

## NAI Report Release

Calculation Number: NAI-1149-020

Revision Number: 0

Title: Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Description:

This calculation analyzes the radiological consequences of the Small Line Break Outside of Containment event presented in section 14.23 of the Palisades FSAR using the Alternative Source Term methodology described in USNRC Reg. Guide 1.183.

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June 9, 2005  
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## NAI Calculation Approval

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Author  
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6/9/05  
Date

Scope of Review:

Review included:

- A review of calculation methods was completed for consistency with plant-specific and generic regulatory requirements and guidance.
- Computer codes (RADTRAD-NAI) were checked for appropriate qualification.
- Calculation and code inputs and assumptions were verified against IAM document(s) and/or checked for reasonableness and conservatism.
- Computations were checked for correctness.
- References were verified as appropriate.
- Outputs from spreadsheets and utility programs were checked.
- Reported Results were verified against computer outputs.
- Results and conclusions were reviewed for reasonableness.
- Cases run were checked against procurement documents.

Design Verification – See Attachment 1

  
\_\_\_\_\_  
Reviewer  
Jim Harrell

6/19/05  
\_\_\_\_\_  
Date

Check items in the following lists to verify that project documentation and engineering calculations are complete. Mark any items that are not applicable with N/A notation.

Project Documentation Checklist:

- NA
- Project QA Plan.
  - Project Organization.
  - Project Work Scope and Design Plan.
  - Project Calculation and Document Index.
  - Project QA Requirements.
  - Project Engineer Training and Qualification Forms.
  - Project QA Training Certification Forms.
  - Project Correspondence.

Engineering Calculations Checklist:

- Identification by subject, originator, reviewer, date and Project so that the calculation is retrievable.
- Table of contents.
- Statement of the objective of the analysis.
- Analysis inputs and their sources.
- Assumptions and how they were developed or determined.
- Hand calculations.
- Identification of computer calculations, including computer type, computer program name and version, code input and output.
- Conclusions.
- Review summary.
- Responses to review comments.
- References.
- Each page of the calculation shall be numbered and the first page shall indicate the total number of pages. The calculation pages may be numbered by sections with the first page of the section indicating the total number of pages in the section.
- The Calculation Approval Sheet shall be signed and dated by the originator.

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## 1.0 Introduction

The purpose of this calculation is to analyze the radiological consequences of the Small Line Break Outside of Containment event presented in section 14.23 of the Palisades FSAR (Reference 2). This analysis will use the Alternative Source Term (AST) methodology described in Regulatory Guide 1.183 (Reference 1). Since Reg. Guide 1.183 does not provide specific guidance for this event, the general guidance of the Reg. Guide will be supplemented with guidance from Standard Review Plan (SRP) section 15.6.2. In accordance with SRP 15.6.2, the source term for this calculation will assume an accident-generated or concurrent iodine spike. In accordance with the assumptions of the current analysis of record for this event, a reactor trip is not assumed.

The previous analysis of this event included a pre-accident iodine spike case and a Tech. Spec. PCS activity case. A pre-accident iodine spike is not required by the SRP. In addition, the Tech. Spec. PCS activity case will be bounded by the concurrent iodine spike case; therefore, only the concurrent iodine spike case need be analyzed. The total dose for this event will consist of the dose from the initial PCS non-iodine nuclides plus the dose from the concurrent iodine spike.

## 2.0 Summary of Results

The results of the small line break outside of containment are provided below. The control room shine dose is a bounding value determined in the shielding analysis calculation performed for the Palisade LOCA/MHA event (filter and external cloud doses from Table 1 of Reference 17).

**Table 2-1 Small Line Break Outside of Containment - Radiological Dose**

Dose Contribution	TEDE Dose (rem)		
	EAB	LPZ	CR
PCS Noble Gas Dose	2.3134E-02	2.8590E-03	3.3831E-03
Iodine Spike Dose	3.9105E-01	4.8319E-02	2.6277E-01
Control Room Shine Dose			0.268
<b>Total</b>	<b>0.41</b>	<b>0.05</b>	<b>0.53</b>
<b>Acceptance Criteria</b>	<b>2.5</b>	<b>2.5</b>	<b>5</b>
<b>Control Room Unfiltered Inleakage = 100 cfm</b>			

### 3.0 Design Input

#### 3.1 Source Term Input

Table 6-5 of Reference 16 presents the source term for the Palisades PCS activity. The iodine activities in the source term were adjusted to achieve the Technical Specification limit of 1.0  $\mu\text{Ci/gm}$  dose equivalent I-131. The non-iodine species were adjusted to achieve the Technical Specification limit of 100/E-bar for non-iodine activities. The *pal\_pcs.nif* (Attachment 3) file presents the final adjusted primary coolant source term. The PCS activity in this file was used to determine the iodine generation rate for the accident generated (concurrent) iodine spike. Per the SRP, a factor of 500 was applied to the iodine generation rate for the concurrent iodine spike. Computation of this iodine spike source term is discussed in Section 7.2 of this calculation.

#### 3.2 Other Input

Reference 5 lists other input, approved by Palisades, used in the development of the Palisades Small Break Outside of Containment RADTRAD-NAI models.

### 4.0 Assumptions

Basic assumptions are consistent with those specified in Reg Guide 1.183, SRP Section 15.6.2, and the current licensing basis for this event.

### 5.0 Acceptance Criteria

Reg. Guide 1.183, does not provide any direct guidance for the acceptance criteria for this event. However, the SRP states that the acceptance criteria is "a small fraction" of the 10CFR100 values which is further described as 10% of the limit. In applying the AST methodology to the small line break outside of containment, that same 10% interpretation will be applied to the 10CFR part 50.67 limits. The acceptable dose limits for the Control Room (CR) are specified in 10CFR50.67. For a small line break outside of containment, these limits are interpreted as:

Area	Dose Criteria	
EAB	2.5 rem TEDE	(for the worst two hour period)
LPZ	2.5 rem TEDE	(for 30 days)
Control Room	5 rem TEDE	(for 30 days)



## 6.0 Computer Codes

The following computer code was used for performing the analyses presented in this calculation:

Computer Code	Version	Reference	Purpose
RADTRAD-NAI	1.1a(QA)	3	Radiological Dose Calculations

RADTRAD-NAI (Reference 3) is qualified and maintained under the Numerical Applications Inc. QA program (Reference 4). This QA program meets the requirements of 10CFR50 Appendix B with code error reporting per 10CFR21. RADTRAD-NAI is accessed via a controlled access web-based interface that provides a front-end for developing and submitting input models. The input developed via the interface is submitted to the RADTRAD-NAI solver that runs on an AMD-ATHLON based personal computer running LINUX.

**7.0 Calculation**

A single release path was evaluated to assess the dose associated with the direct release of 160 gpm of PCS coolant through the line rupture for a period of 60 minutes. The calculations will assume 100 cfm of unfiltered inleakage into the control room.

Separate calculations will be required to compute individual dose contributions from the initial PCS non-iodine activity (Section 7.1) and the concurrent iodine spike activity (Section 7.2). The only difference in the calculations is the definition of the source terms.

**7.1 PCS Noble Gas Dose**

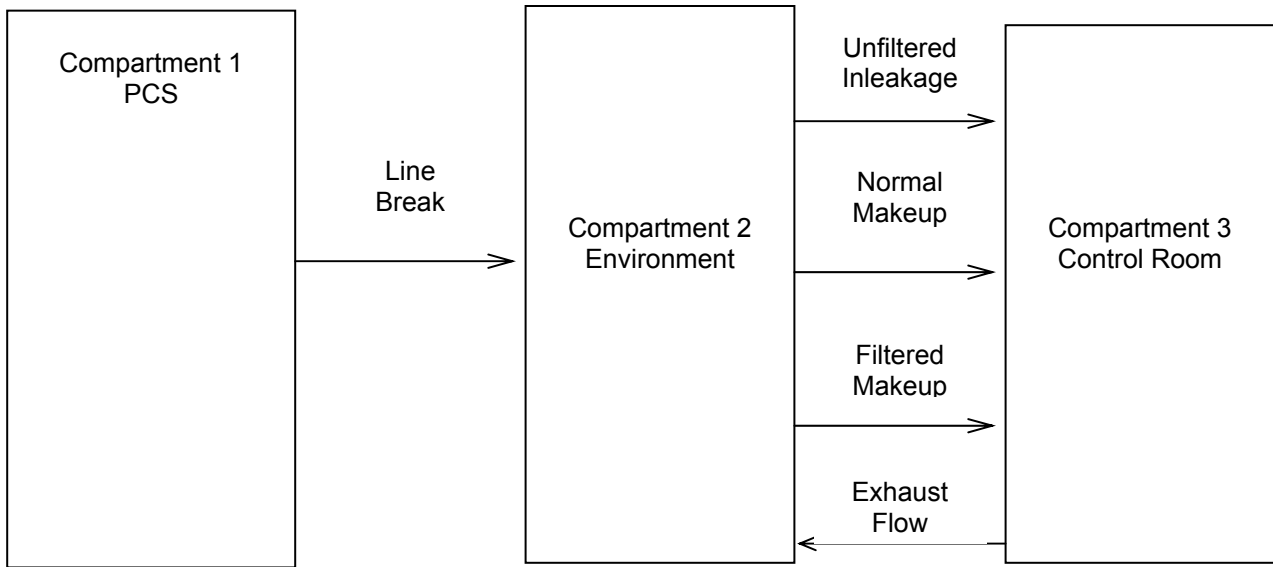
The basic model includes a PCS compartment representing the PCS mass that will receive the activity source associated with the primary coolant activity. A direct release path will be modeled to represent the mass flow rate from the line break. Due to the modeling approach used for the iodine spike, separate models will be required to assess the dose contributions from the iodine spike and the contribution from the initial non-iodine (noble gas) activity in the PCS at the beginning of the event.

The RADTRAD-NAI model developed for initial PCS non-iodine activity dose calculation consists of three compartments and 5 pathways (see Figure 1):

Compartment Description	Compartment Number	RADTRAD-NAI Compartment Type
PCS	1	(3) Normal
Environment	2	(2) Environment
Control Room	3	(1) Control Room

Pathway Description	Compartment Connections	Pathway Number	RADTRAD-NAI Pathway Type
Line Break	1 to 2	1	Filtered
Control Room Unfiltered Makeup	2 to 3	2	Filtered
Control Room Filtered Makeup	2 to 3	3	Filtered
Control Room Unfiltered Inleakage	2 to 3	4	Filtered
Control Room Exhaust	3 to 2	5	Filtered

Figure 1 Small Line Break RADTRAD-NAI Model



The subsections that follow describe the RADTRAD-NAI input for the PCS initial non-iodine activity model. The PCS initial activity RADTRAD-NAI model was set up on a mass flow basis rather than the typical volumetric flow basis; therefore, the PCS volume was specified as lb<sub>m</sub>. The output for this model, *pal\_slb\_pcs\_db\_ast.out*, is presented in Attachment 4.

**7.1.1 PCS Compartment**

For the non-iodine dose calculation, the source term is defined as a concentration; therefore, using either the maximum or the minimum PCS volume is acceptable. From Reference 11, the minimum volume is 9400 ft<sup>3</sup>. At system conditions of 2060 psia and 560°F (Reference 11), the PCS mass is:

$$(9400 \text{ ft}^3) / (2.171017\text{E-}2 \text{ ft}^3/\text{lb}_m) = 432,976.8 \text{ lb}_m$$

The following input was specified for the PCS Compartment:

Volume	432,976.8 lb <sub>m</sub>	
Source Fraction	1.0	100% of source term applied to PCS volume
Recirculation Filters	no	
Natural Deposition	no	

**7.1.2 Environment Compartment**

The only required input for the environment compartment is volume. This value is a “dummy” value; however, an input is required for this field. An arbitrary value of 2.0E20 ft<sup>3</sup> was specified.

**7.1.3 Control Room Compartment**

The control room volume was set to 35,923 ft<sup>3</sup>. The control room HVAC system is assumed to be operating in normal mode at the beginning of the event. The operators are assumed to place the control room into emergency filtration mode at 20 minutes (Reference 5).

Time (hours)	Flow Rate (cfm)	Filter Efficiency		
		Aerosol	Elemental	Organic
0.0	0.0	99	99	99
0.3333	1413.6	99	99	99
720.0	1413.6	99	99	99

**7.1.4 Small Line Break – Pathway 1**

This pathway, which models the total small line break discharge flow, connects the PCS (Compartment 1) with the Environment Compartment (Compartment 2). The break flow is 160.0 gpm total for 60 minutes. The specific volume of the break flow at 35 psia and 135°F (Reference 5) is 1.626797E-2 ft<sup>3</sup>/lb<sub>m</sub>. The break mass flow rate is:

160.0 gpm flow rate = (160.0 gpm)(0.13368 ft<sup>3</sup>/gal)(1 / 1.626797E-2 ft<sup>3</sup>/lb<sub>m</sub>) = 1314.78 lb<sub>m</sub>/min

Per section 5.4 of Appendix A to Reg. Guide 1.183, the flashing fraction is determined by the following equation:

$$FF = (h_{f1} - h_{f2}) / h_{fg}$$

Where, h<sub>f1</sub> is the enthalpy of the break flow, h<sub>f2</sub> is the enthalpy of saturated steam at 14.7 psia and 212°F, and h<sub>fg</sub> is the heat of vaporization at 212°F.

Thus, the break conditions of 35 psia and 135°F will produce no flashing.

The guidance provided in Appendix A of Reg. Guide 1.183 for the handling of ESF system leakage will be applied to the break flow release. This guidance specifies:

- 10% of the total iodine in the leaked fluid is assumed to be released to the air
- The form of the airborne iodine is 97% elemental and 3% organic
- Particulates (all nuclides with the exception of iodine and noble gases) are assumed to remain in the liquid phase

In addition, it will be assumed that all of the noble gas in the break flow is released.

**Small Line Break Flow**

Time (hours)	Flow Rate (lb/min)	Filter Efficiency		
		Aerosol	Elemental	Organic
0.0	1314.78	0	0	0
1.0	0.0	0	0	0
720.0	0.0	0	0	0

**7.1.5 Control Room Unfiltered Makeup**

The control room normal ventilation rate of 660 cfm is applied for the first 20 minutes. At 20 minutes, the control room enters recirculation mode.

**Unfiltered Makeup Flow**

Time (hours)	Flow Rate (cfm)	Filter Efficiency		
		Aerosol	Elemental	Organic
0.0	660.0	0	0	0
0.3333	0.0	0	0	0
720.0	0.0	0	0	0

### 7.1.6 Control Room Filtered Makeup

The control room filtered makeup flow of 1413.6 cfm starts at 20 minutes (time of control room isolation).

Filtered Makeup Flow

Time (hours)	Flow Rate (cfm)	Filter Efficiency		
		Aerosol	Elemental	Organic
0.0	0.0	99	99	99
0.3333	1413.6	99	99	99
720.0	1413.6	99	99	99

### 7.1.7 Control Room Unfiltered Inleakage

The unfiltered inleakage was set to 100 cfm.

Unfiltered Inleakage

Time (hours)	Flow Rate (cfm)	Filter Efficiency		
		Aerosol	Elemental	Organic
0.0	0.0	0	0	0
0.3333	100.0	0	0	0
720.0	100.0	0	0	0

### 7.1.8 Control Room Exhaust

The control room exhaust is equal to the sum of the control room intake and inleakage flows.

Exhaust Flow

Time (hours)	Flow Rate (cfm)	Filter Efficiency		
		Aerosol	Elemental	Organic
0.0	660.0	0	0	0
0.3333	1513.6	0	0	0
720.0	1513.6	0	0	0

### 7.1.9 Plant Power and Release Information

The nuclide inventory file containing the source term is *pal\_pcs.nif*. The "nif" file lists the source term in terms of  $\mu\text{Ci/gm}$  and the reference power level in the "nif" file is 1.0. The total source term is defined by the combination of the "nif" file activities, the "nif" file reference power level, and the plant power input to the RADTRAD model. Therefore, the plant power input to RADTRAD was used to account for the PCS mass and it was used to convert  $\mu\text{Ci}$  to Curies.

At PCS conditions of 2060 psia and 560°F, the specific volume is 2.171017E-2 ft<sup>3</sup>/lb<sub>m</sub>. The minimum PCS volume is 9400 ft<sup>3</sup>.

$$\text{Plant Power} = (9400 \text{ ft}^3)(1 / 2.171017\text{E-}2 \text{ ft}^3/\text{lb}_m)(1 \text{ Ci} / 10^6 \text{ } \mu\text{Ci})(453.592 \text{ gm}/\text{lb}_m)$$

$$\text{Plant Power} = 196.395 \text{ gm-Ci}/\mu\text{Ci}$$

As discussed in Section 7.1.4, the iodine fractions are 97% elemental and 3% organic:

Start of first release time (hours)	0.0
Calculate decay	Yes
Calculate daughters	Yes
Iodine Fraction – aerosol	0.0
Iodine Fraction – elemental	0.97
Iodine Fraction – organic	0.03

### 7.1.10 Dose Location Information

Three dose locations were specified; the Exclusion Boundary (EAB), the Low Population Zone (LPZ), and the Control Room (CR). The X/Qs for the EAB and LPZ are from Table 5 of Reference 12. The breathing rates are from Section 4.1.3 of Reg. Guide 1.183:

Exclusion Boundary Data:

#### EAB X/Q

X/Q Table 1

Time (hours)	X/Q (sec/m <sup>3</sup> )
0.0	5.39E-4
720.0	5.39E-4

#### EAB & LPZ Breathing Rate

Time (hours)	Breathing Rate (m <sup>3</sup> /sec)
0.0	3.5E-4
8.0	1.8E-4
24.0	2.3E-4
720.0	2.3E-4

Low Population Zone Data:

**LPZ X/Q**

**X/Q Table 2**

Time (hours)	X/Q (sec/m <sup>3</sup> )
0.0	6.66E-5
2.0	3.03E-5
8.0	2.04E-5
24.0	8.67E-6
96.0	2.54E-6
720.0	2.54E-6

Control Room Data:

The breathing rates and occupancy factor for the control room are from Section 4.2.6 of Reg. Guide 1.183. The line break occurs in the auxiliary building; therefore, the release is via the plant stack. The X/Qs correspond to the plant stack and are listed in Table 4 of Reference 12.

**Table 3 - Control Room X/Q (Plant Stack to Normal Intake)**

Time (hours)	X/Q (sec/m <sup>3</sup> )
0.0	6.10E-3
2.0	4.32E-3
8.0	1.73E-3
24.0	1.27E-3
96.0	9.79E-4
720.0	9.79E-4

**Table 4 - Control Room X/Q (Plant Stack to Emergency Intake)**

Time (hours)	X/Q (sec/m <sup>3</sup> )
0.0	8.32E-4
2.0	7.69E-4
8.0	2.83E-4
24.0	2.15E-4
96.0	1.57E-4
720.0	1.57E-4



**Control Room Breathing Rate**

Time (hours)	Breathing Rate (m <sup>3</sup> /sec)
0.0	3.5E-4
720.0	3.5E-4

**Control Room Occupancy Factor**

Time (hours)	Factor
0.0	1.0
24.0	0.6
96.0	0.4
720.0	0.4

**Dose Location Pathway Combinations**

Control Room Intake Path	Release Path	X/Q Table
2	1	3
3	1	4
4	1	3

**7.1.11 Source Term and Plant Power**

Section 3.4 of Reg. Guide 1.183 specifies the radionuclide groups that should be considered for AST analyses. Reference 10 provides a listing of the individual nuclides and dose conversion factors used for the analyses presented in this calculation. The data provided in Reference 10 are consistent with Section 3.4 of Reg. Guide 1.183. The dose conversion factors provided in Reference 10 were obtained from Table 2.1 of Federal Guidance Report 11 and Table III.1 of Federal Guidance Report 12.

The source term is given by the nuclide inventory file *pal\_pcs.nif*.

**7.1.12 Release Fraction Timing File**

Table 7-1 presents the release fraction timing file, *pal\_slb\_ng.rft*, used for the noble gas case. The release fractions for all non-noble gas nuclides were set to zero. 100% of the noble gas was specified to be released over a short period of time during the gap activity release phase.

