Title : HPNS RESRAD-BUILD Indoor Worker
Input File : C:\Users\Craig\Desktop\HPNS BUILD IW Am to Pu_25Sep19_9pt3m2_risk.bld

==========
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=== ===
=== RESRAD-BUILD Table of Contents ===
=== ===
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For time = 0.00E+00 yr
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```
==================================================
==================================================
===                                            ===
===     RESRAD-BUILD Input Parameters          ===
===                                            ===
==================================================
==================================================
```

Number of Sources : 10
Number of Receptors: 1
Total Time : 9.125000E+03 days
Fraction Inside : 6.800000E-01

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

Receptor	Room	x [m]	y [m]	z [m]	FracTime	Inhalation [m3/day]	Ingestion(Dust) [m2/hr]
1	1	1.500	1.500	1.000	0.330	6.00E+01	1.00E-04

=== Receptor-Source Shielding Relationship ===

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete
1	2	2.40E+00	0.00E+00	Concrete
1	3	2.40E+00	0.00E+00	Concrete
1	4	2.40E+00	0.00E+00	Concrete
1	5	2.40E+00	0.00E+00	Concrete
1	6	2.40E+00	0.00E+00	Concrete
1	7	2.40E+00	0.00E+00	Concrete
1	8	2.40E+00	0.00E+00	Concrete
1	9	2.40E+00	0.00E+00	Concrete
1	10	2.40E+00	0.00E+00	Concrete

Title : HPNS RESRAD-BUILD Indoor Worker
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======== Building Information ========

Building Air Exchange Rate: 1.50E+00 1/hr

```
Height[m]       Air Exchanges [m3/hr]
Area [m2]
          ******************************
          *                            *
          *                            *
          *                            <=Q01: 4.25E+01
H1:  3.050    *        Room  1        *    Q10 :  4.25E+01
          *  LAMBDA: 1.50E+00        *
Area  9.300    *                            *
          *                            *
          ******************************
```

Deposition velocity: 1.00E-02 [m/s] Resuspension Rate: 5.00E-07 [1/s]

Title : HPNS RESRAD-BUILD Indoor Worker
Input File : C:\Users\Craig\Desktop\HPNS BUILD IW Am to Pu_25Sep19_9pt3m2_risk.bld

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

Source: 1
Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00[m]
Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 2.000E-01
Time to Remove: 9.125E+03 [day]

Contamination::

Nuclide	Concentration [pCi/m2]	Slope Factor Ingestion [Risk/pCi]	Slope Factor Inhalation [Risk/pCi]
AM-241	4.500E+03	2.170E-10	2.810E-08
NP-237	0.000E+00	1.619E-10	1.771E-08
U-233	0.000E+00	1.600E-10	1.160E-08
TH-229	0.000E+00	1.288E-09	2.247E-07

Source: 2
Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00[m]
Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 2.000E-01
Time to Remove: 9.125E+03 [day]

Contamination::

Nuclide	Concentration [pCi/m2]	Slope Factor Ingestion [Risk/pCi]	Slope Factor Inhalation [Risk/pCi]
CO-60	2.250E+05	4.030E-11	3.580E-11

Source: 3

Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00[m]

Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z

Pathway ::

Direct Ingestion Rate: 0.000E+00 [1/hr]

Fraction released to air: 1.000E-01

Removable fraction: 2.000E-01

Time to Remove: 9.125E+03 [day]

Contamination::

Nuclide	Concentration [pCi/m2]	Slope Factor Ingestion [Risk/pCi]	Slope Factor Inhalation [Risk/pCi]
CS-137	2.250E+05	4.330E-11	1.190E-11

Source: 4

Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00[m]

Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z

Pathway ::

Direct Ingestion Rate: 0.000E+00 [1/hr]

Fraction released to air: 1.000E-01

