ingestion(Dust) [m2/hr]
1	1	4.240	2.820	1.000	1.000	4.56E+01	1.0E-04

Receptor	Source	Density [g/cm <sup>3</sup> ]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:37:29 Page: 3 \*\*  
Title : Humboldt Bay DCGL\_Ni59  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Ni59.bld

Building Air Exchange Rate: 8.36E-01 1/hr

```

Height[m]      Air Exchanges [m3/hr]
Area [m2]
*****
*
*
*
H1:   2.490    Room 1          <=Q01: 9.94E+01
*              LAMBDA: 8.36E-01       Q10 : 9.94E+01
*
*
Area  47.770
*****

```

Deposition velocity: 4.78E-04 [m/s]      Resuspension Rate: 6.70E-10 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:37:29 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Ni59  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Ni59.bld

\*\*\*\*\* Source Information \*\*\*\*\*

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NI-59	1.000E+00	2.100E-07	2.700E-06	0.000E+00

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NI-59	1.000E+00	2.100E-07	2.700E-06	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:37:29 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Ni59  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Ni59.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NI-59	1.000E+00	2.100E-07	2.700E-06	0.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NI-59	1.000E+00	2.100E-07	2.700E-06	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:37:29 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Ni59  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Ni59.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
NI-59	1.000E+00	2.100E-07	2.700E-06	0.000E+00

Source: 6  
 Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
 Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 1.825E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration	Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
NI-59	1.000E+00	2.100E-07	2.700E-06	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:37:29 Page: 7 \*\*  
 Title : Humboldt Bay DCGL\_Ni59  
 Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Ni59.bld  
 Evaluation Time: 0.00000000E+00 years

```

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

```

\*\*\*\*\* Source Information \*\*\*\*\*

Source: 1  
 Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
 Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 1.825E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m2]
	NI-59	1.000E+00

Source: 2  
 Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
 Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 1.823E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m2]
	NI-59	1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:37:29 Page: 8 \*\*  
 Title : Humboldt Bay DCGL\_Ni59  
 Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Ni59.bld  
 Evaluation Time: 0.00000000E+00 years

Source: 3  
 Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
 Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 1.813E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m2]
	NI-59	1.000E+00

Source: 4  
 Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
 Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 1.821E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
NI-59 1.000E+00

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
NI-59 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:37:29 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Ni59  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Ni59.bld  
Evaluation Time: 0.0000000E+00 years

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
NI-59 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:37:29 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Ni59  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Ni59.bld  
Evaluation Time: 0.0000000E+00 years

```
=====
=====
===
=== RESRAD-BUILD Dose Tables ===
=====
=====
```

Source Contributions to Receptor Doses  
[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	2.53E-09	1.12E-09	7.43E-10	1.12E-09	7.43E-10	2.53E-09	8.77E-09
Total	2.53E-09	1.12E-09	7.43E-10	1.12E-09	7.43E-10	2.53E-09	8.77E-09

```

** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:38:29 Page: 1 **
Title : Humboldt Bay DCGL_Ni63
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Ni63.bld

```

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:38:29 Page: 2 **
Title : Humboldt Bay DCGL Ni63
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Ni63.bld
```

```

** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:38:29 Page: 3 **
Title : Humboldt Bay DCGL_Ni63
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Ni63.bld

```

## Deposition velocity: 4.78E-04 [m/s]    Resuspension Rate: 6.70E-10 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:38:29 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Ni63  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Ni63.bld

\*\*\*\*\* Source Information \*\*\*\*\*

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NI-63	1.000E+00	5.770E-07	6.290E-06	0.000E+00

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NI-63	1.000E+00	5.770E-07	6.290E-06	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:38:29 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Ni63  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Ni63.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NI-63	1.000E+00	5.770E-07	6.290E-06	0.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NI-63	1.000E+00	5.770E-07	6.290E-06	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:38:29 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Ni63  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Ni63.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]





Contamination:: Nuclide Concentration  
[pCi/m2]  
NI-63 1.000E+00

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
NI-63 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:38:29 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Ni63  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Ni63.bld  
Evaluation Time: 0.00000000E+00 years

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
NI-63 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:38:29 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Ni63  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Ni63.bld  
Evaluation Time: 0.00000000E+00 years