**Table 7-1 Noble Gas Release Fraction Timing File**

```

Release Fraction and Timing Name:
PWR, NUREG 1.183, Palisades SLB Noble Gas Release
Duration (h): Design Basis Accident
  0.1000E-02  0.0000E+00  0.0000E+00  0.0000E+00
Noble Gases:
  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00
Iodine:
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
Cesium:
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
Tellurium:
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
Strontium:
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
Barium:
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
Ruthenium:
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
Cerium:
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
Lanthanum:
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
Non-Radioactive Aerosols (kg):
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
End of Release File

```

## 7.2 Iodine Spike Dose Contribution

This model is similar to the one described in Section 7.1 except that the source term is modeled to represent the iodine spike release. The following changes were applied:

- the nuclide inventory file was changed to represent the concurrent iodine spike
- release fraction timing file was changed to represent the concurrent iodine spike
- “plant power” input to the RADTRAD model was changed to account for the change in the nuclide inventory file
- the PCS volume was changed to be consistent with the PCS activity determination (459,445 lb<sub>m</sub>)
- the line break flow rate was reduced by a factor of 10 to account for the assumption of 10% iodine release from the break flow

A multiplier of 500 for the concurrent iodine spike is required by Section 15.6.2 of the SRP. The definition of concurrent iodine spike is per Appendix E of Reg. Guide 1.183:

*“...the iodine release rate from the fuel rods to the primary coolant (expressed in curies per unit time) increases to a value 500 times greater than the release rate corresponding to the iodine concentration at the equilibrium value (typically 1.0 μCi/gm DE I-131) specified in technical specifications (i.e., concurrent iodine spike case). A concurrent iodine spike need not be considered if fuel damage is postulated. The assumed iodine spike duration should be 8 hours. Shorter spike durations may be considered on a case-by-case basis if it can be shown that the activity released by the 8-hour spike exceeds that available for release from the fuel gap of all fuel pins.”*

With iodine activity at equilibrium, the iodine release rate will be equal to the rate at which iodine is lost due to decay, purification, and primary system leakage:

$$R = A \lambda$$

where: R = appearance rate (Ci/min)

$\lambda$  = removal (min<sup>-1</sup>)

A = activity (Ci)

The iodine removal,  $\lambda$ , is equal to removal by decay, purification, and PCS leakage:

$$\lambda = \lambda_{\text{decay}} + \lambda_{\text{purification}} + \lambda_{\text{leakage}}$$

The iodine removal due to leakage and purification can be determined by a simple ratio:

$$\lambda_{\text{purification}} + \lambda_{\text{leakage}} = [(\text{purification mass flow} + \text{leakage mass flow})] / \text{PCS mass}$$

Reference 8 specifies a letdown temperature of 120°F. Using the PCS pressure of 2060 psia, gives a specific volume of 1.610482E-2 ft<sup>3</sup>/lb<sub>m</sub> for the letdown flow. Using reactor conditions of 2060 psia and 560°F gives a specific volume of 2.171017E-2 ft<sup>3</sup>/lb<sub>m</sub> for the leakage flow.

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$$\begin{aligned} \text{Purification Flow} &= 44 \text{ gpm (Reference 8, 40 gpm + 10\% uncertainty)} \\ &= (44 \text{ gpm})(0.13368 \text{ ft}^3/\text{gal})(1 / 1.610482\text{E-}2 \text{ ft}^3/\text{lb}_m) \\ &= 365.227 \text{ lb}_m/\text{min} \end{aligned}$$

$$\begin{aligned} \text{Leakage Flow} &= 11 \text{ gpm (Reference 15, PCS identified + unidentified leakage)} \\ &= (11 \text{ gpm})(0.13368 \text{ ft}^3/\text{gal})(1 / 2.171017\text{E-}2 \text{ ft}^3/\text{lb}_m) \\ &= 67.732 \text{ lb}_m/\text{min} \end{aligned}$$

$$\text{PCS mass} = 459,445 \text{ lb}_m \text{ (mass specified in Reference 8)}$$

$$\lambda_{\text{purification}} + \lambda_{\text{leakage}} = [365.227 \text{ lb}_m/\text{min} + 67.732 \text{ lb}_m/\text{min}] / 459,445 \text{ lb}_m = 0.000942 \text{ min}^{-1}$$

Using iodine decay constants from Reference 10, the total removal can be determined:

$$\lambda_{131} = 0.000942 + 5.986968\text{E-}5 = 0.001002 \text{ min}^{-1}$$

$$\lambda_{132} = 0.000942 + 0.005023 = 0.005965 \text{ min}^{-1}$$

$$\lambda_{133} = 0.000942 + 0.000555 = 0.001497 \text{ min}^{-1}$$

$$\lambda_{134} = 0.000942 + 0.013178 = 0.014120 \text{ min}^{-1}$$

$$\lambda_{135} = 0.000942 + 0.001748 = 0.002690 \text{ min}^{-1}$$

Using the 1.0  $\mu\text{Ci/gm}$  D.E. I-131 concentrations from Table 7-2, the appearance rates can be determined:

$$\text{Iodine Activity (Ci)} = (\text{D.E. I-131 Concentration}) \times (\text{PCS Mass}) \times 1.0\text{e-}6$$

$$1.0 \mu\text{Ci/gm Iodine Appearance} = (\text{Iodine Activity}) \times (\text{Iodine Removal})$$

$$500 \mu\text{Ci/gm Iodine Appearance} = 500 \times 1.0 \mu\text{Ci/gm Iodine Appearance}$$

(Note that Table 7-2 was copied from a spreadsheet; therefore, not all of the significant figures from the spreadsheet were carried over into the table).

Table 7-2 Concurrent Iodine Spike Activity Appearance Rate

Nuclide	1.0 $\mu\text{Ci/gm}$ D.E I-131 Concentrations ( $\mu\text{Ci/gm}$ )	PCS Mass (gm)	Iodine Activity (Ci)	Iodine Removal ( $\text{min}^{-1}$ )	1.0 $\mu\text{Ci/gm}$ Iodine Appearance (Ci/min)	x 500	500 $\mu\text{Ci/gm}$ Iodine Appearance (Ci/min)
I-131	8.305E-01	2.084E+08	1.731E+02	0.001002	0.1734	500	86.7114868
I-132	1.917E-01	2.084E+08	3.995E+01	0.005965	0.2383	500	119.152137
I-133	8.624E-01	2.084E+08	1.797E+02	0.001497	0.2690	500	134.524016
I-134	7.510E-02	2.084E+08	1.565E+01	0.01412	0.2210	500	110.495326
I-135	3.673E-01	2.084E+08	7.655E+01	0.00269	0.2059	500	102.953824

Nuclide	500 $\mu\text{Ci/gm}$ Iodine Appearance (Ci/min)	8 hour Production (Ci)
I-131	86.7114868	4.162E+04
I-132	119.152137	5.719E+04
I-133	134.524016	6.457E+04
I-134	110.495326	5.304E+04
I-135	102.953824	4.942E+04

The concurrent iodine spike was incorporated into the RADTRAD-NAI run by using modified versions of the nuclide inventory and release fraction timing files. In the nuclide inventory file, *pal\_slb\_iodine.nif* (Attachment 2), the activities for I-131 through I-135 were set to 1.0 and the activities for the remaining isotopes were set to zero. In addition, each iodine isotope was given a different release group number that corresponded to the modified release groupings specified in the release fraction timing file, *pal\_slb\_iodine.rft*. In the release fraction timing file, each iodine isotope was listed as a separate release group. The total 8 hour production (in Curies) for each iodine isotope was then specified to be released over an 8 hour period.

Since the total iodine production is specified in the release fraction timing file and since the reference power was set to 1.0 in the nuclide inventory file, the plant power value in the RADTRAD-NAI model (*pal\_slb\_iodine\_db\_ast.psf*) was set to 1.0.

In order to consistent with the determination of the iodine spike activity, the PCS mass was set equal to 459,445 lb<sub>m</sub>. The output for this model is provided in Attachment 5.

The modified release fraction timing file is given in below:

**Table 7-3 Concurrent Iodine Spike Release Fraction Timing File**

```
Release Fraction and Timing Name:
PWR, NUREG 1.183, Palisades SLB Concurrent Iodine Spike
Duration (h): Design Basis Accident
  0.0100E+00  0.7990E+01  0.0000E+00  0.0000E+00
Noble Gases:
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
Iodine:
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
I-131:
  0.0000E+00  0.4162E+05  0.0000E+00  0.0000E+00
I-132:
  0.0000E+00  0.5719E+05  0.0000E+00  0.0000E+00
I-133:
  0.0000E+00  0.6457E+05  0.0000E+00  0.0000E+00
I-134:
  0.0000E+00  0.5304E+05  0.0000E+00  0.0000E+00
I-135:
  0.0000E+00  0.4942E+05  0.0000E+00  0.0000E+00
Cerium:
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
Lanthanum:
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
Non-Radioactive Aerosols (kg):
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
End of Release File
```

## 8.0 References

1. USNRC, Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Plants", July 2000.
2. Palisades Nuclear Plant FSAR, Revision 24.
3. Numerical Applications Inc., NAI-9912-04, Revision 4, "RADTRAD-NAI Version 1.1a(QA) Documentation", October 2004.
4. Numerical Applications Inc., "Dose Methodology Quality Assurance Procedures", Revision 1, June 4, 2001.
5. NAI-E03-211 Project Memo 2004-07, "Remaining Event Inputs", July 8 2004.
6. NAI Calculation Number NAI-1149-008 Rev. 0, "Palisades Best Estimate Main Steam Line Break AST Radiological Analysis".
7. Palisades Plant Technical Specifications through Amendment 213.
8. NAI Calculation Number NAI-1149-007 Rev. 0, "Primary Coolant Activity for Palisades".
9. NAI Calculation Number NAI-1149-001 Rev. 1, "Source Terms for Palisades Dose Calculations".
10. NAI Calculation Number NAI-1101-001 Rev. 1, "Generation of .nif and .inp Files for RADTRAD-NAI".
11. NAI-E03-211 Project Memo 2004-03, "MHA/LOCA Inputs", June 11 2004.
12. NAI Calculation Number NAI-1149-002 Rev. 0, "Determination of Atmospheric Dispersion Factors for Palisades".
13. Reference deleted.
14. NAI Calculation Number NAI-1149-003 Rev. 1, "Determination of Direct Shine Doses for a LOCA for Palisades".
15. NAI-E03-211 Project Memo 2004-06, "MSLB and SGTR Inputs", July 6 2004.
16. NAI-1149-011 Rev. 0, "Primary Coolant Source Term Determination for Palisades Dose Calculations".
17. NAI Calculation Number NAI-1149-024 Rev. 0, "Determination of Direct Shine Doses for a Design Basis LOCA for Palisades".

**9.0 SLB RADTRAD-NAI Analysis Files****RADTRAD-NAI SLB Case Files**

<b>File Name</b>	<b>Attachment #</b>	<b>Case</b>
pal_slb_iodine.nif	Attachment 2	Iodine spike source Term
pal_pcs.nif	Attachment 3	PCS activity source term
pal_slb_pcs_db_ast.out	Attachment 4	RADTRAD-NAI SLB PCS noble gas dose output
pal_slb_iodine_db_ast.out	Attachment 5	RADTRAD-NAI SLB Iodine spike dose output
pal_slb_ng.rft	Table 7-1	PCS noble gas release fraction timing file
pal_slb_iodine.rft	Table 7-3	Iodine spike release fraction timing file
nai-1101-001rev0.dcf	Attachment 6	FP&L AST dose conversion factor file



**Attachment 1 Verification Comments for Calculation NAI-1149-020 Rev. 0**

Fill in the Control Room shine dose "TBD" in Table 2-1. Suggest adding the environment and the CR filter shine dose.

**Comment 1**

Page 6, Attachments – Please update the fields/title for Attachment 1. The calculation number should be "-020" versus "-010."

*Response: TOC updated.*

**Comment 2**

Page 8, Section 3.1 – The first sentence should reference Table 2 of Reference 8 or Table 6-5 of NAI-1149-011. If the reference is changed to NAI-1149-011, then comment 3 below is no longer applicable.

*Response: Reference changed to NAI-1149-011 (Reference 16).*

**Comment 3**

Page 8, Section 3.1 – Please provide a reference where the 1.0  $\mu\text{Ci/gm}$  dose equivalent I-131 and 100/E-bar adjustments are made or add the tables.

*Response: NAI-1149-011 (Reference 16) has been added, per Comment 2.*

**Comment 4**

Page 8, Section 5.0 – Please add a discussion that the letdown line is the small break outside of containment in Section 1.0.

*Response: For consistency, "Letdown line rupture" has been changed to "small line break outside of containment".*

**Comment 5**

Page 19, Section 7.2, 2<sup>nd</sup> paragraph – Please mention that the definition for the concurrent iodine spike is from Appendix E of RG 1.183 which applies to Main Steam Line Breaks and is more conservative than Appendix F for Steam generator Tube Ruptures.

*Response: The iodine spike multiplier of 500 is required by the SRP. Reg. Guide 1.183 was used to define the iodine spike. Section 7.2 has been updated to note this.*

**Comment 6**

Reference 13 does not appear to be used. It should be deleted

*Response: Reference deleted.*

**Comment 7**

Attachment 5 – The PCS “volume” in the model for the concurrent spike should be changed to 459,455 to be consistent with the basis for the PCS activity and associated spike calculation.

*Response: Correction made. The model, results, and output attachment have been updated.*

**Comment 8**

Reference 14 (shine calc.) is now Rev. 1.

*Response: Reference revised.*

Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

**Attachment 2 Palisades Small Line Break Iodine Source Term**

Nuclide Inventory Name:  
Palisades SLB Concurrent Iodine Spike  
Power Level:  
0.1000E+01  
Nuclides:  
107  
Nuclide 001:  
Co-58  
7  
0.6117120000E+07  
0.5800E+02  
0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 002:  
Co-60  
7  
0.1663401096E+09  
0.6000E+02  
0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 003:  
Kr-85  
1  
0.3382974720E+09  
0.8500E+02  
0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 004:  
Kr-85m  
1  
0.1612800000E+05  
0.8500E+02  
0.0000E+00  
Kr-85 0.2110E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 005:  
Kr-87  
1  
0.4578000000E+04  
0.8700E+02  
0.0000E+00  
Rb-87 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 006:  
Kr-88  
1  
0.1022400000E+05  
0.8800E+02  
0.0000E+00  
Rb-88 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 007:  
Rb-86  
3  
0.1612224000E+07  
0.8600E+02  
0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 008:  
Sr-89

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
5
0.4363200000E+07
0.8900E+02
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 009:
Sr-90
5
0.9189573120E+09
0.9000E+02
0.0000E+00
Y-90      0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 010:
Sr-91
5
0.3420000000E+05
0.9100E+02
0.0000E+00
Y-91m     0.5780E+00
Y-91      0.4220E+00
none      0.0000E+00
Nuclide 011:
Sr-92
5
0.9756000000E+04
0.9200E+02
0.0000E+00
Y-92      0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 012:
Y-90
9
0.2304000000E+06
0.9000E+02
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 013:
Y-91
9
0.5055264000E+07
0.9100E+02
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 014:
Y-92
9
0.1274400000E+05
0.9200E+02
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 015:
Y-93
9
0.3636000000E+05
0.9300E+02
0.0000E+00
Zr-93     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 016:
Zr-95
9
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
0.5527872000E+07
0.9500E+02
0.0000E+00
Nb-95m 0.7000E-02
Nb-95 0.9930E+00
none 0.0000E+00
Nuclide 017:
Zr-97
9
0.6084000000E+05
0.9700E+02
0.0000E+00
Nb-97m 0.9470E+00
Nb-97 0.5300E-01
none 0.0000E+00
Nuclide 018:
Nb-95
9
0.3036960000E+07
0.9500E+02
0.0000E+00
none 0.0000E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 019:
Mo-99
7
0.2376000000E+06
0.9900E+02
0.0000E+00
Tc-99m 0.8760E+00
Tc-99 0.1240E+00
none 0.0000E+00
Nuclide 020:
Tc-99m
7
0.2167200000E+05
0.9900E+02
0.0000E+00
Tc-99 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 021:
Ru-103
7
0.3393792000E+07
0.1030E+03
0.0000E+00
Rh-103m 0.9970E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 022:
Ru-105
7
0.1598400000E+05
0.1050E+03
0.0000E+00
Rh-105 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 023:
Ru-106
7
0.3181248000E+08
0.1060E+03
0.0000E+00
Rh-106 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 024:
Rh-105
7
0.1272960000E+06
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
0.1050E+03
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 025:
Sb-127
  4
  0.3326400000E+06
  0.1270E+03
  0.0000E+00
Te-127m  0.1760E+00
Te-127   0.8240E+00
none     0.0000E+00
Nuclide 026:
Sb-129
  4
  0.1555200000E+05
  0.1290E+03
  0.0000E+00
Te-129m  0.2250E+00
Te-129   0.7750E+00
none     0.0000E+00
Nuclide 027:
Te-127
  4
  0.3366000000E+05
  0.1270E+03
  0.0000E+00
none     0.0000E+00
none     0.0000E+00
none     0.0000E+00
Nuclide 028:
Te-127m
  4
  0.9417600000E+07
  0.1270E+03
  0.0000E+00
Te-127   0.9760E+00
none     0.0000E+00
none     0.0000E+00
Nuclide 029:
Te-129
  4
  0.4176000000E+04
  0.1290E+03
  0.0000E+00
I-129    0.1000E+01
none     0.0000E+00
none     0.0000E+00
Nuclide 030:
Te-129m
  4
  0.2903040000E+07
  0.1290E+03
  0.0000E+00
Te-129   0.6500E+00
I-129    0.3500E+00
none     0.0000E+00
Nuclide 031:
Te-131m
  4
  0.1080000000E+06
  0.1310E+03
  0.0000E+00
Te-131   0.2220E+00
I-131    0.7780E+00
none     0.0000E+00
Nuclide 032:
Te-132
  4
  0.2815200000E+06
  0.1320E+03
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
0.0000E+00
I-132  0.1000E+01
none   0.0000E+00
none   0.0000E+00
Nuclide 033:
I-131
  3
  0.6946560000E+06
  0.1310E+03
  0.1000E+01
Xe-131m 0.1110E-01
none    0.0000E+00
none    0.0000E+00
Nuclide 034:
I-132
  4
  0.8280000000E+04
  0.1320E+03
  0.1000E+01
none    0.0000E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 035:
I-133
  5
  0.7488000000E+05
  0.1330E+03
  0.1000E+01
Xe-133m 0.2900E-01
Xe-133  0.9710E+00
none    0.0000E+00
Nuclide 036:
I-134
  6
  0.3156000000E+04
  0.1340E+03
  0.1000E+01
none    0.0000E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 037:
I-135
  7
  0.2379600000E+05
  0.1350E+03
  0.1000E+01
Xe-135m 0.1540E+00
Xe-135  0.8460E+00
none    0.0000E+00
Nuclide 038:
Xe-133
  1
  0.4531680000E+06
  0.1330E+03
  0.0000E+00
none    0.0000E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 039:
Xe-135
  1
  0.3272400000E+05
  0.1350E+03
  0.0000E+00
Cs-135  0.1000E+01
none    0.0000E+00
none    0.0000E+00
Nuclide 040:
Cs-134
  3
  0.6507177120E+08
  0.1340E+03
  0.0000E+00
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 041:
Cs-136
  3
  0.1131840000E+07
  0.1360E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 042:
Cs-137
  3
  0.9467280000E+09
  0.1370E+03
  0.0000E+00
Ba-137m  0.9460E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 043:
Ba-139
  6
  0.4962000000E+04
  0.1390E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 044:
Ba-140
  6
  0.1100736000E+07
  0.1400E+03
  0.0000E+00
La-140   0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 045:
La-140
  9
  0.1449792000E+06
  0.1400E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 046:
La-141
  9
  0.1414800000E+05
  0.1410E+03
  0.0000E+00
Ce-141   0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 047:
La-142
  9
  0.5550000000E+04
  0.1420E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 048:
Ce-141
  8
  0.2808086400E+07
  0.1410E+03
  0.0000E+00
none      0.0000E+00
```



## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
none      0.0000E+00
none      0.0000E+00
Nuclide 049:
Ce-143
  8
  0.1188000000E+06
  0.1430E+03
  0.0000E+00
Pr-143    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 050:
Ce-144
  8
  0.2456352000E+08
  0.1440E+03
  0.0000E+00
Pr-144m   0.1780E-01
Pr-144    0.9822E+00
none      0.0000E+00
Nuclide 051:
Pr-143
  9
  0.1171584000E+07
  0.1430E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 052:
Nd-147
  9
  0.9486720000E+06
  0.1470E+03
  0.0000E+00
Pm-147    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 053:
Np-239
  8
  0.2034720000E+06
  0.2390E+03
  0.0000E+00
Pu-239    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 054:
Pu-238
  8
  0.2768863824E+10
  0.2380E+03
  0.0000E+00
U-234     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 055:
Pu-239
  8
  0.7594336440E+12
  0.2390E+03
  0.0000E+00
U-235     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 056:
Pu-240
  8
  0.2062920312E+12
  0.2400E+03
  0.0000E+00
U-236     0.1000E+01
none      0.0000E+00
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
none      0.0000E+00
Nuclide 057:
Pu-241
  8
  0.4544294400E+09
  0.2410E+03
  0.0000E+00
U-237     0.2450E-04
Am-241    0.1000E+01
none      0.0000E+00
Nuclide 058:
Am-241
  9
  0.1363919472E+11
  0.2410E+03
  0.0000E+00
Np-237    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 059:
Cm-242
  9
  0.1406592000E+08
  0.2420E+03
  0.0000E+00
Pu-238    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 060:
Cm-244
  9
  0.5715081360E+09
  0.2440E+03
  0.0000E+00
Pu-240    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 061:
I-130
  2
  0.4449600000E+05
  0.1300E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 062:
Kr-83m
  1
  0.6588000000E+04
  0.8300E+02
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 063:
Xe-138
  1
  0.8502000000E+03
  0.1380E+03
  0.0000E+00
Cs-138    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 064:
Xe-131m
  1
  0.1028160000E+07
  0.1310E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
Nuclide 065:
Xe-133m
  1
  0.1890432000E+06
  0.1330E+03
  0.0000E+00
Xe-133  0.1000E+01
none    0.0000E+00
none    0.0000E+00
Nuclide 066:
Xe-135m
  1
  0.9174000000E+03
  0.1350E+03
  0.0000E+00
Xe-135  0.1000E+01
none    0.0000E+00
none    0.0000E+00
Nuclide 067:
Cs-138
  3
  0.1932000000E+04
  0.1380E+03
  0.0000E+00
none    0.0000E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 068:
Cs-134m
  3
  0.1044000000E+05
  0.1340E+03
  0.0000E+00
Cs-134  0.1000E+01
none    0.0000E+00
none    0.0000E+00
Nuclide 069:
Rb-88
  3
  0.1068000000E+04
  0.8800E+02
  0.0000E+00
none    0.0000E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 070:
Rb-89
  3
  0.9120000000E+03
  0.8900E+02
  0.0000E+00
Sr-89   0.1000E+01
none    0.0000E+00
none    0.0000E+00
Nuclide 071:
Sb-124
  4
  0.5201280000E+07
  0.1240E+03
  0.0000E+00
none    0.0000E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 072:
Sb-125
  4
  0.8741455200E+08
  0.1250E+03
  0.0000E+00
Te-125m 0.2280E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 073:
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
Sb-126
  4
  0.1071360000E+07
  0.1260E+03
  0.0000E+00
  none      0.0000E+00
  none      0.0000E+00
  none      0.0000E+00
  Nuclide 074:
  Te-131
    4
    0.1500000000E+04
    0.1310E+03
    0.0000E+00
  I-131     0.1000E+01
  none      0.0000E+00
  none      0.0000E+00
  Nuclide 075:
  Te-133
    4
    0.7470000000E+03
    0.1330E+03
    0.0000E+00
  I-133     0.1000E+01
  none      0.0000E+00
  none      0.0000E+00
  Nuclide 076:
  Te-134
    4
    0.2508000000E+04
    0.1340E+03
    0.0000E+00
  I-134     0.1000E+01
  none      0.0000E+00
  none      0.0000E+00
  Nuclide 077:
  Te-125m
    4
    0.5011200000E+07
    0.1250E+03
    0.0000E+00
  none      0.0000E+00
  none      0.0000E+00
  none      0.0000E+00
  Nuclide 078:
  Te-133m
    4
    0.3324000000E+04
    0.1330E+03
    0.0000E+00
  I-133     0.8700E+00
  Te-133    0.1300E+00
  none      0.0000E+00
  Nuclide 079:
  Ba-141
    6
    0.1096200000E+04
    0.1410E+03
    0.0000E+00
  La-141    0.1000E+01
  none      0.0000E+00
  none      0.0000E+00
  Nuclide 080:
  Ba-137m
    6
    0.1531200000E+03
    0.1370E+03
    0.0000E+00
  none      0.0000E+00
  none      0.0000E+00
  none      0.0000E+00
  Nuclide 081:
  Pd-109
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
7
0.4833720000E+05
0.1090E+03
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 082:
Rh-106
7
0.2990000000E+02
0.1060E+03
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 083:
Rh-103m
7
0.3367200000E+04
0.1030E+03
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 084:
Tc-101
7
0.8520000000E+03
0.1010E+03
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 085:
Eu-154
9
0.2777068800E+09
0.1540E+03
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 086:
Eu-155
9
0.1565256960E+09
0.1550E+03
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 087:
Eu-156
9
0.1312416000E+07
0.1560E+03
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 088:
La-143
9
0.8538000000E+03
0.1430E+03
0.0000E+00
Ce-143   0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 089:
Nb-97
9
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
0.4326000000E+04
0.9700E+02
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 090:
Nb-95m
  9
0.3117600000E+06
0.9500E+02
0.0000E+00
Nb-95     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 091:
Pm-147
  9
0.8278820780E+08
0.1470E+03
0.0000E+00
Sm-147    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 092:
Pm-148
  9
0.4639680000E+06
0.1480E+03
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 093:
Pm-149
  9
0.1910880000E+06
0.1490E+03
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 094:
Pm-151
  9
0.1022400000E+06
0.1510E+03
0.0000E+00
Sm-151    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 095:
Pm-148m
  9
0.3568320000E+07
0.1480E+03
0.0000E+00
Pm-148    0.4600E-01
none      0.0000E+00
none      0.0000E+00
Nuclide 096:
Pr-144
  9
0.1036800000E+04
0.1440E+03
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 097:
Pr-144m
  9
0.4320000000E+03
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
0.1440E+03
0.0000E+00
Pr-144 0.9990E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 098:
Sm-153
9
0.1681200000E+06
0.1530E+03
0.0000E+00
none 0.0000E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 099:
Y-94
9
0.1146000000E+04
0.9400E+02
0.0000E+00
none 0.0000E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 100:
Y-95
9
0.6420000000E+03
0.9500E+02
0.0000E+00
Zr-95 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 101:
Y-91m
9
0.2982600000E+04
0.9100E+02
0.0000E+00
Y-91 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 102:
Br-82
2
0.1270800000E+06
0.8200E+02
0.0000E+00
none 0.0000E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 103:
Br-83
2
0.8604000000E+04
0.8300E+02
0.0000E+00
Kr-83m 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 104:
Br-84
2
0.1908000000E+04
0.8400E+02
0.0000E+00
none 0.0000E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 105:
Am-242
9
0.5767200000E+05
0.2420E+03
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
0.0000E+00
Cm-242  0.8270E+00
Pu-242  0.1730E+00
none    0.0000E+00
Nuclide 106:
Np-238
  8
  0.1829088000E+06
  0.2380E+03
  0.0000E+00
Pu-238  0.1000E+01
none    0.0000E+00
none    0.0000E+00
Nuclide 107:
Pu-243
  8
  0.1784160000E+05
  0.2430E+03
  0.0000E+00
Am-243  0.1000E+01
none    0.0000E+00
none    0.0000E+00
End of Nuclear Inventory File
```



Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

**Attachment 3 Palisades PCS Activity Source Term**

Nuclide Inventory Name:  
Palisades PCS Source 1.0 uCi/gm DE131 and 100/E-bar  
Power Level:  
0.1000E+01  
Nuclides:  
107  
Nuclide 001:  
Co-58  
7  
0.6117120000E+07  
0.5800E+02  
0.5138E-02  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 002:  
Co-60  
7  
0.1663401096E+09  
0.6000E+02  
0.5872E-03  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 003:  
Kr-85  
1  
0.3382974720E+09  
0.8500E+02  
0.3890E+00  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 004:  
Kr-85m  
1  
0.1612800000E+05  
0.8500E+02  
0.8808E+00  
Kr-85 0.2110E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 005:  
Kr-87  
1  
0.4578000000E+04  
0.8700E+02  
0.5505E+00  
Rb-87 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 006:  
Kr-88  
1  
0.1022400000E+05  
0.8800E+02  
0.1615E+01  
Rb-88 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 007:  
Rb-86  
3  
0.1612224000E+07  
0.8600E+02  
0.1101E-01  
none 0.0000E+00  
none 0.0000E+00

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
none      0.0000E+00
Nuclide 008:
Sr-89
  5
  0.4363200000E+07
  0.8900E+02
  0.3964E-02
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 009:
Sr-90
  5
  0.9189573120E+09
  0.9000E+02
  0.3597E-03
Y-90     0.1000E+01
none     0.0000E+00
none     0.0000E+00
Nuclide 010:
Sr-91
  5
  0.3420000000E+05
  0.9100E+02
  0.1101E-02
Y-91m    0.5780E+00
Y-91     0.4220E+00
none     0.0000E+00
Nuclide 011:
Sr-92
  5
  0.9756000000E+04
  0.9200E+02
  0.4331E-03
Y-92     0.1000E+01
none     0.0000E+00
none     0.0000E+00
Nuclide 012:
Y-90
  9
  0.2304000000E+06
  0.9000E+02
  0.4698E-03
none     0.0000E+00
none     0.0000E+00
none     0.0000E+00
Nuclide 013:
Y-91
  9
  0.5055264000E+07
  0.9100E+02
  0.1321E-01
none     0.0000E+00
none     0.0000E+00
none     0.0000E+00
Nuclide 014:
Y-92
  9
  0.1274400000E+05
  0.9200E+02
  0.5285E-03
none     0.0000E+00
none     0.0000E+00
none     0.0000E+00
Nuclide 015:
Y-93
  9
  0.3636000000E+05
  0.9300E+02
  0.3230E-03
Zr-93    0.1000E+01
none     0.0000E+00
none     0.0000E+00
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
Nuclide 016:
Zr-95
  9
  0.5527872000E+07
  0.9500E+02
  0.8808E-03
Nb-95m  0.7000E-02
Nb-95   0.9930E+00
none    0.0000E+00
Nuclide 017:
Zr-97
  9
  0.6084000000E+05
  0.9700E+02
  0.3597E-03
Nb-97m  0.9470E+00
Nb-97   0.5300E-01
none    0.0000E+00
Nuclide 018:
Nb-95
  9
  0.3036960000E+07
  0.9500E+02
  0.8808E-03
none    0.0000E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 019:
Mo-99
  7
  0.2376000000E+06
  0.9900E+02
  0.3083E+01
Tc-99m  0.8760E+00
Tc-99   0.1240E+00
none    0.0000E+00
Nuclide 020:
Tc-99m
  7
  0.2167200000E+05
  0.9900E+02
  0.2349E+01
Tc-99   0.1000E+01
none    0.0000E+00
none    0.0000E+00
Nuclide 021:
Ru-103
  7
  0.3393792000E+07
  0.1030E+03
  0.8808E-03
Rh-103m 0.9970E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 022:
Ru-105
  7
  0.1598400000E+05
  0.1050E+03
  0.1028E-03
Rh-105  0.1000E+01
none    0.0000E+00
none    0.0000E+00
Nuclide 023:
Ru-106
  7
  0.3181248000E+08
  0.1060E+03
  0.3890E-03
Rh-106  0.1000E+01
none    0.0000E+00
none    0.0000E+00
Nuclide 024:
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
Rh-105
  7
  0.1272960000E+06
  0.1050E+03
  0.4037E-03
  none      0.0000E+00
  none      0.0000E+00
  none      0.0000E+00
  Nuclide 025:
  Sb-127
    4
    0.3326400000E+06
    0.1270E+03
    0.3156E-01
  Te-127m  0.1760E+00
  Te-127   0.8240E+00
  none     0.0000E+00
  Nuclide 026:
  Sb-129
    4
    0.1555200000E+05
    0.1290E+03
    0.1762E-01
  Te-129m  0.2250E+00
  Te-129   0.7750E+00
  none     0.0000E+00
  Nuclide 027:
  Te-127
    4
    0.3366000000E+05
    0.1270E+03
    0.3376E-01
  none     0.0000E+00
  none     0.0000E+00
  none     0.0000E+00
  Nuclide 028:
  Te-127m
    4
    0.9417600000E+07
    0.1270E+03
    0.5285E-02
  Te-127   0.9760E+00
  none     0.0000E+00
  none     0.0000E+00
  Nuclide 029:
  Te-129
    4
    0.4176000000E+04
    0.1290E+03
    0.2789E-01
  I-129    0.1000E+01
  none     0.0000E+00
  none     0.0000E+00
  Nuclide 030:
  Te-129m
    4
    0.2903040000E+07
    0.1290E+03
    0.1615E-01
  Te-129   0.6500E+00
  I-129    0.3500E+00
  none     0.0000E+00
  Nuclide 031:
  Te-131m
    4
    0.1080000000E+06
    0.1310E+03
    0.2716E-01
  Te-131   0.2220E+00
  I-131    0.7780E+00
  none     0.0000E+00
  Nuclide 032:
  Te-132
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
4
0.2815200000E+06
0.1320E+03
0.3523E+00
I-132 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 033:
I-131
2
0.6946560000E+06
0.1310E+03
0.8305E+00
Xe-131m 0.1110E-01
none 0.0000E+00
none 0.0000E+00
Nuclide 034:
I-132
2
0.8280000000E+04
0.1320E+03
0.1917E+00
none 0.0000E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 035:
I-133
2
0.7488000000E+05
0.1330E+03
0.8624E+00
Xe-133m 0.2900E-01
Xe-133 0.9710E+00
none 0.0000E+00
Nuclide 036:
I-134
2
0.3156000000E+04
0.1340E+03
0.7510E-01
none 0.0000E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 037:
I-135
2
0.2379600000E+05
0.1350E+03
0.3673E+00
Xe-135m 0.1540E+00
Xe-135 0.8460E+00
none 0.0000E+00
Nuclide 038:
Xe-133
1
0.4531680000E+06
0.1330E+03
0.5138E+02
none 0.0000E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 039:
Xe-135
1
0.3272400000E+05
0.1350E+03
0.5432E+01
Cs-135 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 040:
Cs-134
3
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
0.6507177120E+08
0.1340E+03
0.3597E+02
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 041:
Cs-136
3
0.1131840000E+07
0.1360E+03
0.3156E+01
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 042:
Cs-137
3
0.9467280000E+09
0.1370E+03
0.1908E+02
Ba-137m  0.9460E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 043:
Ba-139
6
0.4962000000E+04
0.1390E+03
0.3156E-03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 044:
Ba-140
6
0.1100736000E+07
0.1400E+03
0.5211E-02
La-140   0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 045:
La-140
9
0.1449792000E+06
0.1400E+03
0.2496E-02
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 046:
La-141
9
0.1414800000E+05
0.1410E+03
0.1762E-03
Ce-141   0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 047:
La-142
9
0.5550000000E+04
0.1420E+03
0.4991E-04
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 048:
Ce-141
8
0.2808086400E+07
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
0.1410E+03
0.8074E-03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 049:
Ce-143
8
0.1188000000E+06
0.1430E+03
0.4624E-03
Pr-143    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 050:
Ce-144
8
0.2456352000E+08
0.1440E+03
0.6826E-03
Pr-144m   0.1780E-01
Pr-144    0.9822E+00
none      0.0000E+00
Nuclide 051:
Pr-143
9
0.1171584000E+07
0.1430E+03
0.7340E-03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 052:
Nd-147
9
0.9486720000E+06
0.1470E+03
0.3156E-03
Pm-147    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 053:
Np-239
8
0.2034720000E+06
0.2390E+03
0.0000E+00
Pu-239    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 054:
Pu-238
8
0.2768863824E+10
0.2380E+03
0.0000E+00
U-234     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 055:
Pu-239
8
0.7594336440E+12
0.2390E+03
0.0000E+00
U-235     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 056:
Pu-240
8
0.2062920312E+12
0.2400E+03
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
0.0000E+00
U-236 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 057:
Pu-241
8
0.4544294400E+09
0.2410E+03
0.0000E+00
U-237 0.2450E-04
Am-241 0.1000E+01
none 0.0000E+00
Nuclide 058:
Am-241
9
0.1363919472E+11
0.2410E+03
0.0000E+00
Np-237 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 059:
Cm-242
9
0.1406592000E+08
0.2420E+03
0.0000E+00
Pu-238 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 060:
Cm-244
9
0.5715081360E+09
0.2440E+03
0.0000E+00
Pu-240 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 061:
I-130
2
0.4449600000E+05
0.1300E+03
0.0000E+00
none 0.0000E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 062:
Kr-83m
1
0.6588000000E+04
0.8300E+02
0.2349E+00
none 0.0000E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 063:
Xe-138
1
0.8502000000E+03
0.1380E+03
0.0000E+00
Cs-138 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 064:
Xe-131m
1
0.1028160000E+07
0.1310E+03
0.3303E+00
```



## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 065:
Xe-133m
  1
    0.1890432000E+06
    0.1330E+03
    0.1248E+01
Xe-133    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 066:
Xe-135m
  1
    0.9174000000E+03
    0.1350E+03
    0.3523E+00
Xe-135    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 067:
Cs-138
  3
    0.1932000000E+04
    0.1380E+03
    0.5138E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 068:
Cs-134m
  3
    0.1044000000E+05
    0.1340E+03
    0.3376E-01
Cs-134    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 069:
Rb-88
  3
    0.1068000000E+04
    0.8800E+02
    0.1688E+01
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 070:
Rb-89
  3
    0.9120000000E+03
    0.8900E+02
    0.4257E-01
Sr-89     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 071:
Sb-124
  4
    0.5201280000E+07
    0.1240E+03
    0.8074E-03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 072:
Sb-125
  4
    0.8741455200E+08
    0.1250E+03
    0.6753E-02
Te-125m   0.2280E+00
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
none      0.0000E+00
none      0.0000E+00
Nuclide 073:
Sb-126
  4
  0.1071360000E+07
  0.1260E+03
  0.4551E-03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 074:
Te-131
  4
  0.1500000000E+04
  0.1310E+03
  0.1101E-01
I-131     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 075:
Te-133
  4
  0.7470000000E+03
  0.1330E+03
  0.0000E+00
I-133     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 076:
Te-134
  4
  0.2508000000E+04
  0.1340E+03
  0.1541E-01
I-134     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 077:
Te-125m
  4
  0.5011200000E+07
  0.1250E+03
  0.1468E-02
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 078:
Te-133m
  4
  0.3324000000E+04
  0.1330E+03
  0.8808E-02
I-133     0.8700E+00
Te-133    0.1300E+00
none      0.0000E+00
Nuclide 079:
Ba-141
  6
  0.1096200000E+04
  0.1410E+03
  0.6679E-04
La-141    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 080:
Ba-137m
  6
  0.1531200000E+03
  0.1370E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
none      0.0000E+00
Nuclide 081:
Pd-109
  7
  0.4833720000E+05
  0.1090E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 082:
Rh-106
  7
  0.2990000000E+02
  0.1060E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 083:
Rh-103m
  7
  0.3367200000E+04
  0.1030E+03
  0.8808E-03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 084:
Tc-101
  7
  0.8520000000E+03
  0.1010E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 085:
Eu-154
  9
  0.2777068800E+09
  0.1540E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 086:
Eu-155
  9
  0.1565256960E+09
  0.1550E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 087:
Eu-156
  9
  0.1312416000E+07
  0.1560E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 088:
La-143
  9
  0.8538000000E+03
  0.1430E+03
  0.0000E+00
Ce-143   0.1000E+01
none      0.0000E+00
none      0.0000E+00
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

Nuclide 089:  
Nb-97  
9  
0.4326000000E+04  
0.9700E+02  
0.5945E-04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 090:  
Nb-95m  
9  
0.3117600000E+06  
0.9500E+02  
0.6239E-05  
Nb-95 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 091:  
Pm-147  
9  
0.8278820780E+08  
0.1470E+03  
0.8808E-04  
Sm-147 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 092:  
Pm-148  
9  
0.4639680000E+06  
0.1480E+03  
0.1248E-03  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 093:  
Pm-149  
9  
0.1910880000E+06  
0.1490E+03  
0.2202E-03  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 094:  
Pm-151  
9  
0.1022400000E+06  
0.1510E+03  
0.6092E-04  
Sm-151 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 095:  
Pm-148m  
9  
0.3568320000E+07  
0.1480E+03  
0.1908E-04  
Pm-148 0.4600E-01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 096:  
Pr-144  
9  
0.1036800000E+04  
0.1440E+03  
0.6826E-03  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 097:

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
Pr-144m
  9
  0.4320000000E+03
  0.1440E+03
  0.0000E+00
Pr-144  0.9990E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 098:
Sm-153
  9
  0.1681200000E+06
  0.1530E+03
  0.0000E+00
none    0.0000E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 099:
Y-94
  9
  0.1146000000E+04
  0.9400E+02
  0.1028E-04
none    0.0000E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 100:
Y-95
  9
  0.6420000000E+03
  0.9500E+02
  0.0000E+00
Zr-95  0.1000E+01
none    0.0000E+00
none    0.0000E+00
Nuclide 101:
Y-91m
  9
  0.2982600000E+04
  0.9100E+02
  0.6533E-03
Y-91   0.1000E+01
none    0.0000E+00
none    0.0000E+00
Nuclide 102:
Br-82
  2
  0.1270800000E+06
  0.8200E+02
  0.1835E-01
none    0.0000E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 103:
Br-83
  2
  0.8604000000E+04
  0.8300E+02
  0.4844E-01
Kr-83m 0.1000E+01
none    0.0000E+00
none    0.0000E+00
Nuclide 104:
Br-84
  2
  0.1908000000E+04
  0.8400E+02
  0.1982E-01
none    0.0000E+00
none    0.0000E+00
none    0.0000E+00
Nuclide 105:
Am-242
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
9
0.5767200000E+05
0.2420E+03
0.0000E+00
Cm-242 0.8270E+00
Pu-242 0.1730E+00
none 0.0000E+00
Nuclide 106:
Np-238
8
0.1829088000E+06
0.2380E+03
0.0000E+00
Pu-238 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 107:
Pu-243
8
0.1784160000E+05
0.2430E+03
0.0000E+00
Am-243 0.1000E+01
none 0.0000E+00
none 0.0000E+00
End of Nuclear Inventory File
```



## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
*Pathway 2:
Control Room Unfiltered Makeup
  2
  3
  2
*Pathway 3:
Control Room Filtered Makeup
  2
  3
  2
*Pathway 4:
Control Room Unfiltered Inleakage
  2
  3
  2
*Pathway 5:
Control Room Exhaust
  3
  2
  2
*Sources
  3
  1 1
  2 0
  3 0
*dose conversion factors filename
pal/SLB/db/nai-1101-001rev0.dcf
*release fraction and timing filename
pal/SLB/db/pal_slb_ng.rft
0
  1
  1
*Iodine
0 0.97 0.03
*Overlying pool
*aerosol model
  0
*elemental model
  0
*organic model
  0
*pH tracking
  0
*Compartment detail
*Compartment 1:
  1
*spray model
0
0
0
*filter model
0
*deposition model
0
0
*Compartment 2:
  1
*spray model
0
0
0
*filter model
0
*deposition model
0
0
*Compartment 3:
  1
*spray model
0
0
0
*filter model
```



## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
1
3
0 0 99 99 99
0.3333 1413.6 99 99 99
720 1413.6 99 99 99
*deposition model
0
0
*Pathways:
*Pathway 1
*filter efficiency model
1
3
0 1314.78 0 0 0
1 0 0 0 0
720 0 0 0 0
*Pathway 2
*filter efficiency model
1
3
0 660 0 0 0
0.3333 0 0 0 0
720 0 0 0 0
*Pathway 3
*filter efficiency model
1
3
0 0 99 99 99
0.3333 1413.6 99 99 99
720 1413.6 99 99 99
*Pathway 4
*filter efficiency model
1
3
0 0 0 0 0
0.3333 100 0 0 0
720 100 0 0 0
*Pathway 5
*filter efficiency model
1
3
0 660 0 0 0
0.3333 1513.6 0 0 0
720 1513.6 0 0 0
*x/q tables
4
EAB
2
0 0.000539
720 0.000539
LPZ
6
0 6.66e-05
2 3.03e-05
8 2.04e-05
24 8.67e-06
96 2.54e-06
720 2.54e-06
Control Room Unfiltered
6
0 0.0061
2 0.00432
8 0.00173
24 0.00127
96 0.000979
720 0.000979
Control Room Filtered
6
0 0.000832
2 0.000769
8 0.000283
24 0.000215
96 0.000157
```

Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```

720 0.000157
*dose locations
  3
*location name, compartment number and x/q table
EAB
  2
  1
*br model
  1
  4
0 0.00035
8 0.00018
24 0.00023
720 0.00023
*of model
  0
*location x/q input to be included
  0
*location name, compartment number and x/q table
LPZ
  2
  2
*br model
  1
  4
0 0.00035
8 0.00018
24 0.00023
720 0.00023
*of model
  0
*location x/q input to be included
  0
*location name, compartment number and x/q table
Control Room
  3
  0
*br model
  1
  2
0 0.00035
720 0.00035
*of model
  1
  4
0 1
24 0.6
96 0.4
720 0.4
*location x/q input to be included
  1
*number of intake combinations
  3
*intake combinations
2 1 3
3 1 4
4 1 3
*time step count
  1
0 0.02
*show plant, scenario, event, step, model
  1
  1
  1
  0
  1

```