Removable fraction: 2.000E-01

Time to Remove: 9.125E+03 [day]

Contamination::

Nuclide	Concentration [pCi/m2]	Slope Factor Ingestion [Risk/pCi]	Slope Factor Inhalation [Risk/pCi]
GD-152	0.000E+00	6.290E-11	9.100E-09
EU-152	2.250E+05	1.620E-11	9.100E-11

Source: 5

Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00[m]

Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z

Pathway ::

Direct Ingestion Rate: 0.000E+00 [1/hr]

Fraction released to air: 1.000E-01

Removable fraction: 2.000E-01

Time to Remove: 9.125E+03 [day]

Contamination::

Nuclide	Concentration [pCi/m2]	Slope Factor Ingestion [Risk/pCi]	Slope Factor Inhalation [Risk/pCi]
EU-154	2.250E+05	2.850E-11	1.150E-10

Source: 6

Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00[m]

Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z

Pathway ::

Direct Ingestion Rate: 0.000E+00 [1/hr]

Fraction released to air: 1.000E-01

Removable fraction: 2.000E-01

Time to Remove: 9.125E+03 [day]

Contamination::

Nuclide	Concentration [pCi/m2]	Slope Factor Ingestion [Risk/pCi]	Slope Factor Inhalation [Risk/pCi]
H-3	2.250E+05	2.200E-13	1.990E-13

Source: 7

Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00[m]

Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z

Pathway ::

Direct Ingestion Rate: 0.000E+00 [1/hr]

Fraction released to air: 1.000E-01

Removable fraction: 2.000E-01

Time to Remove: 9.125E+03 [day]

Contamination::

Nuclide	Concentration [pCi/m2]	Slope Factor Ingestion [Risk/pCi]	Slope Factor Inhalation [Risk/pCi]
PU-239	4.500E+03	2.760E-10	3.330E-08
U-235	0.000E+00	1.634E-10	1.010E-08
PA-231	0.000E+00	3.740E-10	4.550E-08
AC-227	0.000E+00	1.161E-09	2.087E-07

Source: 8

Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00[m]

Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z

Pathway ::

Direct Ingestion Rate: 0.000E+00 [1/hr]

Fraction released to air: 1.000E-01

Removable fraction: 2.000E-01

Time to Remove: 9.125E+03 [day]

Radon Release Fraction: 4.000E-01

Contamination::

Nuclide	Concentration [pCi/m2]	Slope Factor Ingestion [Risk/pCi]	Slope Factor Inhalation [Risk/pCi]
PO-210	4.500E+03	7.960E-10	1.080E-08
RA-226	4.500E+03	7.303E-10	1.157E-08
PB-210	4.500E+03	1.865E-09	3.087E-09

Source: 9

Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00[m]

Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z

Pathway ::

Direct Ingestion Rate: 0.000E+00 [1/hr]

Fraction released to air: 1.000E-01

Removable fraction: 2.000E-01

Time to Remove: 9.125E+03 [day]

Contamination::

Nuclide	Concentration [pCi/m2]	Slope Factor Ingestion [Risk/pCi]	Slope Factor Inhalation [Risk/pCi]
SR-90	4.500E+04	1.443E-10	1.134E-10

Source: 10

Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00[m]

Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z

Pathway ::

Direct Ingestion Rate: 0.000E+00 [1/hr]

Fraction released to air: 1.000E-01

Removable fraction: 2.000E-01

Time to Remove: 9.125E+03 [day]

Radon Release Fraction: 2.000E-02

Contamination::

Nuclide	Concentration [pCi/m2]	Slope Factor Ingestion [Risk/pCi]	Slope Factor Inhalation [Risk/pCi]
TH-232	1.640E+03	2.310E-10	4.330E-08
TH-228	1.640E+03	8.088E-10	1.426E-07
RA-228	1.640E+03	2.286E-09	5.229E-09

Title : HPNS RESRAD-BUILD Indoor Worker
Input File : C:\Users\Craig\Desktop\HPNS BUILD IW Am to Pu_25Sep19_9pt3m2_risk.bld
Evaluation Time: 0.00000000E+00 years

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

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

Source: 1
Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00 [m]
Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 2.000E-01
Time to Remove: 9.125E+03 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	AM-241	4.500E+03
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