```
=====
=====
===
=== RESRAD-BUILD Dose Tables ===
=====
=====
```

Source Contributions to Receptor Doses  
[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	6.56E-09	2.90E-09	1.93E-09	2.90E-09	1.93E-09	6.56E-09	2.28E-08
Total	6.56E-09	2.90E-09	1.93E-09	2.90E-09	1.93E-09	6.56E-09	2.28E-08

## Np-237 Results:

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:39:32 Page: 1 \*\*  
Title : Humboldt Bay DCGL\_Np237  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Np237.bld

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\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:39:32 Page: 2 \*\*  
Title : Humboldt Bay DCGL\_Np237  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Np237.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

### Receptor-Source Shielding Relationship

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:39:32 Page: 3 \*\*  
Title : Humboldt Bay DCGL\_Np237  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Np237.bld

### Building Information

Building Air Exchange Rate: 8.36E-01 1/hr

Height[m]	Area [m2]	Air Exchanges [m3/hr]
H1: 2.490	47.770	Room 1 LAMBDA: 8.36E-01

\*\*\*\*\*  
 <=Q01: 9.94E+01  
 Q10 : 9.94E+01  
 \*\*\*\*\*

Deposition velocity: 1.52E-05 [m/s] Resuspension Rate: 1.79E-08 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:39:32 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Np237  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Np237.bld

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)			
Nuclide	Concentration	Ingestion	Inhalation	Submersion	
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]	
NP-237	1.000E+00	4.444E-03	5.400E-01	1.212E-03	
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06	
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03	

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)			
Nuclide	Concentration	Ingestion	Inhalation	Submersion	
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]	
NP-237	1.000E+00	4.444E-03	5.400E-01	1.212E-03	
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06	
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03	

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:39:32 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Np237  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Np237.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)			
Nuclide	Concentration	Ingestion	Inhalation	Submersion	
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]	
NP-237	1.000E+00	4.444E-03	5.400E-01	1.212E-03	
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06	
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03	

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)			
Nuclide	Concentration	Ingestion	Inhalation	Submersion	
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]	
NP-237	1.000E+00	4.444E-03	5.400E-01	1.212E-03	
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06	
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03	

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:39:32 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Np237  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Np237.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]

Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NP-237	1.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
NP-237	1.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:39:32 Page: 7 \*\*  
Title : Humboldt Bay DCGL\_Np237  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Np237.bld  
Evaluation Time: 0.0000000E+00 years

=====

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

=====

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Nuclide	Concentration [pCi/m2]
NP-237	1.000E+00
U-233	0.000E+00
TH-229	0.000E+00

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Nuclide	Concentration [pCi/m2]
NP-237	1.000E+00
U-233	0.000E+00
TH-229	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:39:32 Page: 8 \*\*  
Title : Humboldt Bay DCGL\_Np237  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Np237.bld  
Evaluation Time: 0.0000000E+00 years

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01

Time to Remove: 1.813E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	NP-237	1.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	NP-237	1.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:39:32 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Np237  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Np237.bld  
Evaluation Time: 0.00000000E+00 years

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	NP-237	1.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	NP-237	1.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:39:32 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Np237  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Np237.bld  
Evaluation Time: 0.00000000E+00 years

```
=====
RESRAD-BUILD Dose Tables
=====
```

Source Contributions to Receptor Doses  
[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	6.62E-05	2.87E-05	1.91E-05	2.88E-05	1.91E-05	6.57E-05	2.27E-04
Total	6.62E-05	2.87E-05	1.91E-05	2.88E-05	1.91E-05	6.57E-05	2.27E-04

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:41:26 Page: 1 **
Title : Humboldt Bay DCGL_Pu238
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Pu238.bld
```

RESRAD-BUILD Input Parameters.....	2
Building Information.....	3
Source Information.....	4
For time = 0.00E+00 yr	
Time Specific Parameters.....	8
Receptor-Source Dose Summary.....	11
Dose by Pathway Detail.....	12
Dose by Nuclide Detail.....	13
For time = 1.00E+00 yr	
Time Specific Parameters.....	15
Receptor-Source Dose Summary.....	18
Dose by Pathway Detail.....	19
Dose by Nuclide Detail.....	20
For time = 5.00E+00 yr	
Time Specific Parameters.....	22
Receptor-Source Dose Summary.....	25
Dose by Pathway Detail.....	26
Dose by Nuclide Detail.....	27
Full Summary.....	29

```

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

```

Receptor	Room	x [m]	y [m]	z [m]	FracTime	Inhalation [m3/day]	Ingestion(Dust) [m2/hr]
1	1	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

Receptor	Source	Density [g/cm <sup>3</sup> ]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

```

Height[m]      Air Exchanges [m3/hr]
Area [m2]
*****
*
*
*
H1:   2.490    *          Room 1          <=Q01: 9.94E+01
*          LAMBDA: 8.36E-01             Q10 : 9.94E+01
Area  47.770  *
*
*****

```

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:41:26 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Pu238  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu238.bld

\*\*\*\*\* Source Information \*\*\*\*\*

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::				
Nuclide	Concentration	Dose Conversion Factor (Library: FGR 11)		
	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-238	1.000E+00	3.200E-03	3.920E-01	5.700E-07
U-234	0.000E+00	2.830E-04	1.320E-01	8.912E-07
TH-230	0.000E+00	5.480E-04	3.260E-01	2.032E-06
RA-226	0.000E+00	1.321E-03	8.594E-03	1.035E-02
PB-210	0.000E+00	5.376E-03	1.380E-02	1.043E-05

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::				
Nuclide	Concentration	Dose Conversion Factor (Library: FGR 11)		
	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-238	1.000E+00	3.200E-03	3.920E-01	5.700E-07

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:41:26 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Pu238  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu238.bld