```

#####
RADTRAD-NAI Version 1.1a(QA) run on May 9, 2005 at 05:49:23
#####
#####
Plant Description

```

Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

#####

Number of Nuclides = 107

Inventory Power = 1.0000E+00 MWth  
 Plant Power Level = 1.9640E+02 MWth

Number of compartments = 3

Compartment information

Compartment number 1 (Source term fraction = 1.0000E+00)  
 Name: PCS  
 Compartment volume = 4.3298E+05 (Cubic feet)  
 Pathways into and out of compartment 1  
     Pathway to compartment number 2: Small Line Break

Compartment number 2  
 Name: Environment  
 Pathways into and out of compartment 2  
     Pathway to compartment number 3: Control Room Unfiltered Makeup  
     Pathway to compartment number 3: Control Room Filtered Makeup  
     Pathway to compartment number 3: Control Room Unfiltered Inleakage  
     Pathway from compartment number 1: Small Line Break  
     Pathway from compartment number 3: Control Room Exhaust

Compartment number 3  
 Name: Control Room  
 Compartment volume = 3.5923E+04 (Cubic feet)  
 Removal devices within compartment:  
     Filter(s)  
 Pathways into and out of compartment 3  
     Pathway to compartment number 2: Control Room Exhaust  
     Pathway from compartment number 2: Control Room Unfiltered Makeup  
     Pathway from compartment number 2: Control Room Filtered Makeup  
     Pathway from compartment number 2: Control Room Unfiltered Inleakage

Total number of pathways = 5

#####  
 RADTRAD-NAI Version 1.1a(QA) run on May 9, 2005 at 05:49:23  
 #####

#####  
 Scenario Description  
 #####

Radioactive Decay is enabled  
 Calculation of Daughters is enabled

Iodine fractions  
     Aerosol = 0.0000E+00  
     Elemental = 9.7000E-01  
     Organic = 3.0000E-02

COMPARTMENT DATA

Compartment number 1: PCS  
 Compartment number 2: Environment  
 Compartment number 3: Control Room

Compartment Filter Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%)		
		Aerosol	Elemental	Organic
0.0000E+00	0.0000E+00	9.9000E+01	9.9000E+01	9.9000E+01
3.3330E-01	1.4136E+03	9.9000E+01	9.9000E+01	9.9000E+01
7.2000E+02	1.4136E+03	9.9000E+01	9.9000E+01	9.9000E+01

PATHWAY DATA

Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

Pathway number 1: Small Line Break

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%)		
		Aerosol	Elemental	Organic
0.0000E+00	1.3148E+03	0.0000E+00	0.0000E+00	0.0000E+00
1.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Pathway number 2: Control Room Unfiltered Makeup

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%)		
		Aerosol	Elemental	Organic
0.0000E+00	6.6000E+02	0.0000E+00	0.0000E+00	0.0000E+00
3.3330E-01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Pathway number 3: Control Room Filtered Makeup

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%)		
		Aerosol	Elemental	Organic
0.0000E+00	0.0000E+00	9.9000E+01	9.9000E+01	9.9000E+01
3.3330E-01	1.4136E+03	9.9000E+01	9.9000E+01	9.9000E+01
7.2000E+02	1.4136E+03	9.9000E+01	9.9000E+01	9.9000E+01

Pathway number 4: Control Room Unfiltered Inleakage

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%)		
		Aerosol	Elemental	Organic
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
3.3330E-01	1.0000E+02	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	1.0000E+02	0.0000E+00	0.0000E+00	0.0000E+00

Pathway number 5: Control Room Exhaust

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%)		
		Aerosol	Elemental	Organic
0.0000E+00	6.6000E+02	0.0000E+00	0.0000E+00	0.0000E+00
3.3330E-01	1.5136E+03	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	1.5136E+03	0.0000E+00	0.0000E+00	0.0000E+00

X/Q DATA

X/Q table 1: EAB

Time (hr)	X/Q (s * m^-3)
0.0000E+00	5.3900E-04
7.2000E+02	5.3900E-04

X/Q table 2: LPZ

Time (hr)	X/Q (s * m^-3)
0.0000E+00	6.6600E-05
2.0000E+00	3.0300E-05
8.0000E+00	2.0400E-05
2.4000E+01	8.6700E-06
9.6000E+01	2.5400E-06
7.2000E+02	2.5400E-06

X/Q table 3: Control Room Unfiltered

Time (hr)	X/Q (s * m^-3)
0.0000E+00	6.1000E-03
2.0000E+00	4.3200E-03
8.0000E+00	1.7300E-03
2.4000E+01	1.2700E-03

Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

9.6000E+01 9.7900E-04
7.2000E+02 9.7900E-04

X/Q table 4: Control Room Filtered
Time (hr) X/Q (s \* m^-3)
0.0000E+00 8.3200E-04
2.0000E+00 7.6900E-04
8.0000E+00 2.8300E-04
2.4000E+01 2.1500E-04
9.6000E+01 1.5700E-04
7.2000E+02 1.5700E-04

LOCATION DATA

Location EAB is in compartment 2

Using X/Q Table 1

Location Breathing Rate Data

Time (hr) Breathing Rate (m^3 \* sec^-1)
0.0000E+00 3.5000E-04
8.0000E+00 1.8000E-04
2.4000E+01 2.3000E-04
7.2000E+02 2.3000E-04

Location LPZ is in compartment 2

Using X/Q Table 2

Location Breathing Rate Data

Time (hr) Breathing Rate (m^3 \* sec^-1)
0.0000E+00 3.5000E-04
8.0000E+00 1.8000E-04
2.4000E+01 2.3000E-04
7.2000E+02 2.3000E-04

Location Control Room is in compartment 3

Inleakage X/Q Table Assignments

Inleakage Path Source Path X/Q Table
2 1 3
3 1 4
4 1 3

Location Breathing Rate Data

Time (hr) Breathing Rate (m^3 \* sec^-1)
0.0000E+00 3.5000E-04
7.2000E+02 3.5000E-04

Location Occupancy Factor Data

Time (hr) Occupancy Factor
0.0000E+00 1.0000E+00
2.4000E+01 6.0000E-01
9.6000E+01 4.0000E-01
7.2000E+02 4.0000E-01

USER SPECIFIED TIME STEP DATA - SUPPLEMENTAL TIME STEPS

Time Time step
0.0000E+00 2.0000E-02

#####
RADTRAD-NAI Version 1.1a(QA) run on May 9, 2005 at 05:49:23
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Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

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 Dose, Detailed Model and Detailed Inventory Output  
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Detailed model information at time (H) = 0.0010

EAB Doses:

Time (h) =	0.0010	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		1.2388E-05	1.7675E-11	2.7360E-05	1.2388E-05
Accumulated dose (rem)		1.2388E-05	1.7675E-11	2.7360E-05	1.2388E-05

LPZ Doses:

Time (h) =	0.0010	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		1.5307E-06	2.1839E-12	3.3807E-06	1.5307E-06
Accumulated dose (rem)		1.5307E-06	2.1839E-12	3.3807E-06	1.5307E-06

Control Room Doses:

Time (h) =	0.0010	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		1.7218E-09	1.1043E-13	1.2875E-07	1.7236E-09
Accumulated dose (rem)		1.7218E-09	1.1043E-13	1.2875E-07	1.7236E-09

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) =	0.0010	Ci	kg	Atoms	Bq
Kr-85		7.6391E+01	1.9471E-04	1.3795E+21	2.8265E+12
Kr-85m		1.7294E+02	2.1015E-08	1.4889E+17	6.3989E+12
Kr-87		1.0805E+02	3.8145E-09	2.6404E+16	3.9977E+12
Kr-88		3.1707E+02	2.5286E-08	1.7304E+17	1.1732E+13
Xe-133		1.0090E+04	5.3904E-05	2.4407E+20	3.7332E+14
Xe-135		1.0666E+03	4.1768E-07	1.8632E+18	3.9466E+13
Kr-83m		4.6112E+01	2.2350E-09	1.6216E+16	1.7062E+12
Xe-131m		6.4863E+01	7.7438E-07	3.5599E+18	2.3999E+12
Xe-133m		2.4508E+02	5.4618E-07	2.4731E+18	9.0678E+12
Xe-135m		6.9003E+01	7.5751E-10	3.3791E+15	2.5531E+12
Rb-88		5.5771E-01	4.6461E-12	3.1795E+13	2.0635E+10

PCS Transport Group Inventory:

Time (h) =	0.0010	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)		1.6318E+21	0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		4.6461E-12	0.0000E+00	0.0000E+00

Time (h) =	0.0010	Deposition Surfaces	Recirculating Filter
Noble gases (atoms)		0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00
Aerosols (kg)		0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

Time (h) =	0.0010	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Environment Integral Nuclide Release:

Time (h) =	0.0010	Ci	kg	Atoms	Bq
Kr-85		4.8021E-03	1.2240E-08	8.6718E+16	1.7768E+08
Kr-85m		1.0872E-02	1.3211E-12	9.3595E+12	4.0225E+08

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Kr-87	6.7921E-03	2.3979E-13	1.6598E+12	2.5131E+08
Kr-88	1.9932E-02	1.5896E-12	1.0878E+13	7.3749E+08
Xe-133	6.3428E-01	3.3886E-09	1.5343E+16	2.3468E+10
Xe-135	6.7053E-02	2.6257E-11	1.1713E+14	2.4809E+09
Kr-83m	2.8987E-03	1.4050E-13	1.0194E+12	1.0725E+08
Xe-131m	4.0775E-03	4.8680E-11	2.2378E+14	1.5087E+08
Xe-133m	1.5406E-02	3.4335E-11	1.5546E+14	5.7003E+08
Xe-135m	4.3376E-03	4.7617E-14	2.1241E+11	1.6049E+08
Rb-88	3.9163E-05	3.2625E-16	2.2327E+09	1.4490E+06

## Environment Transport Group Inventory:

	Present	Release	Integral
Time (h) =	Release	Rate/s	Release
0.0010			
Noble gases (atoms)	1.0258E+17	5.1290E+16	1.0258E+17
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	3.2625E-16	1.6313E-16	3.2625E-16

## Small Line Break Transport Group Inventory:

	Pathway
Time (h) =	Filter
0.0010	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) =	Filter
0.0010	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) =	Filter
0.0010	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) =	Filter
0.0010	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) =	Filter
0.0010	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Compartment Atmosphere Nuclide Inventory:

Time (h) =	Ci	kg	Atoms	Bq
0.0010				
Kr-85	1.3218E-05	3.3691E-11	2.3870E+14	4.8907E+05
Kr-85m	2.9925E-05	3.6363E-15	2.5763E+10	1.1072E+06
Kr-87	1.8696E-05	6.6003E-16	4.5687E+09	6.9174E+05
Kr-88	5.4864E-05	4.3754E-15	2.9942E+10	2.0300E+06
Xe-133	1.7459E-03	9.3272E-12	4.2233E+13	6.4597E+07
Xe-135	1.8457E-04	7.2273E-14	3.2240E+11	6.8289E+06

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Kr-83m	7.9789E-06	3.8672E-16	2.8059E+09	2.9522E+05
Xe-131m	1.1224E-05	1.3399E-13	6.1598E+11	4.1527E+05
Xe-133m	4.2406E-05	9.4508E-14	4.2793E+11	1.5690E+06
Xe-135m	1.1939E-05	1.3107E-16	5.8467E+08	4.4175E+05
Rb-88	1.1407E-07	9.5028E-19	6.5031E+06	4.2206E+03

Control Room Transport Group Inventory:

	Atmosphere	Sump	Overlying Pool	
Time (h) =	0.0010			
Noble gases (atoms)	2.8236E+14	0.0000E+00	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	9.5028E-19	0.0000E+00	0.0000E+00	0.0000E+00

	Surfaces	Filter
Time (h) =	0.0010	
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) =	0.0010
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) =	0.0010
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) =	0.0010
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) =	0.0010
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Detailed model information at time (H) = 0.3333

EAB Doses:

	Whole Body	Thyroid	Skin	TEDE
Time (h) =	0.3333			
Delta dose (rem)	8.0900E-03	5.0809E-06	1.9124E-02	8.1738E-03
Accumulated dose (rem)	8.1024E-03	5.0809E-06	1.9151E-02	8.1862E-03

LPZ Doses:

	Whole Body	Thyroid	Skin	TEDE
Time (h) =	0.3333			
Delta dose (rem)	9.9961E-04	6.2780E-07	2.3630E-03	1.0100E-03
Accumulated dose (rem)	1.0011E-03	6.2781E-07	2.3663E-03	1.0115E-03

Control Room Doses:



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Time (h) =	0.3333	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	4.4732E-04	1.2326E-05	3.6499E-02	6.5065E-04	
Accumulated dose (rem)	4.4732E-04	1.2326E-05	3.6499E-02	6.5066E-04	

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) =	0.3333	Ci	kg	Atoms	Bq
Kr-85		7.1903E+01	1.8327E-04	1.2984E+21	2.6604E+12
Kr-85m		1.5462E+02	1.8789E-08	1.3312E+17	5.7211E+12
Kr-87		8.4851E+01	2.9955E-09	2.0735E+16	3.1395E+12
Kr-88		2.7520E+02	2.1947E-08	1.5019E+17	1.0182E+13
Xe-133		9.4801E+03	5.0647E-05	2.2932E+20	3.5076E+14
Xe-135		9.7993E+02	3.8373E-07	1.7117E+18	3.6257E+13
Kr-83m		3.8270E+01	1.8549E-09	1.3458E+16	1.4160E+12
Xe-131m		6.1003E+01	7.2830E-07	3.3480E+18	2.2571E+12
Xe-133m		2.2967E+02	5.1185E-07	2.3176E+18	8.4977E+12
Xe-135m		2.6305E+01	2.8877E-10	1.2882E+15	9.7328E+11
Rb-88		1.5777E+02	1.3144E-09	8.9946E+15	5.8376E+12

PCS Transport Group Inventory:

Time (h) =	0.3333	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)		1.5355E+21	0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		1.3144E-09	0.0000E+00	0.0000E+00

Time (h) =	0.3333	Deposition Surfaces	Recirculating Filter
Noble gases (atoms)		0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00
Aerosols (kg)		0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

Time (h) =	0.3333	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Environment Integral Nuclide Release:

Time (h) =	0.3333	Ci	kg	Atoms	Bq
Kr-85		4.4854E+00	1.1433E-05	8.0999E+19	1.6596E+11
Kr-85m		9.6458E+00	1.1721E-09	8.3041E+15	3.5689E+11
Kr-87		5.2931E+00	1.8687E-10	1.2935E+15	1.9585E+11
Kr-88		1.7167E+01	1.3691E-09	9.3691E+15	6.3519E+11
Xe-133		5.9139E+02	3.1594E-06	1.4306E+19	2.1881E+13
Xe-135		6.1130E+01	2.3938E-08	1.0678E+17	2.2618E+12
Kr-83m		2.3874E+00	1.1571E-10	8.3956E+14	8.8333E+10
Xe-131m		3.8055E+00	4.5433E-08	2.0886E+17	1.4080E+11
Xe-133m		1.4327E+01	3.1930E-08	1.4458E+17	5.3010E+11
Xe-135m		1.6409E+00	1.8014E-11	8.0358E+13	6.0715E+10
Rb-88		9.8422E+00	8.1992E-11	5.6110E+14	3.6416E+11

Environment Transport Group Inventory:

Time (h) =	0.3333	Present Release	Release Rate/s	Integral Release
Noble gases (atoms)		3.7204E+18	5.1672E+16	9.5785E+19
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		3.1847E-12	4.4231E-14	8.1992E-11

Small Line Break Transport Group Inventory:

Time (h) =	0.3333	Pathway Filter
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Noble gases (atoms) 0.0000E+00  
 Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

Time (h) = 0.3333 Pathway Filter  
 Noble gases (atoms) 0.0000E+00  
 Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 0.0000E+00

Control Room Filtered Makeup Transport Group Inventory:

Time (h) = 0.3333 Pathway Filter  
 Noble gases (atoms) 0.0000E+00  
 Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 0.0000E+00

Control Room Unfiltered Inleakage Transport Group Inventory:

Time (h) = 0.3333 Pathway Filter  
 Noble gases (atoms) 0.0000E+00  
 Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 0.0000E+00

Control Room Exhaust Transport Group Inventory:

Time (h) = 0.3333 Pathway Filter  
 Noble gases (atoms) 0.0000E+00  
 Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 0.0000E+00

Control Room Compartment Atmosphere Nuclide Inventory:

Time (h) =	Ci	kg	Atoms	Bq
0.3333				
Kr-85	7.1357E-03	1.8188E-08	1.2886E+17	2.6402E+08
Kr-85m	1.5345E-02	1.8646E-12	1.3211E+13	5.6777E+08
Kr-87	8.4206E-03	2.9728E-13	2.0578E+12	3.1156E+08
Kr-88	2.7311E-02	2.1780E-12	1.4905E+13	1.0105E+09
Xe-133	9.4081E-01	5.0262E-09	2.2758E+16	3.4810E+10
Xe-135	9.7249E-02	3.8081E-11	1.6987E+14	3.5982E+09
Kr-83m	3.7980E-03	1.8408E-13	1.3356E+12	1.4052E+08
Xe-131m	6.0540E-03	7.2277E-11	3.3226E+14	2.2400E+08
Xe-133m	2.2792E-02	5.0796E-11	2.3000E+14	8.4332E+08
Xe-135m	2.6105E-03	2.8658E-14	1.2784E+11	9.6589E+07
Rb-88	1.5658E-02	1.3044E-13	8.9263E+11	5.7933E+08

Control Room Transport Group Inventory:

Time (h) =	Atmosphere	Sump	Overlying Pool
0.3333			
Noble gases (atoms)	1.5238E+17	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	1.3044E-13	0.0000E+00	0.0000E+00

Time (h) =	Deposition Surfaces	Recirculating Filter
0.3333		
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

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	Pathway
Time (h) = 0.3333	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 0.3333	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 0.3333	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 0.3333	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Detailed model information at time (H) = 1.0000

EAB Doses:

Time (h) = 1.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	1.4568E-02	2.2847E-05	3.8031E-02	1.4945E-02
Accumulated dose (rem)	2.2670E-02	2.7928E-05	5.7182E-02	2.3131E-02

LPZ Doses:

Time (h) = 1.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	1.8001E-03	2.8230E-06	4.6992E-03	1.8466E-03
Accumulated dose (rem)	2.8012E-03	3.4508E-06	7.0655E-03	2.8581E-03

Control Room Doses:

Time (h) = 1.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	1.2310E-03	4.1040E-05	1.0332E-01	1.9081E-03
Accumulated dose (rem)	1.6784E-03	5.3366E-05	1.3982E-01	2.5587E-03

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) = 1.0000	Ci	kg	Atoms	Bq
Kr-85	6.3678E+01	1.6231E-04	1.1499E+21	2.3561E+12
Kr-85m	1.2352E+02	1.5009E-08	1.0634E+17	4.5701E+12
Kr-87	5.2249E+01	1.8446E-09	1.2768E+16	1.9332E+12
Kr-88	2.0712E+02	1.6518E-08	1.1304E+17	7.6634E+12
Xe-133	8.3657E+03	4.4693E-05	2.0237E+20	3.0953E+14
Xe-135	8.2536E+02	3.2320E-07	1.4417E+18	3.0538E+13
Kr-83m	2.6329E+01	1.2761E-09	9.2591E+15	9.7418E+11
Xe-131m	5.3938E+01	6.4395E-07	2.9603E+18	1.9957E+12
Xe-133m	2.0162E+02	4.4933E-07	2.0345E+18	7.4598E+12
Xe-135m	3.7995E+00	4.1710E-11	1.8606E+14	1.4058E+11
Rb-88	2.0748E+02	1.7284E-09	1.1828E+16	7.6766E+12

PCS Transport Group Inventory:

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Time (h) =	1.0000	Atmosphere	Sump	Pool
Noble gases (atoms)		1.3590E+21	0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		1.7284E-09	0.0000E+00	0.0000E+00

Time (h) =	1.0000	Deposition	
		Surfaces	Recirculating Filter
Noble gases (atoms)		0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00
Aerosols (kg)		0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

Time (h) =	1.0000	Pathway
		Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Environment Integral Nuclide Release:

Time (h) =	1.0000	Ci	kg	Atoms	Bq
Kr-85		1.2712E+01	3.2402E-05	2.2956E+20	4.7036E+11
Kr-85m		2.4658E+01	2.9963E-09	2.1228E+16	9.1235E+11
Kr-87		1.0431E+01	3.6824E-10	2.5490E+15	3.8594E+11
Kr-88		4.1348E+01	3.2975E-09	2.2566E+16	1.5299E+12
Xe-133		1.6701E+03	8.9223E-06	4.0399E+19	6.1793E+13
Xe-135		1.6477E+02	6.4521E-08	2.8782E+17	6.0965E+12
Kr-83m		5.2562E+00	2.5476E-10	1.8484E+15	1.9448E+11
Xe-131m		1.0768E+01	1.2856E-07	5.9098E+17	3.9841E+11
Xe-133m		4.0249E+01	8.9701E-08	4.0616E+17	1.4892E+12
Xe-135m		7.5850E-01	8.3267E-12	3.7144E+13	2.8065E+10
Rb-88		4.1413E+01	3.4500E-10	2.3610E+15	1.5323E+12

Environment Transport Group Inventory:

Time (h) =	1.0000	Present	Release	Integral
		Release	Rate/s	Release
Noble gases (atoms)		4.9618E+18	6.8914E+16	2.7130E+20
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		6.3075E-12	8.7605E-14	3.4500E-10

Small Line Break Transport Group Inventory:

Time (h) =	1.0000	Pathway
		Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

Time (h) =	1.0000	Pathway
		Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) =	1.0000	Ci	kg	Atoms	Bq
Rb-88		6.6744E-03	5.5602E-14	3.8050E+11	2.4695E+08

Control Room Filtered Makeup Transport Group Inventory:

Time (h) =	1.0000	Pathway
		Filter

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Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	5.5602E-14

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Compartment Atmosphere Nuclide Inventory:

Time (h) = 1.0000	Ci	kg	Atoms	Bq
Kr-85	4.6191E-03	1.1773E-08	8.3412E+16	1.7091E+08
Kr-85m	8.9596E-03	1.0887E-12	7.7134E+12	3.3151E+08
Kr-87	3.7900E-03	1.3380E-13	9.2618E+11	1.4023E+08
Kr-88	1.5024E-02	1.1981E-12	8.1993E+12	5.5588E+08
Xe-133	6.0683E-01	3.2419E-09	1.4679E+16	2.2453E+10
Xe-135	5.9869E-02	2.3444E-11	1.0458E+14	2.2152E+09
Kr-83m	1.9099E-03	9.2567E-14	6.7163E+11	7.0665E+07
Xe-131m	3.9126E-03	4.6711E-11	2.1473E+14	1.4476E+08
Xe-133m	1.4625E-02	3.2593E-11	1.4758E+14	5.4111E+08
Xe-135m	2.7560E-04	3.0255E-15	1.3496E+10	1.0197E+07
Rb-88	7.3418E-03	6.1162E-14	4.1855E+11	2.7165E+08

Control Room Transport Group Inventory:

Time (h) = 1.0000	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)	9.8576E+16	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	6.1162E-14	0.0000E+00	0.0000E+00

Recirculating Filter Inventory

Time (h) = 1.0000	Ci	kg	Atoms	Bq
Rb-88	6.9047E-03	5.7521E-14	3.9363E+11	2.5547E+08

Deposition Recirculating

Time (h) = 1.0000	Surfaces	Filter
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	5.7521E-14

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) = 1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) = 1.0000	Ci	kg	Atoms	Bq
Rb-88	6.6744E-03	5.5602E-14	3.8050E+11	2.4695E+08

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Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	5.5602E-14

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Total Filter Nuclide Inventory:

Time (h) = 1.0000	Ci	kg	Atoms	Bq
Rb-88	1.3579E-02	1.1312E-13	7.7414E+11	5.0243E+08

Detailed model information at time (H) = 2.0000

EAB Doses:

Time (h) = 2.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	6.4837E-06	6.3182E-09	1.6356E-05	6.5879E-06
Accumulated dose (rem)	2.2677E-02	2.7934E-05	5.7198E-02	2.3138E-02

LPZ Doses:

Time (h) = 2.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	8.0114E-07	7.8069E-10	2.0210E-06	8.1402E-07
Accumulated dose (rem)	2.8020E-03	3.4516E-06	7.0675E-03	2.8589E-03

Control Room Doses:

Time (h) = 2.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	4.9755E-04	1.6423E-05	4.2494E-02	7.6846E-04
Accumulated dose (rem)	2.1759E-03	6.9789E-05	1.8231E-01	3.3272E-03

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) = 2.0000	Ci	kg	Atoms	Bq
Kr-85	6.3678E+01	1.6231E-04	1.1499E+21	2.3561E+12
Kr-85m	1.0581E+02	1.2858E-08	9.1094E+16	3.9150E+12
Kr-87	3.0294E+01	1.0695E-09	7.4031E+15	1.1209E+12
Kr-88	1.6226E+02	1.2941E-08	8.8556E+16	6.0038E+12
Xe-133	8.3209E+03	4.4454E-05	2.0128E+20	3.0787E+14
Xe-135	7.6485E+02	2.9951E-07	1.3360E+18	2.8300E+13
Kr-83m	1.8028E+01	8.7377E-10	6.3397E+15	6.6702E+11
Xe-131m	5.3808E+01	6.4239E-07	2.9531E+18	1.9909E+12
Xe-133m	1.9897E+02	4.4344E-07	2.0078E+18	7.3620E+12
Xe-135m	2.5029E-01	2.7476E-12	1.2257E+13	9.2606E+09
Rb-88	1.8263E+02	1.5215E-09	1.0412E+16	6.7574E+12

PCS Transport Group Inventory:

Time (h) = 2.0000	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)	1.3577E+21	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00

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Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	1.5215E-09	0.0000E+00	0.0000E+00

	Deposition Recirculating	
Time (h) = 2.0000	Surfaces	Filter
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

	Pathway
Time (h) = 2.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Environment Integral Nuclide Release:

Time (h) = 2.0000	Ci	kg	Atoms	Bq
Kr-85	1.2717E+01	3.2413E-05	2.2964E+20	4.7051E+11
Kr-85m	2.1131E+01	2.5677E-09	1.8192E+16	7.8183E+11
Kr-87	6.0498E+00	2.1358E-10	1.4784E+15	2.2384E+11
Kr-88	3.2404E+01	2.5842E-09	1.7685E+16	1.1990E+12
Xe-133	1.6617E+03	8.8774E-06	4.0196E+19	6.1483E+13
Xe-135	1.5274E+02	5.9811E-08	2.6681E+17	5.6515E+12
Kr-83m	3.6001E+00	1.7449E-10	1.2660E+15	1.3321E+11
Xe-131m	1.0745E+01	1.2829E-07	5.8974E+17	3.9758E+11
Xe-133m	3.9735E+01	8.8555E-08	4.0097E+17	1.4702E+12
Xe-135m	4.9983E-02	5.4870E-13	2.4477E+12	1.8494E+09
Rb-88	3.6470E+01	3.0382E-10	2.0791E+15	1.3494E+12

Environment Transport Group Inventory:

	Present	Release	Integral
Time (h) = 2.0000	Release	Rate/s	Release
Noble gases (atoms)	4.0764E+14	5.6617E+12	2.7113E+20
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	2.2884E-16	3.1783E-18	3.0382E-10

Small Line Break Transport Group Inventory:

	Pathway
Time (h) = 2.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) = 2.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) = 2.0000	Ci	kg	Atoms	Bq
Rb-88	6.4521E-04	5.3751E-15	3.6783E+10	2.3873E+07

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 2.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00

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Aerosols (kg) 5.3751E-15

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 2.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 2.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Compartment Atmosphere Nuclide Inventory:

Time (h) = 2.0000	Ci	kg	Atoms	Bq
Kr-85	3.6866E-04	9.3965E-10	6.6573E+15	1.3640E+07
Kr-85m	6.1258E-04	7.4437E-14	5.2738E+11	2.2666E+07
Kr-87	1.7539E-04	6.1918E-15	4.2859E+10	6.4893E+06
Kr-88	9.3941E-04	7.4918E-14	5.1269E+11	3.4758E+07
Xe-133	4.8173E-02	2.5736E-10	1.1653E+15	1.7824E+09
Xe-135	4.4281E-03	1.7340E-12	7.7349E+12	1.6384E+08
Kr-83m	1.0437E-04	5.0586E-15	3.6703E+10	3.8617E+06
Xe-131m	3.1151E-04	3.7191E-12	1.7097E+13	1.1526E+07
Xe-133m	1.1519E-03	2.5672E-12	1.1624E+13	4.2621E+07
Xe-135m	1.4490E-06	1.5907E-17	7.0959E+07	5.3614E+04
Rb-88	5.1831E-04	4.3178E-15	2.9548E+10	1.9177E+07

Control Room Transport Group Inventory:

			Overlying
Time (h) = 2.0000	Atmosphere	Sump	Pool
Noble gases (atoms)	7.8602E+15	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	4.3178E-15	0.0000E+00	0.0000E+00

Recirculating Filter Inventory

Time (h) = 2.0000	Ci	kg	Atoms	Bq
Rb-88	2.0795E-03	1.7324E-14	1.1855E+11	7.6942E+07

	Deposition Surfaces	Recirculating Filter
Time (h) = 2.0000		
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	1.7324E-14

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) = 2.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) = 2.0000	Ci	kg	Atoms	Bq
Rb-88	6.4521E-04	5.3751E-15	3.6783E+10	2.3873E+07

Control Room Filtered Makeup Transport Group Inventory:

Pathway



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Time (h) = 2.0000 Filter  
 Noble gases (atoms) 0.0000E+00  
 Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 5.3751E-15

Control Room Unfiltered Inleakage Transport Group Inventory:

Time (h) = 2.0000 Pathway Filter  
 Noble gases (atoms) 0.0000E+00  
 Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 0.0000E+00

Control Room Exhaust Transport Group Inventory:

Time (h) = 2.0000 Pathway Filter  
 Noble gases (atoms) 0.0000E+00  
 Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 0.0000E+00

Control Room Total Filter Nuclide Inventory:

Time (h) =	Ci	kg	Atoms	Bq
2.0000	2.7247E-03	2.2699E-14	1.5534E+11	1.0081E+08
Rb-88				

Detailed model information at time (H) = 8.0000

EAB Doses:

Time (h) =	Whole Body	Thyroid	Skin	TEDE
8.0000	4.8142E-07	4.4312E-10	1.2464E-06	4.8873E-07
Delta dose (rem)	2.2677E-02	2.7934E-05	5.7200E-02	2.3138E-02
Accumulated dose (rem)				

LPZ Doses:

Time (h) =	Whole Body	Thyroid	Skin	TEDE
8.0000	2.7063E-08	2.4910E-11	7.0069E-08	2.7474E-08
Delta dose (rem)	2.8020E-03	3.4516E-06	7.0676E-03	2.8590E-03
Accumulated dose (rem)				

Control Room Doses:

Time (h) =	Whole Body	Thyroid	Skin	TEDE
8.0000	3.6944E-05	1.1518E-06	3.2382E-03	5.5944E-05
Delta dose (rem)	2.2129E-03	7.0940E-05	1.8555E-01	3.3831E-03
Accumulated dose (rem)				

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) =	Ci	kg	Atoms	Bq
8.0000	6.3676E+01	1.6230E-04	1.1499E+21	2.3560E+12
Kr-85	4.1818E+01	5.0815E-09	3.6002E+16	1.5473E+12
Kr-85m	1.1509E+00	4.0631E-11	2.8125E+14	4.2583E+10
Kr-87	3.7518E+01	2.9921E-09	2.0476E+16	1.3882E+12
Kr-88	8.0567E+03	4.3042E-05	1.9489E+20	2.9810E+14
Xe-133	4.8404E+02	1.8954E-07	8.4552E+17	1.7910E+13
Xe-135	1.8576E+00	9.0035E-11	6.5326E+14	6.8732E+10
Kr-83m	5.3030E+01	6.3311E-07	2.9104E+18	1.9621E+12
Xe-131m	1.8382E+02	4.0967E-07	1.8550E+18	6.8014E+12
Xe-133m	2.0453E-08	2.2453E-19	1.0016E+06	7.5674E+02
Xe-135m	4.2882E+01	3.5724E-10	2.4447E+15	1.5866E+12
Rb-88				

PCS Transport Group Inventory:

Time (h) =	Atmosphere	Sump	Overlying Pool
8.0000	1.3504E+21	0.0000E+00	0.0000E+00
Noble gases (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	3.5724E-10	0.0000E+00	0.0000E+00

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	Deposition	Recirculating
	Surfaces	Filter
Time (h) =	8.0000	
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00

## Small Line Break Transport Group Inventory:

	Pathway
	Filter
Time (h) =	8.0000
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Environment Integral Nuclide Release:

Time (h) =	Ci	kg	Atoms	Bq
8.0000	1.2716E+01	3.2412E-05	2.2964E+20	4.7051E+11
	1.6090E+03	8.5958E-06	3.8921E+19	5.9532E+13
	1.0590E+01	1.2644E-07	5.8123E+17	3.9184E+11
	3.6710E+01	8.1814E-08	3.7045E+17	1.3583E+12

## Environment Transport Group Inventory:

	Present	Release	Integral
	Release	Rate/s	Release
Time (h) =	8.0000		
Noble gases (atoms)	1.0480E+08	1.4556E+06	2.6969E+20
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	1.3695E-23	1.9021E-25	7.1342E-11

## Small Line Break Transport Group Inventory:

	Pathway
	Filter
Time (h) =	8.0000
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
	Filter
Time (h) =	8.0000
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Filtered Makeup Transport Group Inventory:

	Pathway
	Filter
Time (h) =	8.0000
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	4.3867E-21

## Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
	Filter
Time (h) =	8.0000
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Exhaust Transport Group Inventory:

	Pathway
	Filter
Time (h) =	8.0000

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Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Compartment Atmosphere Nuclide Inventory:

Time (h) =	8.0000	Ci	kg	Atoms	Bq
Kr-85		9.5288E-11	2.4287E-16	1.7207E+09	3.5256E+00
Xe-133		1.2056E-08	6.4410E-17	2.9165E+08	4.4609E+02
Xe-135		7.2435E-10	2.8364E-19	1.2653E+06	2.6801E+01
Xe-131m		7.9356E-11	9.4741E-19	4.3553E+06	2.9362E+00
Xe-133m		2.7508E-10	6.1305E-19	2.7759E+06	1.0178E+01

## Control Room Transport Group Inventory:

Time (h) =	8.0000	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)		2.0209E+09	0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		2.5841E-22	0.0000E+00	0.0000E+00

## Recirculating Filter Inventory

Time (h) =	8.0000	Ci	kg	Atoms	Bq
Rb-88		3.7140E-09	3.0940E-20	2.1174E+05	1.3742E+02

Time (h) =	8.0000	Deposition Surfaces	Recirculating Filter
Noble gases (atoms)		0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00
Aerosols (kg)		0.0000E+00	3.0940E-20

## Control Room Unfiltered Makeup Transport Group Inventory:

Time (h) =	8.0000	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

## Control Room Filtered Makeup Transport Group Inventory:

Time (h) =	8.0000	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		4.3867E-21

## Control Room Unfiltered Inleakage Transport Group Inventory:

Time (h) =	8.0000	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

## Control Room Exhaust Transport Group Inventory:

Time (h) =	8.0000	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

## Control Room Total Filter Nuclide Inventory:

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Time (h) =	8.0000	Ci	kg	Atoms	Bq
Rb-88		4.2406E-09	3.5327E-20	2.4175E+05	1.5690E+02

Detailed model information at time (H) = 24.0000

EAB Doses:

Time (h) =	24.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		6.8258E-14	1.3627E-17	1.9894E-13	6.8483E-14
Accumulated dose (rem)		2.2677E-02	2.7934E-05	5.7200E-02	2.3138E-02

LPZ Doses:

Time (h) =	24.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		2.5834E-15	5.1577E-19	7.5295E-15	2.5919E-15
Accumulated dose (rem)		2.8020E-03	3.4516E-06	7.0676E-03	2.8590E-03

Control Room Doses:

Time (h) =	24.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		5.2379E-12	6.8875E-14	5.1682E-10	6.3741E-12
Accumulated dose (rem)		2.2129E-03	7.0940E-05	1.8555E-01	3.3831E-03

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) =	24.0000	Ci	kg	Atoms	Bq
Kr-85		6.3669E+01	1.6228E-04	1.1497E+21	2.3557E+12
Kr-85m		3.5177E+00	4.2745E-10	3.0284E+15	1.3016E+11
Kr-87		1.8772E-04	6.6271E-15	4.5873E+10	6.9455E+06
Kr-88		7.5561E-01	6.0260E-11	4.1238E+14	2.7958E+10
Xe-133		7.3912E+03	3.9487E-05	1.7879E+20	2.7347E+14
Xe-135		1.4290E+02	5.5956E-08	2.4961E+17	5.2871E+12
Kr-83m		4.3351E-03	2.1012E-13	1.5245E+12	1.6040E+08
Xe-131m		5.1010E+01	6.0899E-07	2.7996E+18	1.8874E+12
Xe-133m		1.4882E+02	3.3168E-07	1.5018E+18	5.5065E+12
Rb-88		8.6364E-01	7.1947E-12	4.9236E+13	3.1955E+10

PCS Transport Group Inventory:

Time (h) =	24.0000	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)		1.3331E+21	0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		7.1947E-12	0.0000E+00	0.0000E+00

Time (h) =	24.0000	Deposition Surfaces	Recirculating Filter
Noble gases (atoms)		0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00
Aerosols (kg)		0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

Time (h) =	24.0000	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Environment Transport Group Inventory:

Time (h) =	24.0000	Present Release	Release Rate/s	Integral Release
Noble gases (atoms)		2.8049E-10	3.8956E-12	2.6623E+20
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		7.4829E-43	1.0393E-44	1.4368E-12

Small Line Break Transport Group Inventory:

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	Pathway
Time (h) = 24.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) = 24.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 24.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	2.5516E-37

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 24.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 24.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Transport Group Inventory:

	Atmosphere	Sump	Overlying Pool
Time (h) = 24.0000			
Noble gases (atoms)	5.4084E-09	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	1.4110E-41	0.0000E+00	0.0000E+00

	Deposition Surfaces	Recirculating Filter
Time (h) = 24.0000		
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	1.8769E-36

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) = 24.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 24.0000	Filter
Noble gases (atoms)	0.0000E+00

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Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 2.5516E-37

Control Room Unfiltered Inleakage Transport Group Inventory:

Time (h) = 24.0000 Pathway Filter  
 Noble gases (atoms) 0.0000E+00  
 Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 0.0000E+00

Control Room Exhaust Transport Group Inventory:

Time (h) = 24.0000 Pathway Filter  
 Noble gases (atoms) 0.0000E+00  
 Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 0.0000E+00

Detailed model information at time (H) = 96.0000

EAB Doses:

Time (h) = 96.0000 Whole Body Thyroid Skin TEDE  
 Delta dose (rem) 1.0920E-31 9.5076E-37 3.5479E-31 1.0921E-31  
 Accumulated dose (rem) 2.2677E-02 2.7934E-05 5.7200E-02 2.3138E-02

LPZ Doses:

Time (h) = 96.0000 Whole Body Thyroid Skin TEDE  
 Delta dose (rem) 1.7565E-33 1.5293E-38 5.7070E-33 1.7567E-33  
 Accumulated dose (rem) 2.8020E-03 3.4516E-06 7.0676E-03 2.8590E-03

Control Room Doses:

Time (h) = 96.0000 Whole Body Thyroid Skin TEDE  
 Delta dose (rem) 5.0276E-30 2.2564E-33 5.5300E-28 5.0648E-30  
 Accumulated dose (rem) 2.2129E-03 7.0940E-05 1.8555E-01 3.3831E-03

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) = 96.0000 Ci kg Atoms Bq  
 Kr-85 6.3635E+01 1.6220E-04 1.1491E+21 2.3545E+12  
 Kr-85m 5.1083E-05 6.2073E-15 4.3978E+10 1.8901E+06  
 Kr-88 1.7642E-08 1.4070E-18 9.6283E+06 6.5276E+02  
 Xe-133 5.0025E+03 2.6725E-05 1.2101E+20 1.8509E+14  
 Xe-135 5.8969E-01 2.3091E-10 1.0301E+15 2.1818E+10  
 Xe-131m 4.2832E+01 5.1136E-07 2.3507E+18 1.5848E+12  
 Xe-133m 5.7535E+01 1.2822E-07 5.8059E+17 2.1288E+12  
 Rb-88 2.0164E-08 1.6798E-19 1.1496E+06 7.4608E+02

PCS Transport Group Inventory:

Time (h) = 96.0000 Atmosphere Sump Overlying Pool  
 Noble gases (atoms) 1.2731E+21 0.0000E+00 0.0000E+00  
 Elemental I (atoms) 0.0000E+00 0.0000E+00 0.0000E+00  
 Organic I (atoms) 0.0000E+00 0.0000E+00 0.0000E+00  
 Aerosols (kg) 1.6798E-19 0.0000E+00 0.0000E+00

Time (h) = 96.0000 Deposition Surfaces Recirculating Filter  
 Noble gases (atoms) 0.0000E+00 0.0000E+00  
 Elemental I (atoms) 0.0000E+00 0.0000E+00  
 Organic I (atoms) 0.0000E+00 0.0000E+00  
 Aerosols (kg) 0.0000E+00 0.0000E+00

Small Line Break Transport Group Inventory:

Pathway

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Time (h) = 96.0000 Filter  
 Noble gases (atoms) 0.0000E+00  
 Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 0.0000E+00

Environment Transport Group Inventory:

	Present	Release	Integral
Time (h) = 96.0000	Release	Rate/s	Release
Noble gases (atoms)	0.0000E+00	0.0000E+00	2.5424E+20
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	3.3547E-20

Small Line Break Transport Group Inventory:

	Pathway
Time (h) = 96.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) = 96.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 96.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 96.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 96.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Transport Group Inventory:

	Atmosphere	Sump	Overlying Pool
Time (h) = 96.0000			
Noble gases (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	0.0000E+00

	Deposition Surfaces	Recirculating Filter
Time (h) = 96.0000		
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00

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Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) = 96.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 96.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 96.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 96.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Detailed model information at time (H) = 720.0000

EAB Doses:

Time (h) = 720.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	5.6833-111	1.9746-123	1.9050-110	5.6833-111
Accumulated dose (rem)	2.2677E-02	2.7934E-05	5.7200E-02	2.3138E-02

LPZ Doses:

Time (h) = 720.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	2.6782-113	9.3049-126	8.9771-113	2.6782-113
Accumulated dose (rem)	2.8020E-03	3.4516E-06	7.0676E-03	2.8590E-03

Control Room Doses:

Time (h) = 720.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	1.7445-109	3.1240-120	1.9795-107	1.7445-109
Accumulated dose (rem)	2.2129E-03	7.0940E-05	1.8555E-01	3.3831E-03

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) = 720.0000	Ci	kg	Atoms	Bq
Kr-85	6.3343E+01	1.6145E-04	1.1439E+21	2.3437E+12
Xe-133	1.6236E+02	8.6740E-07	3.9275E+18	6.0074E+12
Xe-131m	9.4200E+00	1.1246E-07	5.1700E+17	3.4854E+11
Xe-133m	1.5233E-02	3.3949E-11	1.5372E+14	5.6363E+08

PCS Transport Group Inventory:

			Overlying
Time (h) = 720.0000	Atmosphere	Sump	Pool
Noble gases (atoms)	1.1483E+21	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00



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Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	0.0000E+00

	Deposition Recirculating	
Time (h) = 720.0000	Surfaces	Filter
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Environment Transport Group Inventory:

	Present	Release	Integral
Time (h) = 720.0000	Release	Rate/s	Release
Noble gases (atoms)	0.0000E+00	0.0000E+00	2.2932E+20
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

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Control Room Transport Group Inventory:

	Atmosphere	Sump	Overlying Pool
Time (h) = 720.0000			
Noble gases (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	0.0000E+00

	Surfaces	Recirculating Filter
Time (h) = 720.0000		
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway Filter
Time (h) = 720.0000	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Filtered Makeup Transport Group Inventory:

	Pathway Filter
Time (h) = 720.0000	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway Filter
Time (h) = 720.0000	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway Filter
Time (h) = 720.0000	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Transport Group Totals in Model:

Noble Gases (atoms)	1.3776E+21
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

36004

#####  
 I-131 Summary  
 #####

	PCS I-131 (Curies)	Environment I-131 (Curies)	Control Room I-131 (Curies)
Time (hr)			
0.001	0.0000E+00	0.0000E+00	0.0000E+00
0.001	0.0000E+00	0.0000E+00	0.0000E+00
0.280	0.0000E+00	0.0000E+00	0.0000E+00
0.333	0.0000E+00	0.0000E+00	0.0000E+00

Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

0.600	0.0000E+00	0.0000E+00	0.0000E+00
0.860	0.0000E+00	0.0000E+00	0.0000E+00
1.000	0.0000E+00	0.0000E+00	0.0000E+00
1.260	0.0000E+00	0.0000E+00	0.0000E+00
1.520	0.0000E+00	0.0000E+00	0.0000E+00
1.780	0.0000E+00	0.0000E+00	0.0000E+00
2.000	0.0000E+00	0.0000E+00	0.0000E+00
2.260	0.0000E+00	0.0000E+00	0.0000E+00
2.520	0.0000E+00	0.0000E+00	0.0000E+00
2.780	0.0000E+00	0.0000E+00	0.0000E+00
3.040	0.0000E+00	0.0000E+00	0.0000E+00
3.300	0.0000E+00	0.0000E+00	0.0000E+00
3.560	0.0000E+00	0.0000E+00	0.0000E+00
3.820	0.0000E+00	0.0000E+00	0.0000E+00
4.080	0.0000E+00	0.0000E+00	0.0000E+00
4.340	0.0000E+00	0.0000E+00	0.0000E+00
4.600	0.0000E+00	0.0000E+00	0.0000E+00
4.860	0.0000E+00	0.0000E+00	0.0000E+00
5.120	0.0000E+00	0.0000E+00	0.0000E+00
5.380	0.0000E+00	0.0000E+00	0.0000E+00
5.640	0.0000E+00	0.0000E+00	0.0000E+00
5.900	0.0000E+00	0.0000E+00	0.0000E+00
6.160	0.0000E+00	0.0000E+00	0.0000E+00
6.420	0.0000E+00	0.0000E+00	0.0000E+00
6.680	0.0000E+00	0.0000E+00	0.0000E+00
6.940	0.0000E+00	0.0000E+00	0.0000E+00
7.200	0.0000E+00	0.0000E+00	0.0000E+00
7.460	0.0000E+00	0.0000E+00	0.0000E+00
7.720	0.0000E+00	0.0000E+00	0.0000E+00
7.980	0.0000E+00	0.0000E+00	0.0000E+00
8.000	0.0000E+00	0.0000E+00	0.0000E+00
8.260	0.0000E+00	0.0000E+00	0.0000E+00
8.520	0.0000E+00	0.0000E+00	0.0000E+00
8.780	0.0000E+00	0.0000E+00	0.0000E+00
9.040	0.0000E+00	0.0000E+00	0.0000E+00
9.300	0.0000E+00	0.0000E+00	0.0000E+00
9.560	0.0000E+00	0.0000E+00	0.0000E+00
9.820	0.0000E+00	0.0000E+00	0.0000E+00
10.080	0.0000E+00	0.0000E+00	0.0000E+00
24.000	0.0000E+00	0.0000E+00	0.0000E+00
96.000	0.0000E+00	0.0000E+00	0.0000E+00
720.000	0.0000E+00	0.0000E+00	0.0000E+00

#####  
 Cumulative Dose Summary  
 #####

Time (hr)	EAB		LPZ		Control Room	
	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)
0.001	0.0000E+00	3.8234E-06	0.0000E+00	4.7243E-07	0.0000E+00	3.9206E-10
0.001	1.7675E-11	1.2388E-05	2.1839E-12	1.5307E-06	1.1043E-13	1.7236E-09
0.280	3.7128E-06	6.8925E-03	4.5877E-07	8.5166E-04	7.7621E-06	4.5030E-04
0.333	5.0809E-06	8.1862E-03	6.2781E-07	1.0115E-03	1.2326E-05	6.5066E-04
0.600	1.3501E-05	1.4473E-02	1.6682E-06	1.7883E-03	3.2534E-05	1.5622E-03
0.860	2.2840E-05	2.0213E-02	2.8222E-06	2.4976E-03	4.6790E-05	2.2419E-03
1.000	2.7928E-05	2.3131E-02	3.4508E-06	2.8581E-03	5.3366E-05	2.5587E-03
1.260	2.7931E-05	2.3135E-02	3.4512E-06	2.8586E-03	6.2108E-05	2.9707E-03
1.520	2.7933E-05	2.3136E-02	3.4514E-06	2.8588E-03	6.6601E-05	3.1784E-03
1.780	2.7934E-05	2.3137E-02	3.4515E-06	2.8589E-03	6.8823E-05	3.2817E-03
2.000	2.7934E-05	2.3138E-02	3.4516E-06	2.8589E-03	6.9789E-05	3.3272E-03
2.260	2.7934E-05	2.3138E-02	3.4516E-06	2.8589E-03	7.0380E-05	3.3554E-03
2.520	2.7934E-05	2.3138E-02	3.4516E-06	2.8590E-03	7.0668E-05	3.3694E-03
2.780	2.7934E-05	2.3138E-02	3.4516E-06	2.8590E-03	7.0808E-05	3.3763E-03
3.040	2.7934E-05	2.3138E-02	3.4516E-06	2.8590E-03	7.0876E-05	3.3797E-03
3.300	2.7934E-05	2.3138E-02	3.4516E-06	2.8590E-03	7.0909E-05	3.3814E-03
3.560	2.7934E-05	2.3138E-02	3.4516E-06	2.8590E-03	7.0925E-05	3.3823E-03
3.820	2.7934E-05	2.3138E-02	3.4516E-06	2.8590E-03	7.0933E-05	3.3827E-03
4.080	2.7934E-05	2.3138E-02	3.4516E-06	2.8590E-03	7.0937E-05	3.3829E-03
4.340	2.7934E-05	2.3138E-02	3.4516E-06	2.8590E-03	7.0939E-05	3.3830E-03
4.600	2.7934E-05	2.3138E-02	3.4516E-06	2.8590E-03	7.0940E-05	3.3831E-03
4.860	2.7934E-05	2.3138E-02	3.4516E-06	2.8590E-03	7.0940E-05	3.3831E-03
5.120	2.7934E-05	2.3138E-02	3.4516E-06	2.8590E-03	7.0940E-05	3.3831E-03

Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

5.380 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
5.640 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
5.900 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
6.160 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
6.420 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
6.680 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
6.940 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
7.200 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
7.460 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
7.720 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
7.980 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
8.000 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
8.260 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
8.520 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
8.780 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
9.040 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
9.300 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
9.560 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
9.820 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
10.080 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
24.000 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
96.000 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03  
720.000 2.7934E-05 2.3138E-02 3.4516E-06 2.8590E-03 7.0940E-05 3.3831E-03

#####  
Worst Two-Hour Dose  
(Provided for Dose Location 1)  
#####

EAB

Time (hr)	Whole Body (rem)	Thyroid (rem)	Skin (rem)	TEDE (rem)
0.0	2.2673E-02	2.7934E-05	5.7190E-02	2.3134E-02

#####  
30 Day Control Room Skin Dose  
#####

Control Room

Time (hr)	Skin (rem)
720.0	1.8555E-01

Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

**Attachment 5 Palisades Small Line Break Iodine Spike Dose**