Source: 2
Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00 [m]
Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 2.000E-01
Time to Remove: 9.125E+03 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CO-60	2.250E+05

Title : HPNS RESRAD-BUILD Indoor Worker
Input File : C:\Users\Craig\Desktop\HPNS BUILD IW Am to Pu_25Sep19_9pt3m2_risk.bld
Evaluation Time: 0.00000000E+00 years

Source: 3
Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00 [m]
Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 2.000E-01
Time to Remove: 9.125E+03 [day]

Contamination:: Nuclide Concentration
[pCi/m2]
CS-137 2.250E+05

Source: 4
Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00 [m]
Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 2.000E-01
Time to Remove: 9.125E+03 [day]

Contamination:: Nuclide Concentration
[pCi/m2]
GD-152 0.000E+00
EU-152 2.250E+05

Source: 5
Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00 [m]
Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 2.000E-01
Time to Remove: 9.125E+03 [day]

Contamination:: Nuclide Concentration
[pCi/m2]
EU-154 2.250E+05

Title : HPNS RESRAD-BUILD Indoor Worker
Input File : C:\Users\Craig\Desktop\HPNS BUILD IW Am to Pu_25Sep19_9pt3m2_risk.bld
Evaluation Time: 0.00000000E+00 years

Source: 6
Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00 [m]
Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 2.000E-01
Time to Remove: 9.125E+03 [day]

Contamination:: Nuclide Concentration
[pCi/m2]
H-3 2.250E+05

Source: 7
Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00 [m]
Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 2.000E-01
Time to Remove: 9.125E+03 [day]

Contamination:: Nuclide Concentration
[pCi/m2]
PU-239 4.500E+03
U-235 0.000E+00
PA-231 0.000E+00
AC-227 0.000E+00

Source: 8

Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00 [m]

Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z

Pathway ::

Direct Ingestion Rate: 0.000E+00 [1/hr]

Fraction released to air: 1.000E-01

Removable fraction: 2.000E-01

Time to Remove: 9.125E+03 [day]

Contamination:: Nuclide Concentration [pCi/m2]

PO-210	4.500E+03
RA-226	4.500E+03
PB-210	4.500E+03

Source: 9

Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00 [m]

Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z

Pathway ::

Direct Ingestion Rate: 0.000E+00 [1/hr]

Fraction released to air: 1.000E-01

Removable fraction: 2.000E-01

Time to Remove: 9.125E+03 [day]

Contamination:: Nuclide Concentration [pCi/m2]

SR-90	4.500E+04

Source: 10

Location:: Room : 1 x: 1.50 y: 1.50 z: 0.00 [m]

Geometry:: Type: Area Length[m]:3.05E+00 Width[m]:3.05E+00 Direction: z

Pathway ::

Direct Ingestion Rate: 0.000E+00 [1/hr]

Fraction released to air: 1.000E-01

Removable fraction: 2.000E-01

Time to Remove: 9.125E+03 [day]

Contamination:: Nuclide Concentration [pCi/m2]

TH-232	1.640E+03
TH-228	1.640E+03
RA-228	1.640E+03

Title : HPNS RESRAD-BUILD Indoor Worker

Input File : C:\Users\Craig\Desktop\HPNS BUILD IW Am to Pu_25Sep19_9pt3m2_risk.bld

Evaluation Time: 0.00000000E+00 years

```
==============================================
==============================================
===                                      ===
===      RESRAD-BUILD Risk Tables        ===
===                                      ===
==============================================
==============================================
```

Source Contributions to Receptor Risks

==========

[Risk]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Source 7	Source 8	Source 9	Source 10	Total
Receptor 1	3.08E-07	9.45E-06	5.47E-06	8.33E-06	7.09E-06	1.36E-10	3.63E-07	1.64E-06	3.02E-08	1.25E-06	3.39E-05