U-234	0.000E+00	2.830E-04	1.320E-01	8.912E-07
TH-230	0.000E+00	5.480E-04	3.260E-01	2.032E-06
RA-226	0.000E+00	1.321E-03	8.594E-03	1.035E-02
PB-210	0.000E+00	5.376E-03	1.380E-02	1.043E-05

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::				
Nuclide	Concentration	Dose Conversion Factor (Library: FGR 11)		
	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-238	1.000E+00	3.200E-03	3.920E-01	5.700E-07
U-234	0.000E+00	2.830E-04	1.320E-01	8.912E-07
TH-230	0.000E+00	5.480E-04	3.260E-01	2.032E-06
RA-226	0.000E+00	1.321E-03	8.594E-03	1.035E-02
PB-210	0.000E+00	5.376E-03	1.380E-02	1.043E-05

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]  
Radon Release Fraction: 1.000E-01



Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
--	----------	-------------------------	--------------------------	--------------------------------------

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:41:26 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Pu238  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu238.bld

PU-238	1.000E+00	3.200E-03	3.920E-01	5.700E-07
U-234	0.000E+00	2.830E-04	1.320E-01	8.912E-07
TH-230	0.000E+00	5.480E-04	3.260E-01	2.032E-06
RA-226	0.000E+00	1.321E-03	8.594E-03	1.035E-02
PB-210	0.000E+00	5.376E-03	1.380E-02	1.043E-05

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
--	----------	-------------------------	--------------------------	--------------------------------------

PU-238	1.000E+00	3.200E-03	3.920E-01	5.700E-07
U-234	0.000E+00	2.830E-04	1.320E-01	8.912E-07
TH-230	0.000E+00	5.480E-04	3.260E-01	2.032E-06
RA-226	0.000E+00	1.321E-03	8.594E-03	1.035E-02
PB-210	0.000E+00	5.376E-03	1.380E-02	1.043E-05

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:41:26 Page: 7 \*\*  
Title : Humboldt Bay DCGL\_Pu238  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu238.bld

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
--	----------	-------------------------	--------------------------	--------------------------------------

PU-238	1.000E+00	3.200E-03	3.920E-01	5.700E-07
U-234	0.000E+00	2.830E-04	1.320E-01	8.912E-07
TH-230	0.000E+00	5.480E-04	3.260E-01	2.032E-06
RA-226	0.000E+00	1.321E-03	8.594E-03	1.035E-02
PB-210	0.000E+00	5.376E-03	1.380E-02	1.043E-05

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:41:26 Page: 8 \*\*  
Title : Humboldt Bay DCGL\_Pu238  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu238.bld  
Evaluation Time: 0.0000000E+00 years

=====

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

=====

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
PU-238 1.000E+00  
U-234 0.000E+00

TH-230 0.000E+00  
RA-226 0.000E+00  
PB-210 0.000E+00

Source: 2

Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m2]
	PU-238	1.000E+00
	U-234	0.000E+00
	TH-230	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:41:26 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Pu238  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu238.bld  
Evaluation Time: 0.0000000E+00 years

Source: 3

Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m2]
	PU-238	1.000E+00
	U-234	0.000E+00
	TH-230	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00

Source: 4

Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m2]
	PU-238	1.000E+00
	U-234	0.000E+00
	TH-230	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:41:26 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Pu238  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu238.bld  
Evaluation Time: 0.0000000E+00 years

Source: 5

Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m2]
	PU-238	1.000E+00
	U-234	0.000E+00
	TH-230	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00

Source: 6

Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m <sup>2</sup> ]
	PU-238	1.000E+00
	U-234	0.000E+00
	TH-230	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:41:26 Page: 11 \*\*  
 Title : Humboldt Bay DCGL\_Pu238  
 Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu238.bld  
 Evaluation Time: 0.00000000E+00 years

```

=====
=====
=====
RESRAD-BUILD Dose Tables
=====
=====
=====
  
```

Source Contributions to Receptor Doses  
 [mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	4.62E-05	2.04E-05	1.36E-05	2.04E-05	1.36E-05	4.62E-05	1.60E-04
Total	4.62E-05	2.04E-05	1.36E-05	2.04E-05	1.36E-05	4.62E-05	1.60E-04

## Pu-239 Results:

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:44:48 Page: 1 \*\*  
Title : Humboldt Bay DCGL\_Pu239  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu239.bld

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\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:44:48 Page: 2 \*\*  
Title : Humboldt Bay DCGL\_Pu239  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu239.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

### Receptor-Source Shielding Relationship

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:44:48 Page: 3 \*\*  
Title : Humboldt Bay DCGL\_Pu239  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu239.bld

### Building Information

Building Air Exchange Rate: 8.36E-01 1/hr

Height [m]	Area [m2]	Air Exchanges [m3/hr]
H1: 2.490	Area 47.770	<p>*****</p> <p>Room 1</p> <p>LAMBDA: 8.36E-01</p> <p>*****</p>

<=Q01: 9.94E+01  
Q10 : 9.94E+01

Deposition velocity: 1.52E-05 [m/s]    Resuspension Rate: 1.79E-08 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:44:48 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Pu239  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu239.bld