```
#####
RADTRAD-NAI Version 1.1a(QA) run on Jun 9, 2005 at 07:02:13
#####

#####
File information
#####

Plant file name          = pal/SLB/db/pal_slb_iodine_db_ast.psf
Inventory file name      = pal/SLB/db/pal_slb_iodine.nif
Scenario file name      = pal/SLB/db/pal_slb_iodine_db_ast.psf
Release file name       = pal/SLB/db/pal_slb_iodine.rft
Dose conversion file name = pal/SLB/db/nai-1101-001rev0.dcf
```

```
#####  #####  #####  # # # ##### # # #####
# # # # # # # # # # # # # # # # # # # # # #
# # # # # # # # # # # # # # # # # # # # # #
#####  #####  #####  # # # # ##### # # # #
# # # # # # # # # # # # # # # # # # # # # #
# # # # # # # # # # # # # # # # # # # # # #
# # # # # # # # # # # # # # # # # # # # # #
```

```
*RADTRAD-NAI 1.1a(QA)
*09 Jun 2005 07:02:08
** Palisades Small Line Break Outside Cont.
** DB AST iodine spike dose
**
*Nuclide inventory file
pal/SLB/db/pal_slb_iodine.nif
*Plant power
1
*Compartments
3
*Compartment 1:
PCS
3
459455
0
0
0
0
*Compartment 2:
Environment
2
2e+20
0
0
0
0
*Compartment 3:
Control Room
1
35923
0
1
0
0
*Pathways
5
*Pathway 1:
Small Line Break
1
2
2
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
*Pathway 2:
Control Room Unfiltered Makeup
  2
  3
  2
*Pathway 3:
Control Room Filtered Makeup
  2
  3
  2
*Pathway 4:
Control Room Unfiltered Inleakage
  2
  3
  2
*Pathway 5:
Control Room Exhaust
  3
  2
  2
*Sources
  3
  1 1
  2 0
  3 0
*dose conversion factors filename
pal/SLB/db/nai-1101-001rev0.dcf
*release fraction and timing filename
pal/SLB/db/pal_slb_iodine.rft
0
  1
  1
*Iodine
0 0.97 0.03
*Overlying pool
*aerosol model
  0
*elemental model
  0
*organic model
  0
*pH tracking
  0
*Compartment detail
*Compartment 1:
  1
*spray model
0
0
0
*filter model
0
*deposition model
0
0
*Compartment 2:
  1
*spray model
0
0
0
*filter model
0
*deposition model
0
0
*Compartment 3:
  1
*spray model
0
0
0
*filter model
```

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```
1
3
0 0 99 99 99
0.3333 1413.6 99 99 99
720 1413.6 99 99 99
*deposition model
0
0
*Pathways:
*Pathway 1
*filter efficiency model
1
3
0 131.478 0 0 0
1 0 0 0 0
720 0 0 0 0
*Pathway 2
*filter efficiency model
1
3
0 660 0 0 0
0.3333 0 0 0 0
720 0 0 0 0
*Pathway 3
*filter efficiency model
1
3
0 0 99 99 99
0.3333 1413.6 99 99 99
720 1413.6 99 99 99
*Pathway 4
*filter efficiency model
1
3
0 0 0 0 0
0.3333 100 0 0 0
720 100 0 0 0
*Pathway 5
*filter efficiency model
1
3
0 660 0 0 0
0.3333 1513.6 0 0 0
720 1513.6 0 0 0
*x/q tables
4
EAB
2
0 0.000539
720 0.000539
LPZ
6
0 6.66e-05
2 3.03e-05
8 2.04e-05
24 8.67e-06
96 2.54e-06
720 2.54e-06
Control Room Unfiltered
6
0 0.0061
2 0.00432
8 0.00173
24 0.00127
96 0.000979
720 0.000979
Control Room Filtered
6
0 0.000832
2 0.000769
8 0.000283
24 0.000215
96 0.000157
```

Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

```

720 0.000157
*dose locations
  3
*location name, compartment number and x/q table
EAB
  2
  1
*br model
  1
  4
0 0.00035
8 0.00018
24 0.00023
720 0.00023
*of model
  0
*location x/q input to be included
  0
*location name, compartment number and x/q table
LPZ
  2
  2
*br model
  1
  4
0 0.00035
8 0.00018
24 0.00023
720 0.00023
*of model
  0
*location x/q input to be included
  0
*location name, compartment number and x/q table
Control Room
  3
  0
*br model
  1
  2
0 0.00035
720 0.00035
*of model
  1
  4
0 1
24 0.6
96 0.4
720 0.4
*location x/q input to be included
  1
*number of intake combinations
  3
*intake combinations
2 1 3
3 1 4
4 1 3
*time step count
  1
0 0.02
*show plant, scenario, event, step, model
  1
  1
  1
  0
  1

```

```

#####
RADTRAD-NAI Version 1.1a(QA) run on Jun  9, 2005 at 07:02:13
#####
#####
Plant Description

```



Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

#####

Number of Nuclides = 107

Inventory Power = 1.0000E+00 MWth
Plant Power Level = 1.0000E+00 MWth

Number of compartments = 3

Compartment information

Compartment number 1 (Source term fraction = 1.0000E+00)
Name: PCS
Compartment volume = 4.5945E+05 (Cubic feet)
Pathways into and out of compartment 1
Pathway to compartment number 2: Small Line Break

Compartment number 2
Name: Environment
Pathways into and out of compartment 2
Pathway to compartment number 3: Control Room Unfiltered Makeup
Pathway to compartment number 3: Control Room Filtered Makeup
Pathway to compartment number 3: Control Room Unfiltered Inleakage
Pathway from compartment number 1: Small Line Break
Pathway from compartment number 3: Control Room Exhaust

Compartment number 3
Name: Control Room
Compartment volume = 3.5923E+04 (Cubic feet)
Removal devices within compartment:
Filter(s)
Pathways into and out of compartment 3
Pathway to compartment number 2: Control Room Exhaust
Pathway from compartment number 2: Control Room Unfiltered Makeup
Pathway from compartment number 2: Control Room Filtered Makeup
Pathway from compartment number 2: Control Room Unfiltered Inleakage

Total number of pathways = 5

#####
RADTRAD-NAI Version 1.1a(QA) run on Jun 9, 2005 at 07:02:13
#####

#####
Scenario Description
#####

Radioactive Decay is enabled
Calculation of Daughters is enabled

Iodine fractions
Aerosol = 0.0000E+00
Elemental = 9.7000E-01
Organic = 3.0000E-02

COMPARTMENT DATA

Compartment number 1: PCS
Compartment number 2: Environment
Compartment number 3: Control Room

Compartment Filter Data

Table with 5 columns: Time (hr), Flow Rate (cfm), and Filter Efficiencies (%) for Aerosol, Elemental, and Organic.