Total	3.08E-07	9.45E-06	5.47E-06	8.33E-06	7.09E-06	1.36E-10	3.63E-07	1.64E-06	3.02E-08	1.25E-06	3.39E-05

Title : HPNS RESRAD-BUILD Indoor Worker
Input File : C:\Users\Craig\Desktop\HPNS BUILD IW Am to Pu_25Sep19_9pt3m2_risk.bld
Evaluation Time: 0.00000000E+00 years

Pathway Detail of Risks
==========
[Risk]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	8.85E-09	3.84E-12	2.92E-14	2.98E-07	0.00E+00	1.84E-09
Total	8.85E-09	3.84E-12	2.92E-14	2.98E-07	0.00E+00	1.84E-09

Source: 2

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	9.43E-06	3.69E-09	7.80E-11	5.42E-09	0.00E+00	4.84E-09
Total	9.43E-06	3.69E-09	7.80E-11	5.42E-09	0.00E+00	4.84E-09

Source: 3

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	5.45E-06	2.33E-09	4.43E-11	4.86E-09	0.00E+00	1.41E-08
Total	5.45E-06	2.33E-09	4.43E-11	4.86E-09	0.00E+00	1.41E-08

Source: 4

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	8.29E-06	3.46E-09	6.79E-11	2.71E-08	0.00E+00	3.85E-09
Total	8.29E-06	3.46E-09	6.79E-11	2.71E-08	0.00E+00	3.85E-09

Source: 5

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	7.05E-06	2.88E-09	5.74E-11	2.65E-08	0.00E+00	5.23E-09
Total	7.05E-06	2.88E-09	5.74E-11	2.65E-08	0.00E+00	5.23E-09

Source: 6

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	0.00E+00	0.00E+00	0.00E+00	8.56E-11	0.00E+00	5.03E-11
Total	0.00E+00	0.00E+00	0.00E+00	8.56E-11	0.00E+00	5.03E-11

Source: 7

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	3.90E-10	1.69E-13	1.66E-16	3.60E-07	0.00E+00	2.39E-09
Total	3.90E-10	1.69E-13	1.66E-16	3.60E-07	0.00E+00	2.39E-09

Title : HPNS RESRAD-BUILD Indoor Worker
Input File : C:\Users\Craig\Desktop\HPNS BUILD IW Am to Pu_25Sep19_9pt3m2_risk.bld
Evaluation Time: 0.00000000E+00 years

Source: 8

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	4.38E-07	1.88E-10	3.86E-12	1.59E-07	1.02E-06	2.22E-08
Total	4.38E-07	1.88E-10	3.86E-12	1.59E-07	1.02E-06	2.22E-08

Source: 9

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1.17E-08	5.00E-12	6.80E-14	9.18E-09	0.00E+00	9.33E-09
Total	1.17E-08	5.00E-12	6.80E-14	9.18E-09	0.00E+00	9.33E-09

Source: 10

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	2.20E-07	8.36E-11	1.81E-12	6.67E-07	3.52E-07	9.59E-09
Total	2.20E-07	8.36E-11	1.81E-12	6.67E-07	3.52E-07	9.59E-09

Title : HPNS RESRAD-BUILD Indoor Worker
Input File : C:\Users\Craig\Desktop\HPNS BUILD IW Am to Pu_25Sep19_9pt3m2_risk.bld
Evaluation Time: 0.00000000E+00 years

Nuclide Detail of Risks
==========
[Risk]

Source: 1

Nuclide	Receptor 1	Total
AM-241	3.08E-07	3.08E-07
NP-237	9.84E-13	9.84E-13
U-233	1.77E-17	1.77E-17
TH-229	2.03E-19	2.03E-19

Source: 2

Nuclide	Receptor 1	Total
CO-60	9.45E-06	9.45E-06

Source: 3

Nuclide	Receptor 1	Total
CS-137	5.47E-06	5.47E-06

Source: 4

Nuclide	Receptor 1	Total
GD-152	2.65E-19	2.65E-19
EU-152	8.33E-06	8.33E-06

Title : HPNS RESRAD-BUILD Indoor Worker
Input File : C:\Users\Craig\Desktop\HPNS BUILD IW Am to Pu_25Sep19_9pt3m2_risk.bld
Evaluation Time: 0.00000000E+00 years

Source: 5

Nuclide	Receptor 1	Total
EU-154	7.09E-06	7.09E-06

Source: 6

Nuclide	Receptor 1	Total
H-3	1.36E-10	1.36E-10

Source: 7

Nuclide	Receptor 1	Total
PU-239	3.63E-07	3.63E-07
U-235	1.84E-15	1.84E-15
PA-231	1.05E-18	1.05E-18
AC-227	8.08E-19	8.08E-19

Source: 8

Nuclide	Receptor 1	Total
PO-210	8.44E-09	8.44E-09
RA-226	1.58E-06	1.58E-06
PB-210	1.48E-08	1.48E-08
PB-210	3.55E-08	3.55E-08

Title : HPNS RESRAD-BUILD Indoor Worker
Input File : C:\Users\Craig\Desktop\HPNS BUILD IW Am to Pu_25Sep19_9pt3m2_risk.bld
Evaluation Time: 0.00000000E+00 years

Source: 9

Nuclide	Receptor 1	Total
SR-90	3.02E-08	3.02E-08

Source: 10

Nuclide	Receptor 1	Total
TH-232	1.71E-07	1.71E-07
TH-228	5.43E-07	5.43E-07
RA-228	7.70E-08	7.70E-08
TH-228	1.15E-07	1.15E-07
TH-228	3.05E-07	3.05E-07
RA-228	3.81E-08	3.81E-08