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-239	1.000E+00	3.540E-03	4.290E-01	4.952E-07
U-235	0.000E+00	2.673E-04	1.230E-01	9.019E-04
PA-231	0.000E+00	1.060E-02	1.280E+00	2.009E-04
AC-227	0.000E+00	1.480E-02	6.724E+00	2.161E-03

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-239	1.000E+00	3.540E-03	4.290E-01	4.952E-07
U-235	0.000E+00	2.673E-04	1.230E-01	9.019E-04

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:44:48 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Pu239  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu239.bld

PA-231	0.000E+00	1.060E-02	1.280E+00	2.009E-04
AC-227	0.000E+00	1.480E-02	6.724E+00	2.161E-03

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-239	1.000E+00	3.540E-03	4.290E-01	4.952E-07
U-235	0.000E+00	2.673E-04	1.230E-01	9.019E-04
PA-231	0.000E+00	1.060E-02	1.280E+00	2.009E-04
AC-227	0.000E+00	1.480E-02	6.724E+00	2.161E-03

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-239	1.000E+00	3.540E-03	4.290E-01	4.952E-07
U-235	0.000E+00	2.673E-04	1.230E-01	9.019E-04
PA-231	0.000E+00	1.060E-02	1.280E+00	2.009E-04

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:44:48 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Pu239  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu239.bld

AC-227	0.000E+00	1.480E-02	6.724E+00	2.161E-03
--------	-----------	-----------	-----------	-----------

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::

Direct Ingestion Rate: 9.320E-07 [l/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-239	1.000E+00	3.540E-03	4.290E-01	4.952E-07
U-235	0.000E+00	2.673E-04	1.230E-01	9.019E-04
PA-231	0.000E+00	1.060E-02	1.280E+00	2.009E-04
AC-227	0.000E+00	1.480E-02	6.724E+00	2.161E-03

Source: 6

Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::

Direct Ingestion Rate: 9.320E-07 [l/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-239	1.000E+00	3.540E-03	4.290E-01	4.952E-07
U-235	0.000E+00	2.673E-04	1.230E-01	9.019E-04
PA-231	0.000E+00	1.060E-02	1.280E+00	2.009E-04
AC-227	0.000E+00	1.480E-02	6.724E+00	2.161E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:44:48 Page: 7 \*\*

Title : Humboldt Bay DCGL\_Pu239  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu239.bld  
Evaluation Time: 0.0000000E+00 years

=====

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

=====

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

Source: 1

Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::

Direct Ingestion Rate: 9.320E-07 [l/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
PU-239 1.000E+00  
U-235 0.000E+00  
PA-231 0.000E+00  
AC-227 0.000E+00

Source: 2

Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::

Direct Ingestion Rate: 9.320E-07 [l/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
PU-239 1.000E+00  
U-235 0.000E+00  
PA-231 0.000E+00  
AC-227 0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:44:48 Page: 8 \*\*

Title : Humboldt Bay DCGL\_Pu239  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu239.bld  
Evaluation Time: 0.0000000E+00 years

Source: 3

Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::

Direct Ingestion Rate: 9.320E-07 [l/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
PU-239 1.000E+00  
U-235 0.000E+00  
PA-231 0.000E+00  
AC-227 0.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]  
  
Contamination:: Nuclide Concentration  
[pCi/m2]  
PU-239 1.000E+00  
U-235 0.000E+00  
PA-231 0.000E+00  
AC-227 0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:44:48 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Pu239  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu239.bld  
Evaluation Time: 0.0000000E+00 years

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]  
  
Contamination:: Nuclide Concentration  
[pCi/m2]  
PU-239 1.000E+00  
U-235 0.000E+00  
PA-231 0.000E+00  
AC-227 0.000E+00

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]  
  
Contamination:: Nuclide Concentration  
[pCi/m2]  
PU-239 1.000E+00  
U-235 0.000E+00  
PA-231 0.000E+00  
AC-227 0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:44:48 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Pu239  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu239.bld  
Evaluation Time: 0.0000000E+00 years

```
=====
RESRAD-BUILD Dose Tables
=====
```

Source Contributions to Receptor Doses  
[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	5.11E-05	2.26E-05	1.51E-05	2.26E-05	1.51E-05	5.11E-05	1.78E-04
Total	5.11E-05	2.26E-05	1.51E-05	2.26E-05	1.51E-05	5.11E-05	1.78E-04

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:48:07 Page: 1 **
Title : Humboldt Bay DCGL_Pu240
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Pu240;b1d
```

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:48:07 Page: 2 **
Title : Humboldt Bay DCGL_Pu240
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Pu240.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 [m3/day]	Inhalation Ingestion(Dust) [m2/hr]
1	1	4.240	2.820	1.000	1.000	4.56E+01

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

Receptor	Source	Density [g/cm <sup>3</sup> ]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:48:07 Page: 3 **
Title : Humboldt Bay DCGL_Pu240
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Pu240.b1d
```

```
===== Building Information =====
```