PATHWAY DATA

Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

Pathway number 1: Small Line Break

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%)		
		Aerosol	Elemental	Organic
0.0000E+00	1.3148E+02	0.0000E+00	0.0000E+00	0.0000E+00
1.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Pathway number 2: Control Room Unfiltered Makeup

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%)		
		Aerosol	Elemental	Organic
0.0000E+00	6.6000E+02	0.0000E+00	0.0000E+00	0.0000E+00
3.3330E-01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Pathway number 3: Control Room Filtered Makeup

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%)		
		Aerosol	Elemental	Organic
0.0000E+00	0.0000E+00	9.9000E+01	9.9000E+01	9.9000E+01
3.3330E-01	1.4136E+03	9.9000E+01	9.9000E+01	9.9000E+01
7.2000E+02	1.4136E+03	9.9000E+01	9.9000E+01	9.9000E+01

Pathway number 4: Control Room Unfiltered Inleakage

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%)		
		Aerosol	Elemental	Organic
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
3.3330E-01	1.0000E+02	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	1.0000E+02	0.0000E+00	0.0000E+00	0.0000E+00

Pathway number 5: Control Room Exhaust

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%)		
		Aerosol	Elemental	Organic
0.0000E+00	6.6000E+02	0.0000E+00	0.0000E+00	0.0000E+00
3.3330E-01	1.5136E+03	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	1.5136E+03	0.0000E+00	0.0000E+00	0.0000E+00

X/Q DATA

X/Q table 1: EAB

Time (hr)	X/Q (s * m^-3)
0.0000E+00	5.3900E-04
7.2000E+02	5.3900E-04

X/Q table 2: LPZ

Time (hr)	X/Q (s * m^-3)
0.0000E+00	6.6600E-05
2.0000E+00	3.0300E-05
8.0000E+00	2.0400E-05
2.4000E+01	8.6700E-06
9.6000E+01	2.5400E-06
7.2000E+02	2.5400E-06

X/Q table 3: Control Room Unfiltered

Time (hr)	X/Q (s * m^-3)
0.0000E+00	6.1000E-03
2.0000E+00	4.3200E-03
8.0000E+00	1.7300E-03
2.4000E+01	1.2700E-03

Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

9.6000E+01 9.7900E-04
7.2000E+02 9.7900E-04

X/Q table 4: Control Room Filtered
Time (hr) X/Q (s \* m^-3)
0.0000E+00 8.3200E-04
2.0000E+00 7.6900E-04
8.0000E+00 2.8300E-04
2.4000E+01 2.1500E-04
9.6000E+01 1.5700E-04
7.2000E+02 1.5700E-04

LOCATION DATA

Location EAB is in compartment 2

Using X/Q Table 1

Location Breathing Rate Data

Time (hr) Breathing Rate (m^3 \* sec^-1)
0.0000E+00 3.5000E-04
8.0000E+00 1.8000E-04
2.4000E+01 2.3000E-04
7.2000E+02 2.3000E-04

Location LPZ is in compartment 2

Using X/Q Table 2

Location Breathing Rate Data

Time (hr) Breathing Rate (m^3 \* sec^-1)
0.0000E+00 3.5000E-04
8.0000E+00 1.8000E-04
2.4000E+01 2.3000E-04
7.2000E+02 2.3000E-04

Location Control Room is in compartment 3

Inleakage X/Q Table Assignments

Inleakage Path Source Path X/Q Table
2 1 3
3 1 4
4 1 3

Location Breathing Rate Data

Time (hr) Breathing Rate (m^3 \* sec^-1)
0.0000E+00 3.5000E-04
7.2000E+02 3.5000E-04

Location Occupancy Factor Data

Time (hr) Occupancy Factor
0.0000E+00 1.0000E+00
2.4000E+01 6.0000E-01
9.6000E+01 4.0000E-01
7.2000E+02 4.0000E-01

USER SPECIFIED TIME STEP DATA - SUPPLEMENTAL TIME STEPS

Time Time step
0.0000E+00 2.0000E-02

#####
RADTRAD-NAI Version 1.1a(QA) run on Jun 9, 2005 at 07:02:13
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Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

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#####  
 Dose, Detailed Model and Detailed Inventory Output  
 #####

Detailed model information at time (H) = 0.0100

EAB Doses:

Time (h) =	0.0100	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

LPZ Doses:

Time (h) =	0.0100	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Control Room Doses:

Time (h) =	0.0100	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

PCS Transport Group Inventory:

Time (h) =	0.0100	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Time (h) =	0.0100	Deposition Surfaces	Recirculating Filter
Noble gases (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

Time (h) =	0.0100	Pathway Filter
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00

Environment Transport Group Inventory:

Time (h) =	0.0100	Present Release	Release Rate/s	Integral Release
Noble gases (atoms)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

Time (h) =	0.0100	Pathway Filter
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

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	Pathway
Time (h) = 0.0100	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 0.0100	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 0.0100	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 0.0100	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Transport Group Inventory:

			Overlying
Time (h) = 0.0100	Atmosphere	Sump	Pool
Noble gases (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	0.0000E+00

	Deposition	Recirculating
Time (h) = 0.0100	Surfaces	Filter
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) = 0.0100	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 0.0100	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 0.0100	Filter
Noble gases (atoms)	0.0000E+00

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Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 0.0000E+00

Control Room Exhaust Transport Group Inventory:

Time (h) = 0.0100 Pathway Filter  
 Noble gases (atoms) 0.0000E+00  
 Elemental I (atoms) 0.0000E+00  
 Organic I (atoms) 0.0000E+00  
 Aerosols (kg) 0.0000E+00

Detailed model information at time (H) = 0.3333

EAB Doses:

Time (h) =	0.3333	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		4.0993E-03	1.2321E+00	6.0826E-03	4.2699E-02
Accumulated dose (rem)		4.0993E-03	1.2321E+00	6.0826E-03	4.2699E-02

LPZ Doses:

Time (h) =	0.3333	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		5.0652E-04	1.5225E-01	7.5158E-04	5.2760E-03
Accumulated dose (rem)		5.0652E-04	1.5225E-01	7.5158E-04	5.2760E-03

Control Room Doses:

Time (h) =	0.3333	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		1.4854E-04	1.5241E+00	7.4642E-03	4.7890E-02
Accumulated dose (rem)		1.4854E-04	1.5241E+00	7.4642E-03	4.7890E-02

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) =	0.3333	Ci	kg	Atoms	Bq
I-131		1.6774E+03	1.3530E-05	6.2199E+19	6.2064E+13
I-132		2.0871E+03	2.0220E-07	9.2248E+17	7.7224E+13
I-133		2.5767E+03	2.2746E-06	1.0299E+19	9.5337E+13
I-134		1.6444E+03	6.1642E-08	2.7703E+17	6.0843E+13
I-135		1.9257E+03	5.4833E-07	2.4460E+18	7.1249E+13
Xe-133		2.3662E+00	1.2641E-08	5.7239E+16	8.7550E+10
Xe-135		2.2230E+01	8.7050E-09	3.8832E+16	8.2252E+11
Xe-131m		7.7378E-03	9.2380E-11	4.2467E+14	2.8630E+08
Xe-133m		1.6927E-01	3.7724E-10	1.7081E+15	6.2630E+09
Xe-135m		1.0821E+02	1.1880E-09	5.2993E+15	4.0039E+12

PCS Transport Group Inventory:

Time (h) =	0.3333	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)		1.0350E+17	0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		1.6617E-05	0.0000E+00	0.0000E+00

Time (h) =	0.3333	Deposition Surfaces	Recirculating Filter
Noble gases (atoms)		0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00
Aerosols (kg)		0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

Time (h) =	0.3333	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Environment Integral Nuclide Release:

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Time (h) =	0.3333	Ci	kg	Atoms	Bq
I-131		4.6520E+00	3.7524E-08	1.7250E+17	1.7212E+11
I-132		5.7883E+00	5.6077E-10	2.5584E+15	2.1417E+11
I-133		7.1460E+00	6.3082E-09	2.8563E+16	2.6440E+11
I-134		4.5605E+00	1.7095E-10	7.6829E+14	1.6874E+11
I-135		5.3405E+00	1.5207E-09	6.7836E+15	1.9760E+11
Xe-133		8.6270E-03	4.6089E-11	2.0869E+14	3.1920E+08
Xe-135		8.1452E-02	3.1895E-11	1.4228E+14	3.0137E+09
Xe-131m		2.8200E-05	3.3667E-13	1.5477E+12	1.0434E+06
Xe-133m		6.1706E-04	1.3752E-12	6.2268E+12	2.2831E+07
Xe-135m		3.8059E-01	4.1781E-12	1.8638E+13	1.4082E+10

## Environment Transport Group Inventory:

Time (h) =	0.3333	Present Release	Release Rate/s	Integral Release
Noble gases (atoms)		2.3565E+13	3.2729E+11	3.7738E+14
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		3.7108E-09	5.1539E-11	4.6084E-08

## Small Line Break Transport Group Inventory:

Time (h) =	0.3333	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

## Control Room Unfiltered Makeup Transport Group Inventory:

Time (h) =	0.3333	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

## Control Room Filtered Makeup Transport Group Inventory:

Time (h) =	0.3333	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

## Control Room Unfiltered Inleakage Transport Group Inventory:

Time (h) =	0.3333	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

## Control Room Exhaust Transport Group Inventory:

Time (h) =	0.3333	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

## Control Room Compartment Atmosphere Nuclide Inventory:

Time (h) =	0.3333	Ci	kg	Atoms	Bq
I-131		7.8892E-03	6.3636E-11	2.9254E+14	2.9190E+08
I-132		9.8163E-03	9.5099E-13	4.3387E+12	3.6320E+08
I-133		1.2119E-02	1.0698E-11	4.8440E+13	4.4839E+08

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I-134	7.7340E-03	2.8992E-13	1.3029E+12	2.8616E+08
I-135	9.0568E-03	2.5789E-12	1.1504E+13	3.3510E+08
Xe-133	1.4428E-05	7.7079E-14	3.4901E+11	5.3383E+05
Xe-135	1.3617E-04	5.3323E-14	2.3787E+11	5.0384E+06
Xe-131m	4.7164E-08	5.6307E-16	2.5885E+09	1.7451E+03
Xe-133m	1.0320E-06	2.2999E-15	1.0414E+10	3.8184E+04
Xe-135m	6.3819E-04	7.0060E-15	3.1253E+10	2.3613E+07

Control Room Transport Group Inventory:

Time (h) =	0.3333	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)		6.3113E+11	0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		7.8153E-11	0.0000E+00	0.0000E+00

Time (h) =	0.3333	Deposition Surfaces	Recirculating Filter
Noble gases (atoms)		0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00
Aerosols (kg)		0.0000E+00	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

Time (h) =	0.3333	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Control Room Filtered Makeup Transport Group Inventory:

Time (h) =	0.3333	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Control Room Unfiltered Inleakage Transport Group Inventory:

Time (h) =	0.3333	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Control Room Exhaust Transport Group Inventory:

Time (h) =	0.3333	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Detailed model information at time (H) = 1.0000

EAB Doses:

Time (h) =	1.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		2.8899E-02	1.0216E+01	4.3173E-02	3.4833E-01
Accumulated dose (rem)		3.2999E-02	1.1449E+01	4.9256E-02	3.9103E-01

LPZ Doses:

Time (h) =	1.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		3.5708E-03	1.2624E+00	5.3346E-03	4.3041E-02
Accumulated dose (rem)		4.0774E-03	1.4146E+00	6.0862E-03	4.8317E-02



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Control Room Doses:

Time (h) =	1.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		4.6039E-04	5.2667E+00	2.3293E-02	1.6518E-01
Accumulated dose (rem)		6.0892E-04	6.7908E+00	3.0757E-02	2.1307E-01

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) =	1.0000	Ci	kg	Atoms	Bq
I-131		5.0950E+03	4.1097E-05	1.8893E+20	1.8852E+14
I-132		5.1980E+03	5.0358E-07	2.2975E+18	1.9233E+14
I-133		7.6729E+03	6.7734E-06	3.0669E+19	2.8390E+14
I-134		2.9555E+03	1.1079E-07	4.9790E+17	1.0935E+14
I-135		5.4672E+03	1.5568E-06	6.9445E+18	2.0229E+14
Xe-133		2.0851E+01	1.1139E-07	5.0438E+17	7.7148E+11
Xe-135		1.9613E+02	7.6801E-08	3.4260E+17	7.2567E+12
Xe-131m		6.9132E-02	8.2534E-10	3.7941E+15	2.5579E+09
Xe-133m		1.4889E+00	3.3182E-09	1.5024E+16	5.5088E+10
Xe-135m		5.8554E+02	6.4279E-09	2.8674E+16	2.1665E+13

PCS Transport Group Inventory:

Time (h) =	1.0000	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)		8.9447E+17	0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		5.0042E-05	0.0000E+00	0.0000E+00

Time (h) =	1.0000	Deposition Surfaces	Recirculating Filter
Noble gases (atoms)		0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00
Aerosols (kg)		0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

Time (h) =	1.0000	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Environment Integral Nuclide Release:

Time (h) =	1.0000	Ci	kg	Atoms	Bq
I-131		4.3392E+01	3.5001E-07	1.6090E+18	1.6055E+12
I-132		4.4270E+01	4.2888E-09	1.9566E+16	1.6380E+12
I-133		6.5347E+01	5.7686E-08	2.6120E+17	2.4178E+12
I-134		2.5171E+01	9.4354E-10	4.2404E+15	9.3131E+11
I-135		4.6562E+01	1.3258E-08	5.9144E+16	1.7228E+12
Xe-133		2.3640E-01	1.2629E-09	5.7185E+15	8.7467E+09
Xe-135		2.2411E+00	8.7760E-10	3.9148E+15	8.2922E+10
Xe-131m		7.8289E-04	9.3467E-12	4.2967E+13	2.8967E+07
Xe-133m		1.6875E-02	3.7607E-11	1.7028E+14	6.2436E+08
Xe-135m		6.0334E+00	6.6234E-11	2.9546E+14	2.2324E+11

Environment Transport Group Inventory:

Time (h) =	1.0000	Present Release	Release Rate/s	Integral Release
Noble gases (atoms)		3.0707E+14	4.2648E+12	1.0142E+16
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		1.7000E-08	2.3611E-10	4.2618E-07

Small Line Break Transport Group Inventory:

Time (h) =	1.0000	Pathway Filter

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Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) = 1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) = 1.0000	Ci	kg	Atoms	Bq
I-131	2.1308E-02	1.7187E-10	7.9011E+14	7.8840E+08
I-132	2.1739E-02	2.1061E-12	9.6083E+12	8.0434E+08
I-133	3.2089E-02	2.8327E-11	1.2826E+14	1.1873E+09
I-134	1.2360E-02	4.6333E-13	2.0823E+12	4.5733E+08
I-135	2.2865E-02	6.5107E-12	2.9043E+13	8.4599E+08

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	2.0928E-10

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Compartment Atmosphere Nuclide Inventory:

Time (h) = 1.0000	Ci	kg	Atoms	Bq
I-131	4.4685E-03	3.6043E-11	1.6569E+14	1.6533E+08
I-132	4.5588E-03	4.4166E-13	2.0149E+12	1.6868E+08
I-133	6.7294E-03	5.9404E-12	2.6898E+13	2.4899E+08
I-134	2.5920E-03	9.7165E-14	4.3667E+11	9.5905E+07
I-135	4.7949E-03	1.3653E-12	6.0906E+12	1.7741E+08
Xe-133	1.1715E-04	6.2589E-13	2.8340E+12	4.3347E+06
Xe-135	1.1000E-03	4.3073E-13	1.9214E+12	4.0698E+07
Xe-131m	3.8850E-07	4.6381E-15	2.1322E+10	1.4374E+04
Xe-133m	8.3660E-06	1.8645E-14	8.4422E+10	3.0954E+05
Xe-135m	3.3603E-03	3.6889E-14	1.6456E+11	1.2433E+08

Control Room Transport Group Inventory:

			Overlying
Time (h) = 1.0000	Atmosphere	Sump	Pool
Noble gases (atoms)	5.0257E+12	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	4.3888E-11	0.0000E+00	0.0000E+00

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

## Recirculating Filter Inventory

Time (h) =	Ci	kg	Atoms	Bq
1.0000				
I-131	7.1032E-03	5.7295E-11	2.6339E+14	2.6282E+08
I-132	7.2468E-03	7.0206E-13	3.2030E+12	2.6813E+08
I-133	1.0697E-02	9.4430E-12	4.2757E+13	3.9579E+08
I-134	4.1203E-03	1.5445E-13	6.9414E+11	1.5245E+08
I-135	7.6220E-03	2.1704E-12	9.6817E+12	2.8202E+08

## Deposition Recirculating

Time (h) =	Surfaces	Filter
1.0000		
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	6.9765E-11

## Control Room Unfiltered Makeup Transport Group Inventory:

Time (h) =	Pathway
1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) =	Ci	kg	Atoms	Bq
1.0000				
I-131	2.1308E-02	1.7187E-10	7.9011E+14	7.8840E+08
I-132	2.1739E-02	2.1061E-12	9.6083E+12	8.0434E+08
I-133	3.2089E-02	2.8327E-11	1.2826E+14	1.1873E+09
I-134	1.2360E-02	4.6333E-13	2.0823E+12	4.5733E+08
I-135	2.2865E-02	6.5107E-12	2.9043E+13	8.4599E+08

## Control Room Filtered Makeup Transport Group Inventory:

Time (h) =	Pathway
1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	2.0928E-10

## Control Room Unfiltered Inleakage Transport Group Inventory:

Time (h) =	Pathway
1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Exhaust Transport Group Inventory:

Time (h) =	Pathway
1.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Total Filter Nuclide Inventory:

Time (h) =	Ci	kg	Atoms	Bq
1.0000				
I-131	2.8411E-02	2.2917E-10	1.0535E+15	1.0512E+09
I-132	2.8986E-02	2.8081E-12	1.2811E+13	1.0725E+09
I-133	4.2786E-02	3.7770E-11	1.7102E+14	1.5831E+09
I-134	1.6481E-02	6.1779E-13	2.7764E+12	6.0978E+08
I-135	3.0487E-02	8.6811E-12	3.8725E+13	1.1280E+09

Detailed model information at time (H) = 2.0000

EAB Doses:

Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

Time (h) =	2.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		1.8107E-06	6.0347E-04	2.7732E-06	2.0650E-05
Accumulated dose (rem)		3.3000E-02	1.1449E+01	4.9259E-02	3.9105E-01

LPZ Doses:

Time (h) =	2.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		2.2374E-07	7.4566E-05	3.4266E-07	2.5516E-06
Accumulated dose (rem)		4.0776E-03	1.4147E+00	6.0865E-03	4.8319E-02

Control Room Doses:

Time (h) =	2.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		1.3901E-04	1.5686E+00	7.2074E-03	4.9108E-02
Accumulated dose (rem)		7.4794E-04	8.3594E+00	3.7964E-02	2.6218E-01

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) =	2.0000	Ci	kg	Atoms	Bq
I-131		1.0248E+04	8.2666E-05	3.8002E+20	3.7919E+14
I-132		7.7630E+03	7.5208E-07	3.4311E+18	2.8723E+14
I-133		1.4982E+04	1.3225E-05	5.9883E+19	5.5432E+14
I-134		2.7059E+03	1.0143E-07	4.5586E+17	1.0012E+14
I-135		9.9379E+03	2.8298E-06	1.2623E+19	3.6770E+14
Xe-133		8.1806E+01	4.3704E-07	1.9789E+18	3.0268E+12
Xe-135		7.3982E+02	2.8970E-07	1.2923E+18	2.7373E+13
Xe-131m		2.7690E-01	3.3058E-09	1.5197E+16	1.0245E+10
Xe-133m		5.8256E+00	1.2983E-08	5.8787E+16	2.1555E+11
Xe-135m		1.3299E+03	1.4599E-08	6.5125E+16	4.9206E+13

PCS Transport Group Inventory:

Time (h) =	2.0000	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)		3.4103E+18	0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		9.9574E-05	0.0000E+00	0.0000E+00

Time (h) =	2.0000	Deposition Surfaces	Recirculating Filter
Noble gases (atoms)		0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00
Aerosols (kg)		0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

Time (h) =	2.0000	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Environment Integral Nuclide Release:

Time (h) =	2.0000	Ci	kg	Atoms	Bq
I-131		4.3239E+01	3.4877E-07	1.6033E+18	1.5998E+12
I-132		3.2753E+01	3.1730E-09	1.4476E+16	1.2118E+12
I-133		6.3209E+01	5.5798E-08	2.5265E+17	2.3387E+12
I-134		1.1417E+01	4.2796E-10	1.9233E+15	4.2241E+11
I-135		4.1929E+01	1.1939E-08	5.3259E+16	1.5514E+12
Xe-133		5.7824E-01	3.0892E-09	1.3988E+16	2.1395E+10
Xe-135		5.3050E+00	2.0773E-09	9.2667E+15	1.9628E+11
Xe-131m		1.9474E-03	2.3249E-11	1.0688E+14	7.2054E+07
Xe-133m		4.1116E-02	9.1632E-11	4.1490E+14	1.5213E+09
Xe-135m		6.7952E+00	7.4596E-11	3.3276E+14	2.5142E+11

Environment Transport Group Inventory:

Present	Release	Integral
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Time (h) =	2.0000	Release	Rate/s	Release
Noble gases (atoms)		2.0473E+11	2.8435E+09	2.4109E+16
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		1.7707E-14	2.4593E-16	4.2011E-07

Small Line Break Transport Group Inventory:

	Pathway
Time (h) =	2.0000
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) =	2.0000
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) =	2.0000	Ci	kg	Atoms	Bq
I-131		2.1232E-02	1.7126E-10	7.8728E+14	7.8557E+08
I-132		1.6083E-02	1.5581E-12	7.1083E+12	5.9506E+08
I-133		3.1038E-02	2.7399E-11	1.2406E+14	1.1484E+09
I-134		5.6059E-03	2.1014E-13	9.4441E+11	2.0742E+08
I-135		2.0588E-02	5.8625E-12	2.6152E+13	7.6177E+08

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) =	2.0000
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	2.0629E-10

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) =	2.0000
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) =	2.0000
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Compartment Atmosphere Nuclide Inventory:

Time (h) =	2.0000	Ci	kg	Atoms	Bq
I-131		3.4319E-05	2.7682E-13	1.2726E+12	1.2698E+06
I-132		2.5996E-05	2.5185E-15	1.1490E+10	9.6185E+05
I-133		5.0169E-05	4.4287E-14	2.0053E+11	1.8563E+06
I-134		9.0614E-06	3.3967E-16	1.5265E+09	3.3527E+05
I-135		3.3279E-05	9.4762E-15	4.2272E+10	1.2313E+06
Xe-133		9.9480E-05	5.3146E-13	2.4064E+12	3.6808E+06
Xe-135		8.7285E-04	3.4179E-13	1.5247E+12	3.2295E+07
Xe-131m		3.3912E-07	4.0487E-15	1.8612E+10	1.2548E+04
Xe-133m		7.0993E-06	1.5822E-14	7.1640E+10	2.6268E+05
Xe-135m		2.5425E-03	2.7911E-14	1.2451E+11	9.4072E+07

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

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## Control Room Transport Group Inventory:

		Atmosphere	Sump	Overlying Pool
Time (h) =	2.0000			
Noble gases (atoms)		4.1459E+12	0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		3.3344E-13	0.0000E+00	0.0000E+00