Building Air Exchange Rate: 8.36E-01 1/hr

```

Height[m]      Air Exchanges [m3/hr]
Area [m2]
*****
*
*
*
H1:   2.490    *          Q=Q01: 9.94E+01
*          *          Q10 : 9.94E+01
*          *
LAMBDA: 8.36E-01
*
Area  47.770
*****

```

Deposition velocity: 1.52E-05 [m/s]      Resuspension Rate: 1.79E-08 [1/s]



\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:48:07 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Pu240  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu240.bld

\*\*\*\*\* Source Information \*\*\*\*\*

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::				
Nuclide	Concentration	Dose Conversion Factor (Library: FGR 11)		
	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-240	1.000E+00	3.540E-03	4.290E-01	5.548E-07
U-236	0.000E+00	2.690E-04	1.250E-01	5.852E-07
TH-232	0.000E+00	2.730E-03	1.640E+00	1.018E-06
TH-228	0.000E+00	8.086E-04	3.454E-01	9.378E-03
RA-228	0.000E+00	1.442E-03	5.078E-03	5.583E-03

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::				
Nuclide	Concentration	Dose Conversion Factor (Library: FGR 11)		
	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-240	1.000E+00	3.540E-03	4.290E-01	5.548E-07

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:48:07 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Pu240  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu240.bld

U-236	0.000E+00	2.690E-04	1.250E-01	5.852E-07
TH-232	0.000E+00	2.730E-03	1.640E+00	1.018E-06
TH-228	0.000E+00	8.086E-04	3.454E-01	9.378E-03
RA-228	0.000E+00	1.442E-03	5.078E-03	5.583E-03

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::				
Nuclide	Concentration	Dose Conversion Factor (Library: FGR 11)		
	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-240	1.000E+00	3.540E-03	4.290E-01	5.548E-07
U-236	0.000E+00	2.690E-04	1.250E-01	5.852E-07
TH-232	0.000E+00	2.730E-03	1.640E+00	1.018E-06
TH-228	0.000E+00	8.086E-04	3.454E-01	9.378E-03
RA-228	0.000E+00	1.442E-03	5.078E-03	5.583E-03

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::				
Nuclide	Concentration	Dose Conversion Factor (Library: FGR 11)		
	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:48:07 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Pu240  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu240.bld

PU-240	1.000E+00	3.540E-03	4.290E-01	5.548E-07
U-236	0.000E+00	2.690E-04	1.250E-01	5.852E-07
TH-232	0.000E+00	2.730E-03	1.640E+00	1.018E-06
TH-228	0.000E+00	8.086E-04	3.454E-01	9.378E-03
RA-228	0.000E+00	1.442E-03	5.078E-03	5.583E-03

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-240	1.000E+00	3.540E-03	4.290E-01	5.548E-07
U-236	0.000E+00	2.690E-04	1.250E-01	5.852E-07
TH-232	0.000E+00	2.730E-03	1.640E+00	1.018E-06
TH-228	0.000E+00	8.086E-04	3.454E-01	9.378E-03
RA-228	0.000E+00	1.442E-03	5.078E-03	5.583E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:48:07 Page: 7 \*\*  
Title : Humboldt Bay DCGL\_Pu240  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu240.bld

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]  
Radon Release Fraction: 1.000E-01

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-240	1.000E+00	3.540E-03	4.290E-01	5.548E-07
U-236	0.000E+00	2.690E-04	1.250E-01	5.852E-07
TH-232	0.000E+00	2.730E-03	1.640E+00	1.018E-06
TH-228	0.000E+00	8.086E-04	3.454E-01	9.378E-03
RA-228	0.000E+00	1.442E-03	5.078E-03	5.583E-03

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:48:07 Page: 8 \*\*  
Title : Humboldt Bay DCGL\_Pu240  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu240.bld  
Evaluation Time: 0.0000000E+00 years

=====

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

=====

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	PU-240	1.000E+00
	U-236	0.000E+00
	TH-232	0.000E+00
	TH-228	0.000E+00
	RA-228	0.000E+00

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	PU-240	1.000E+00
	U-236	0.000E+00
	TH-232	0.000E+00
	TH-228	0.000E+00
	RA-228	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:48:07 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Pu240  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu240.bld  
Evaluation Time: 0.0000000E+00 years

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]  
  
Contamination:: Nuclide Concentration  
[pCi/m2]  
PU-240 1.000E+00  
U-236 0.000E+00  
TH-232 0.000E+00  
TH-228 0.000E+00  
RA-228 0.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]  
  
Contamination:: Nuclide Concentration  
[pCi/m2]  
PU-240 1.000E+00  
U-236 0.000E+00  
TH-232 0.000E+00  
TH-228 0.000E+00  
RA-228 0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:48:07 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Pu240  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu240.bld  
Evaluation Time: 0.0000000E+00 years

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]  
  
Contamination:: Nuclide Concentration  
[pCi/m2]  
PU-240 1.000E+00  
U-236 0.000E+00  
TH-232 0.000E+00  
TH-228 0.000E+00  
RA-228 0.000E+00

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]  
  
Contamination:: Nuclide Concentration  
[pCi/m2]  
PU-240 1.000E+00  
U-236 0.000E+00  
TH-232 0.000E+00  
TH-228 0.000E+00  
RA-228 0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:48:07 Page: 11 \*\*  
Title : Humboldt Bay DCGL\_Pu240  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu240.bld  
Evaluation Time: 0.0000000E+00 years

```
=====
=====
=====
RESRAD-BUILD Dose Tables
=====
=====
```

Source Contributions to Receptor Doses  
[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	5.11E-05	2.26E-05	1.51E-05	2.26E-05	1.51E-05	5.11E-05	1.78E-04
Total	5.11E-05	2.26E-05	1.51E-05	2.26E-05	1.51E-05	5.11E-05	1.78E-04

## Pu-241 Results:

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:51:42 Page: 1 \*\*  
Title : Humboldt Bay DCGL\_Pu241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu241.bld

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\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:51:42 Page: 2 \*\*  
Title : Humboldt Bay DCGL\_Pu241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu241.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

### Receptor-Source Shielding Relationship

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:51:42 Page: 3 \*\*  
Title : Humboldt Bay DCGL\_Pu241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu241.bld

### Building Information

Building Air Exchange Rate: 8.36E-01 1/hr

```

Height[m]      Air Exchanges [m3/hr]
Area [m2]
*****
*
*
*
H1:  2.490    *      Room 1      <=Q01: 9.94E+01
*      LAMBDA: 8.36E-01      Q10 : 9.94E+01
*
Area 47.770   *
*****

```

Deposition velocity: 1.52E-05 [m/s] Resuspension Rate: 1.79E-08 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:51:42 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Pu241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu241.bld

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination:  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-241	1.000E+00	6.840E-05	8.250E-03	2.555E-08
AM-241	0.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.823E+04 [day]

Contamination:  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-241	1.000E+00	6.840E-05	8.250E-03	2.555E-08

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:51:42 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Pu241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu241.bld

AM-241	0.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination:  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
PU-241	1.000E+00	6.840E-05	8.250E-03	2.555E-08
AM-241	0.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]



Contamination::	Nuclide	Concentration
		[pCi/m <sup>2</sup> ]
	PU-241	1.000E+00
	AM-241	0.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:51:42 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Pu241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu241.bld  
Evaluation Time: 0.0000000E+00 years

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.813E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m <sup>2</sup> ]
	PU-241	1.000E+00
	AM-241	0.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.821E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m <sup>2</sup> ]
	PU-241	1.000E+00
	AM-241	0.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:51:42 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Pu241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu241.bld  
Evaluation Time: 0.0000000E+00 years

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.809E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m <sup>2</sup> ]
	PU-241	1.000E+00
	AM-241	0.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 1.825E+04 [day]

Contamination::	Nuclide	Concentration
		[pCi/m <sup>2</sup> ]
	PU-241	1.000E+00
	AM-241	0.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:51:42 Page: 11 \*\*  
Title : Humboldt Bay DCGL\_Pu241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu241.bld  
Evaluation Time: 0.0000000E+00 years

```
=====
||
|| RESRAD-BUILD Dose Tables
||
=====
```

Source Contributions to Receptor Doses

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	1.00E-06	4.44E-07	2.96E-07	4.44E-07	2.96E-07	1.00E-06	3.49E-06
Total	1.00E-06	4.44E-07	2.96E-07	4.44E-07	2.96E-07	1.00E-06	3.49E-06

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:51:42 Page: 18 \*\*  
Title : Humboldt Bay DCGL\_Pu241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu241.bld  
Evaluation Time: 1.00000000 years

RESRAD-BUILD Dose Tables

Source Contributions to Receptor Doses

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	1.03E-06	4.53E-07	3.02E-07	4.53E-07	3.02E-07	1.03E-06	3.56E-06
Total	1.03E-06	4.53E-07	3.02E-07	4.53E-07	3.02E-07	1.03E-06	3.56E-06

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:51:42 Page: 25 \*\*  
Title : Humboldt Bay DCGL\_Pu241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu241.bld  
Evaluation Time: 5.00000000 years

RESRAD-BUILD Dose Tables

Source Contributions to Receptor Doses

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	1.08E-06	4.77E-07	3.18E-07	4.77E-07	3.18E-07	1.08E-06	3.75E-06
Total	1.08E-06	4.77E-07	3.18E-07	4.77E-07	3.18E-07	1.08E-06	3.75E-06

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:51:42 Page: 32 \*\*  
Title : Humboldt Bay DCGL\_Pu241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu241.bld  
Evaluation Time: 10.00000000 years

RESRAD-BUILD Dose Tables

Source Contributions to Receptor Doses

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	1.10E-06	4.86E-07	3.24E-07	4.87E-07	3.24E-07	1.10E-06	3.83E-06
Total	1.10E-06	4.86E-07	3.24E-07	4.87E-07	3.24E-07	1.10E-06	3.83E-06

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:51:42 Page: 39 \*\*  
Title : Humboldt Bay DCGL\_Pu241  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Pu241.bld  
Evaluation Time: 25.00000019 years

RESRAD-BUILD Dose Tables

Source Contributions to Receptor Doses

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	9.67E-07	4.25E-07	2.83E-07	4.25E-07	2.82E-07	9.65E-07	3.35E-06
Total	9.67E-07	4.25E-07	2.83E-07	4.25E-07	2.82E-07	9.65E-07	3.35E-06



\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:59:26 Page: 1 \*\*  
Title : Humboldt Bay DCGL\_Sr90  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Sr90.bld

```
=====
```

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Dose by Nuclide Detail.....	12
For time = 1.00E+00 yr	
Time Specific Parameters.....	14
Receptor-Source Dose Summary.....	17
Dose by Pathway Detail.....	18
Dose by Nuclide Detail.....	19
For time = 5.00E+00 yr	
Time Specific Parameters.....	21
Receptor-Source Dose Summary.....	24
Dose by Pathway Detail.....	25
Dose by Nuclide Detail.....	26
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```
=====
```

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:59:26 Page: 2 **
Title : Humboldt Bay DCG_LSr90
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCG_LSr90.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	4.240	2.820	1.000	1.000	4.56E+01    1.00E-04

### Receptor-Source Shielding Relationship

Receptor	Source	Density [g/cm <sup>3</sup> ]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:59:26 Page: 3 **
Title : Humboldt Bay DCGL_Sr90
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Sr90.bld
```

```
===== Building Information =====
```

Building Air Exchange Rate: 8.36E-01 1/hr

```

Height[m]      Air Exchanges [m3/hr]
Area [m2]
*****
*
*
*
*
H1:   2.490    *          Room 1          <=Q01: 9.94E+01
*          LAMBDA: 8.36E-01              Q10 : 9.94E+01
Area  47.770  *
*
*****

```

Deposition velocity: 4.78E-04 [m/s]    Resuspension Rate: 6.70E-10 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:59:26 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Sr90  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Sr90.bld

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.306E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
SR-90	1.000E+00	1.528E-04	1.308E-03	2.307E-05

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.320E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
SR-90	1.000E+00	1.528E-04	1.308E-03	2.307E-05

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:59:26 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Sr90  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Sr90.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.305E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
SR-90	1.000E+00	1.528E-04	1.308E-03	2.307E-05

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.304E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
SR-90	1.000E+00	1.528E-04	1.308E-03	2.307E-05

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:59:26 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Sr90  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Sr90.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.311E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration [pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
SR-90	1.000E+00	1.528E-04	1.308E-03	2.307E-05

Source: 6  
 Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
 Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 3.305E+04 [day]

Contamination::		Dose Conversion Factor (Library: FGR 11)		
Nuclide	Concentration [pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
SR-90	1.000E+00	1.528E-04	1.308E-03	2.307E-05

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:59:26 Page: 7 \*\*  
 Title : Humboldt Bay DCGL\_Sr90  
 Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Sr90.bld  
 Evaluation Time: 0.00000000E+00 years

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

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

Source: 1  
 Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
 Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 3.306E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	SR-90	1.000E+00

Source: 2  
 Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
 Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 3.320E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	SR-90	1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:59:26 Page: 8 \*\*  
 Title : Humboldt Bay DCGL\_Sr90  
 Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Sr90.bld  
 Evaluation Time: 0.00000000E+00 years

Source: 3  
 Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
 Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02  
 Removable fraction: 1.000E-01  
 Time to Remove: 3.305E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	SR-90	1.000E+00

Source: 4  
 Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
 Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
 Pathway ::  
 Direct Ingestion Rate: 9.320E-07 [1/hr]  
 Fraction released to air: 7.000E-02

Removable fraction: 1.000E-01  
Time to Remove: 3.304E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
SR-90 1.000E+00

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.311E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
SR-90 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:59:26 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Sr90  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Sr90.bld  
Evaluation Time: 0.00000000E+00 years

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.305E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m2]  
SR-90 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 10:59:26 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Sr90  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Sr90.bld  
Evaluation Time: 0.00000000E+00 years

```
=====
==
== RESRAD-BUILD Dose Tables ==
==
=====
```

Source Contributions to Receptor Doses  
[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	1.66E-06	7.22E-07	4.78E-07	7.22E-07	4.78E-07	1.65E-06	5.71E-06
Total	1.66E-06	7.22E-07	4.78E-07	7.22E-07	4.78E-07	1.65E-06	5.71E-06

**Tc-99 Results:**

```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 11:00:53 Page: 1 **
Title : Humboldt Bay DCGL_Tc99
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Tc99.bld
```

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For time = 1.00E+00 yr	
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Dose by Pathway Detail.....	18
Dose by Nuclide Detail.....	19
For time = 5.00E+00 yr	
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```
** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 11:00:53 Page: 2 **
Title : Humboldt Bay DCGL_Tc99
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Tc99.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	4.240	2.820	1.000	1.000	4.56E+01	1.00E-04

### Receptor-Source Shielding Relationship

Receptor	Source	Density [g/cm <sup>3</sup> ]	Thickness [cm]	Material
1	1	1.00E+00	0.00E+00	Concrete
1	2	1.00E+00	0.00E+00	Concrete
1	3	1.00E+00	0.00E+00	Concrete
1	4	1.00E+00	0.00E+00	Concrete
1	5	1.00E+00	0.00E+00	Concrete
1	6	1.00E+00	0.00E+00	Concrete

```

** RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 11:00:53 Page: 3 **
Title : Humboldt Bay DCGL_Tc99
Input File : C:\RESRAD_Family\BUILD\3.5\HB_DCGL-Tc99.bld

```

```
===== Building Information =====
```

Building Air Exchange Rate: 8.36E-01 1/hr

```

Height[m]      Air Exchanges [m3/hr]
Area [m2]
*****
*
*
*
H1:   2.490    *          Room 1          <=Q01: 9.94E+01
*          LAMBDA: 8.36E-01              Q10 : 9.94E+01
Area  47.770  *
*
*****

```

Deposition velocity: 4.78E-04 [m/s]    Resuspension Rate: 6.70E-10 [1/s]

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 11:00:53 Page: 4 \*\*  
Title : Humboldt Bay DCGL\_Tc99  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Tc99.bld

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

Source: 1  
Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.306E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
TC-99	1.000E+00	1.460E-06	8.320E-06	1.892E-07

Source: 2  
Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.320E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
TC-99	1.000E+00	1.460E-06	8.320E-06	1.892E-07

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 11:00:53 Page: 5 \*\*  
Title : Humboldt Bay DCGL\_Tc99  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Tc99.bld

Source: 3  
Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.278E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
TC-99	1.000E+00	1.460E-06	8.320E-06	1.892E-07

Source: 4  
Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25[m]  
Geometry:: Type: Area Length[m]:8.47E+00 Width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.273E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
TC-99	1.000E+00	1.460E-06	8.320E-06	1.892E-07

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 11:00:53 Page: 6 \*\*  
Title : Humboldt Bay DCGL\_Tc99  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Tc99.bld

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25[m]  
Geometry:: Type: Area Length[m]:5.64E+00 Width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.271E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
TC-99	1.000E+00	1.460E-06	8.320E-06	1.892E-07

Source: 6

Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49[m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.305E+04 [day]

Contamination::  
Nuclide Concentration Dose Conversion Factor (Library: FGR 11)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
TC-99	1.000E+00	1.460E-06	8.320E-06	1.892E-07

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 11:00:53 Page: 7 \*\*  
Title : Humboldt Bay DCGL\_Tc99  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Tc99.bld  
Evaluation Time: 0.0000000E+00 years

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

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

Source: 1

Location:: Room : 1 x: 4.24 y: 2.82 z: 0.00 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.306E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	TC-99	1.000E+00

Source: 2

Location:: Room : 1 x: 4.24 y: 0.00 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.320E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	TC-99	1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 11:00:53 Page: 8 \*\*  
Title : Humboldt Bay DCGL\_Tc99  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Tc99.bld  
Evaluation Time: 0.0000000E+00 years

Source: 3

Location:: Room : 1 x: 0.00 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.278E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	TC-99	1.000E+00

Source: 4

Location:: Room : 1 x: 4.24 y: 5.64 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:2.49E+00 Direction: y  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01

Time to Remove: 5.273E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m<sup>2</sup>]  
TC-99 1.000E+00

Source: 5  
Location:: Room : 1 x: 8.47 y: 2.82 z: 1.25 [m]  
Geometry:: Type: Area Length[m]:5.64E+00 width[m]:2.49E+00 Direction: x  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 5.271E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m<sup>2</sup>]  
TC-99 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 11:00:53 Page: 9 \*\*  
Title : Humboldt Bay DCGL\_Tc99  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Tc99.bld  
Evaluation Time: 0.0000000E+00 years

Source: 6  
Location:: Room : 1 x: 4.24 y: 2.82 z: 2.49 [m]  
Geometry:: Type: Area Length[m]:8.47E+00 width[m]:5.64E+00 Direction: z  
Pathway ::  
Direct Ingestion Rate: 9.320E-07 [1/hr]  
Fraction released to air: 7.000E-02  
Removable fraction: 1.000E-01  
Time to Remove: 3.305E+04 [day]

Contamination:: Nuclide Concentration  
[pCi/m<sup>2</sup>]  
TC-99 1.000E+00

\*\* RESRAD-BUILD Dose Program Output, Version 3.50 01/25/12 11:00:53 Page: 10 \*\*  
Title : Humboldt Bay DCGL\_Tc99  
Input File : C:\RESRAD\_Family\BUILD\3.5\HB\_DCGL-Tc99.bld  
Evaluation Time: 0.0000000E+00 years

```
=====
=====
===
=== RESRAD-BUILD Dose Tables
===
=====
=====
```

Source Contributions to Receptor Doses  
[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	1.69E-08	7.32E-09	4.72E-09	7.14E-09	4.72E-09	1.68E-08	5.76E-08
Total	1.69E-08	7.32E-09	4.72E-09	7.14E-09	4.72E-09	1.68E-08	5.76E-08