## Recirculating Filter Inventory

	Ci	kg	Atoms	Bq
Time (h) =	2.0000			
I-131	9.2019E-03	7.4224E-11	3.4121E+14	3.4047E+08
I-132	6.9703E-03	6.7527E-13	3.0807E+12	2.5790E+08
I-133	1.3452E-02	1.1875E-11	5.3768E+13	4.9772E+08
I-134	2.4296E-03	9.1076E-14	4.0931E+11	8.9896E+07
I-135	8.9231E-03	2.5408E-12	1.1334E+13	3.3015E+08

	Deposition Surfaces	Recirculating Filter
Time (h) =	2.0000	
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	8.9406E-11

## Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway Filter
Time (h) =	2.0000
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

	Ci	kg	Atoms	Bq
Time (h) =	2.0000			
I-131	2.1232E-02	1.7126E-10	7.8728E+14	7.8557E+08
I-132	1.6083E-02	1.5581E-12	7.1083E+12	5.9506E+08
I-133	3.1038E-02	2.7399E-11	1.2406E+14	1.1484E+09
I-134	5.6059E-03	2.1014E-13	9.4441E+11	2.0742E+08
I-135	2.0588E-02	5.8625E-12	2.6152E+13	7.6177E+08

## Control Room Filtered Makeup Transport Group Inventory:

	Pathway Filter
Time (h) =	2.0000
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	2.0629E-10

## Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway Filter
Time (h) =	2.0000
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Exhaust Transport Group Inventory:

	Pathway Filter
Time (h) =	2.0000
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Total Filter Nuclide Inventory:

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Time (h) =	Ci	kg	Atoms	Bq
2.0000				
I-131	3.0434E-02	2.4548E-10	1.1285E+15	1.1260E+09
I-132	2.3053E-02	2.2333E-12	1.0189E+13	8.5296E+08
I-133	4.4489E-02	3.9273E-11	1.7783E+14	1.6461E+09
I-134	8.0355E-03	3.0122E-13	1.3537E+12	2.9731E+08
I-135	2.9511E-02	8.4034E-12	3.7486E+13	1.0919E+09

Detailed model information at time (H) = 8.0000

EAB Doses:

Time (h) =	Whole Body	Thyroid	Skin	TEDE
8.0000				
Delta dose (rem)	1.3695E-06	4.6268E-06	2.2637E-06	1.5136E-06
Accumulated dose (rem)	3.3002E-02	1.1449E+01	4.9261E-02	3.9105E-01

LPZ Doses:

Time (h) =	Whole Body	Thyroid	Skin	TEDE
8.0000				
Delta dose (rem)	7.6986E-08	2.6010E-07	1.2726E-07	8.5085E-08
Accumulated dose (rem)	4.0777E-03	1.4147E+00	6.0866E-03	4.8319E-02

Control Room Doses:

Time (h) =	Whole Body	Thyroid	Skin	TEDE
8.0000				
Delta dose (rem)	1.0509E-04	1.2026E-02	5.8806E-03	4.7959E-04
Accumulated dose (rem)	8.5302E-04	8.3714E+00	4.3845E-02	2.6266E-01

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) =	Ci	kg	Atoms	Bq
8.0000				
I-131	4.0399E+04	3.2586E-04	1.4980E+21	1.4947E+15
I-132	5.1263E+03	4.9663E-07	2.2657E+18	1.8967E+14
I-133	4.9408E+04	4.3615E-05	1.9749E+20	1.8281E+15
I-134	9.4865E+01	3.5561E-09	1.5982E+16	3.5100E+12
I-135	2.1336E+04	6.0754E-06	2.7102E+19	7.8944E+14
Xe-133	1.1412E+03	6.0965E-06	2.7605E+19	4.2223E+13
Xe-135	6.9765E+03	2.7319E-06	1.2187E+19	2.5813E+14
Xe-131m	4.3682E+00	5.2150E-08	2.3974E+17	1.6162E+11
Xe-133m	7.9910E+01	1.7809E-07	8.0638E+17	2.9567E+12
Xe-135m	3.3475E+03	3.6748E-08	1.6393E+17	1.2386E+14

PCS Transport Group Inventory:

Time (h) =	Atmosphere	Sump	Overlying Pool
8.0000			
Noble gases (atoms)	4.1001E+19	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	3.7605E-04	0.0000E+00	0.0000E+00

Time (h) =	Surfaces	Recirculating Filter
8.0000		
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

Time (h) =	Pathway Filter
8.0000	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Environment Integral Nuclide Release:

Time (h) =	Ci	kg	Atoms	Bq
8.0000				
Xe-133	2.3712E+00	1.2668E-08	5.7358E+16	8.7733E+10
Xe-135	1.4598E+01	5.7163E-09	2.5500E+16	5.4013E+11
Xe-131m	8.7882E-03	1.0492E-10	4.8232E+14	3.2516E+08
Xe-133m	1.6443E-01	3.6646E-10	1.6593E+15	6.0840E+09

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Xe-135m	3.6793E+00	4.0391E-11	1.8018E+14	1.3613E+11
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## Environment Transport Group Inventory:

	Present	Release	Integral
Time (h) = 8.0000	Release	Rate/s	Release
Noble gases (atoms)	1.4169E+11	1.9679E+09	8.5180E+16
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	3.4816E-27	4.8356E-29	3.9391E-07

## Small Line Break Transport Group Inventory:

	Pathway
Time (h) = 8.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) = 8.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) = 8.0000	Ci	kg	Atoms	Bq
I-131	2.0779E-02	1.6761E-10	7.7049E+14	7.6882E+08
I-132	2.6367E-03	2.5544E-13	1.1654E+12	9.7558E+07
I-133	2.5413E-02	2.2433E-11	1.0158E+14	9.4027E+08
I-134	4.8794E-05	1.8291E-15	8.2201E+09	1.8054E+06
I-135	1.0974E-02	3.1249E-12	1.3940E+13	4.0604E+08

## Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 8.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	1.9342E-10

## Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 8.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 8.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Compartment Atmosphere Nuclide Inventory:

Time (h) = 8.0000	Ci	kg	Atoms	Bq
Xe-133	7.9944E-05	4.2709E-13	1.9338E+12	2.9579E+06
Xe-135	4.5606E-04	1.7858E-13	7.9664E+11	1.6874E+07
Xe-131m	3.2582E-07	3.8898E-15	1.7882E+10	1.2055E+04
Xe-133m	5.7055E-06	1.2715E-14	5.7575E+10	2.1110E+05
Xe-135m	1.3503E-03	1.4823E-14	6.6125E+10	4.9961E+07



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Control Room Transport Group Inventory:

Time (h) =	Atmosphere	Sump	Overlying Pool
8.0000			
Noble gases (atoms)	2.8721E+12	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	6.5563E-26	0.0000E+00	0.0000E+00

Recirculating Filter Inventory

Time (h) =	Ci	kg	Atoms	Bq
8.0000				
I-131	9.0218E-03	7.2771E-11	3.3453E+14	3.3381E+08
I-132	1.1448E-03	1.1091E-13	5.0599E+11	4.2358E+07
I-133	1.1034E-02	9.7402E-12	4.4103E+13	4.0825E+08
I-134	2.1185E-05	7.9415E-16	3.5690E+09	7.8386E+05
I-135	4.7648E-03	1.3568E-12	6.0523E+12	1.7630E+08

Deposition Recirculating

Time (h) =	Surfaces	Filter
8.0000		
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	8.3980E-11

Control Room Unfiltered Makeup Transport Group Inventory:

Time (h) =	Pathway Filter
8.0000	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) =	Ci	kg	Atoms	Bq
8.0000				
I-131	2.0779E-02	1.6761E-10	7.7049E+14	7.6882E+08
I-132	2.6367E-03	2.5544E-13	1.1654E+12	9.7558E+07
I-133	2.5413E-02	2.2433E-11	1.0158E+14	9.4027E+08
I-134	4.8794E-05	1.8291E-15	8.2201E+09	1.8054E+06
I-135	1.0974E-02	3.1249E-12	1.3940E+13	4.0604E+08

Control Room Filtered Makeup Transport Group Inventory:

Time (h) =	Pathway Filter
8.0000	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	1.9342E-10

Control Room Unfiltered Inleakage Transport Group Inventory:

Time (h) =	Pathway Filter
8.0000	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

Time (h) =	Pathway Filter
8.0000	
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Total Filter Nuclide Inventory:

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Time (h) =	8.0000	Ci	kg	Atoms	Bq
I-131		2.9801E-02	2.4038E-10	1.1050E+15	1.1026E+09
I-132		3.7815E-03	3.6635E-13	1.6714E+12	1.3992E+08
I-133		3.6447E-02	3.2174E-11	1.4568E+14	1.3485E+09
I-134		6.9979E-05	2.6232E-15	1.1789E+10	2.5892E+06
I-135		1.5739E-02	4.4817E-12	1.9992E+13	5.8234E+08

Detailed model information at time (H) = 24.0000

EAB Doses:

Time (h) =	24.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		1.2666E-06	4.6694E-19	2.1017E-06	1.2666E-06
Accumulated dose (rem)		3.3003E-02	1.1449E+01	4.9263E-02	3.9106E-01

LPZ Doses:

Time (h) =	24.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		4.7937E-08	1.7673E-20	7.9544E-08	4.7937E-08
Accumulated dose (rem)		4.0777E-03	1.4147E+00	6.0867E-03	4.8319E-02

Control Room Doses:

Time (h) =	24.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)		9.7192E-05	2.3600E-15	5.4597E-03	9.7192E-05
Accumulated dose (rem)		9.5022E-04	8.3714E+00	4.9304E-02	2.6276E-01

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) =	24.0000	Ci	kg	Atoms	Bq
I-131		3.8142E+04	3.0766E-04	1.4143E+21	1.4113E+15
I-132		4.1275E+01	3.9986E-09	1.8243E+16	1.5272E+12
I-133		2.8989E+04	2.5590E-05	1.1587E+20	1.0726E+15
I-134		3.0410E-04	1.1400E-14	5.1231E+10	1.1252E+07
I-135		3.9852E+03	1.1348E-06	5.0621E+18	1.4745E+14
Xe-133		4.1850E+03	2.2358E-05	1.0123E+20	1.5484E+14
Xe-135		8.2682E+03	3.2377E-06	1.4443E+19	3.0592E+14
Xe-131m		2.0797E+01	2.4829E-07	1.1414E+18	7.6949E+11
Xe-133m		2.7419E+02	6.1107E-07	2.7669E+18	1.0145E+13
Xe-135m		6.5586E+02	7.1999E-09	3.2118E+16	2.4267E+13

PCS Transport Group Inventory:

Time (h) =	24.0000	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)		1.1962E+20	0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)		3.3439E-04	0.0000E+00	0.0000E+00

Time (h) =	24.0000	Surfaces	Recirculating Filter
Noble gases (atoms)		0.0000E+00	0.0000E+00
Elemental I (atoms)		0.0000E+00	0.0000E+00
Organic I (atoms)		0.0000E+00	0.0000E+00
Aerosols (kg)		0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

Time (h) =	24.0000	Pathway Filter
Noble gases (atoms)		0.0000E+00
Elemental I (atoms)		0.0000E+00
Organic I (atoms)		0.0000E+00
Aerosols (kg)		0.0000E+00

Environment Integral Nuclide Release:

Time (h) =	24.0000	Ci	kg	Atoms	Bq
Xe-133		5.4688E+00	2.9217E-08	1.3229E+17	2.0235E+11
Xe-135		1.0819E+01	4.2366E-09	1.8899E+16	4.0030E+11
Xe-131m		2.5849E-02	3.0860E-10	1.4187E+15	9.5641E+08
Xe-133m		3.5272E-01	7.8609E-10	3.5594E+15	1.3051E+10

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Xe-135m	6.8723E-01	7.5443E-12	3.3654E+13	2.5427E+10
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## Environment Transport Group Inventory:

	Present	Release	Integral
Time (h) = 24.0000	Release	Rate/s	Release
Noble gases (atoms)	6.6424E+10	9.2255E+08	1.5620E+17
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	3.5027E-07

## Small Line Break Transport Group Inventory:

	Pathway
Time (h) = 24.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) = 24.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) = 24.0000	Ci	kg	Atoms	Bq
I-131	1.9618E-02	1.5824E-10	7.2746E+14	7.2588E+08
I-132	2.1229E-05	2.0567E-15	9.3831E+09	7.8549E+05
I-133	1.4910E-02	1.3162E-11	5.9598E+13	5.5169E+08
I-135	2.0498E-03	5.8367E-13	2.6037E+12	7.5842E+07

## Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 24.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	1.7199E-10

## Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 24.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 24.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Compartment Atmosphere Nuclide Inventory:

Time (h) = 24.0000	Ci	kg	Atoms	Bq
Xe-133	4.6905E-05	2.5059E-13	1.1346E+12	1.7355E+06
Xe-135	8.5183E-05	3.3356E-14	1.4880E+11	3.1518E+06
Xe-131m	3.0762E-07	3.6726E-15	1.6883E+10	1.1382E+04
Xe-133m	3.3476E-06	7.4605E-15	3.3781E+10	1.2386E+05
Xe-135m	2.5221E-04	2.7688E-15	1.2351E+10	9.3319E+06

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Control Room Transport Group Inventory:

Time (h) = 24.0000	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)	1.3465E+12	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	0.0000E+00

Recirculating Filter Inventory

Time (h) = 24.0000	Ci	kg	Atoms	Bq
I-131	8.5179E-03	6.8707E-11	3.1585E+14	3.1516E+08
I-132	9.2174E-06	8.9298E-16	4.0740E+09	3.4105E+05
I-133	6.4738E-03	5.7148E-12	2.5876E+13	2.3953E+08
I-135	8.8997E-04	2.5342E-13	1.1305E+12	3.2929E+07

Deposition Recirculating

Time (h) = 24.0000	Surfaces	Filter
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	7.4676E-11

Control Room Unfiltered Makeup Transport Group Inventory:

Time (h) = 24.0000	Pathway Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) = 24.0000	Ci	kg	Atoms	Bq
I-131	1.9618E-02	1.5824E-10	7.2746E+14	7.2588E+08
I-132	2.1229E-05	2.0567E-15	9.3831E+09	7.8549E+05
I-133	1.4910E-02	1.3162E-11	5.9598E+13	5.5169E+08
I-135	2.0498E-03	5.8367E-13	2.6037E+12	7.5842E+07

Control Room Filtered Makeup Transport Group Inventory:

Time (h) = 24.0000	Pathway Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	1.7199E-10

Control Room Unfiltered Inleakage Transport Group Inventory:

Time (h) = 24.0000	Pathway Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

Time (h) = 24.0000	Pathway Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Total Filter Nuclide Inventory:

Time (h) = 24.0000	Ci	kg	Atoms	Bq
I-131	2.8136E-02	2.2695E-10	1.0433E+15	1.0410E+09
I-132	3.0447E-05	2.9497E-15	1.3457E+10	1.1265E+06

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I-133	2.1384E-02	1.8877E-11	8.5475E+13	7.9122E+08
I-135	2.9397E-03	8.3709E-13	3.7341E+12	1.0877E+08

Detailed model information at time (H) = 96.0000

EAB Doses:

Time (h) = 96.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	2.9937E-07	8.1025E-53	5.1246E-07	2.9937E-07
Accumulated dose (rem)	3.3003E-02	1.1449E+01	4.9264E-02	3.9106E-01

LPZ Doses:

Time (h) = 96.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	4.8155E-09	1.3033E-54	8.2431E-09	4.8155E-09
Accumulated dose (rem)	4.0777E-03	1.4147E+00	6.0867E-03	4.8319E-02

Control Room Doses:

Time (h) = 96.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	1.3783E-05	1.9229E-49	7.9875E-04	1.3783E-05
Accumulated dose (rem)	9.6400E-04	8.3714E+00	5.0103E-02	2.6277E-01

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) = 96.0000	Ci	kg	Atoms	Bq
I-131	2.9450E+04	2.3755E-04	1.0920E+21	1.0896E+15
I-132	1.5564E-08	1.5079E-18	6.8793E+06	5.7589E+02
I-133	2.6315E+03	2.3230E-06	1.0518E+19	9.7366E+13
I-135	2.0963E+00	5.9692E-10	2.6628E+15	7.7563E+10
Xe-133	6.1633E+03	3.2927E-05	1.4909E+20	2.2804E+14
Xe-135	7.2638E+01	2.8444E-08	1.2688E+17	2.6876E+12
Xe-131m	7.7051E+01	9.1989E-07	4.2288E+18	2.8509E+12
Xe-133m	2.6914E+02	5.9980E-07	2.7159E+18	9.9580E+12
Xe-135m	3.4499E-01	3.7873E-12	1.6895E+13	1.2765E+10

PCS Transport Group Inventory:

Time (h) = 96.0000	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)	1.5616E+20	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	2.3987E-04	0.0000E+00	0.0000E+00

Time (h) = 96.0000	Deposition Surfaces	Recirculating Filter
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

Time (h) = 96.0000	Pathway Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Environment Integral Nuclide Release:

Time (h) = 96.0000	Ci	kg	Atoms	Bq
Xe-133	7.2018E+00	3.8475E-08	1.7421E+17	2.6647E+11
Xe-135	8.5023E-02	3.3294E-11	1.4852E+14	3.1458E+09
Xe-131m	8.4166E-02	1.0048E-09	4.6193E+15	3.1141E+09
Xe-133m	3.0736E-01	6.8500E-10	3.1016E+15	1.1372E+10
Xe-135m	3.6150E-04	3.9685E-15	1.7703E+10	1.3375E+07

Environment Transport Group Inventory:

Present Release Integral

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Time (h) = 96.0000	Release	Rate/s	Release
Noble gases (atoms)	5.8793E+09	8.1657E+07	1.8208E+17
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	2.5126E-07

## Small Line Break Transport Group Inventory:

Time (h) = 96.0000	Pathway
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Unfiltered Makeup Transport Group Inventory:

Time (h) = 96.0000	Pathway
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) = 96.0000	Ci	kg	Atoms	Bq
I-131	1.5147E-02	1.2218E-10	5.6167E+14	5.6045E+08
I-133	1.3535E-03	1.1948E-12	5.4101E+12	5.0080E+07
I-135	1.0782E-06	3.0703E-16	1.3696E+09	3.9894E+04

## Control Room Filtered Makeup Transport Group Inventory:

Time (h) = 96.0000	Pathway
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	1.2338E-10

## Control Room Unfiltered Inleakage Transport Group Inventory:

Time (h) = 96.0000	Pathway
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Exhaust Transport Group Inventory:

Time (h) = 96.0000	Pathway
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

## Control Room Compartment Atmosphere Nuclide Inventory:

Time (h) = 96.0000	Ci	kg	Atoms	Bq
Xe-133	4.2579E-06	2.2747E-14	1.0300E+11	1.5754E+05
Xe-135	4.4808E-08	1.7546E-17	7.8271E+07	1.6579E+03
Xe-131m	2.3751E-07	2.8356E-15	1.3035E+10	8.7880E+03
Xe-133m	3.0388E-07	6.7724E-16	3.0665E+09	1.1244E+04
Xe-135m	1.3267E-07	1.4564E-18	6.4969E+06	4.9088E+03

## Control Room Transport Group Inventory:

Time (h) = 96.0000	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)	1.1919E+11	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00

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Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	0.0000E+00

Recirculating Filter Inventory

Time (h) = 96.0000	Ci	kg	Atoms	Bq
I-131	6.5767E-03	5.3049E-11	2.4387E+14	2.4334E+08
I-133	5.8767E-04	5.1877E-13	2.3490E+12	2.1744E+07
I-135	4.6815E-07	1.3330E-16	5.9465E+08	1.7321E+04

Deposition Recirculating

Time (h) = 96.0000	Surfaces	Filter
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	5.3568E-11

Control Room Unfiltered Makeup Transport Group Inventory:

Time (h) = 96.0000	Pathway
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) = 96.0000	Ci	kg	Atoms	Bq
I-131	1.5147E-02	1.2218E-10	5.6167E+14	5.6045E+08
I-133	1.3535E-03	1.1948E-12	5.4101E+12	5.0080E+07
I-135	1.0782E-06	3.0703E-16	1.3696E+09	3.9894E+04

Control Room Filtered Makeup Transport Group Inventory:

Time (h) = 96.0000	Pathway
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	1.2338E-10

Control Room Unfiltered Inleakage Transport Group Inventory:

Time (h) = 96.0000	Pathway
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

Time (h) = 96.0000	Pathway
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Total Filter Nuclide Inventory:

Time (h) = 96.0000	Ci	kg	Atoms	Bq
I-131	2.1724E-02	1.7523E-10	8.0554E+14	8.0379E+08
I-133	1.9412E-03	1.7136E-12	7.7591E+12	7.1824E+07
I-135	1.5464E-06	4.4033E-16	1.9642E+09	5.7216E+04

Detailed model information at time (H) = 720.0000

EAB Doses:

Time (h) = 720.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	1.3068E-09	4.0677-205	5.2404E-09	1.3068E-09

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Accumulated dose (rem) 3.3003E-02 1.1449E+01 4.9264E-02 3.9106E-01

LPZ Doses:

Time (h) = 720.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	6.1581E-12	1.9169-207	2.4695E-11	6.1581E-12
Accumulated dose (rem)	4.0777E-03	1.4147E+00	6.0867E-03	4.8319E-02

Control Room Doses:

Time (h) = 720.0000	Whole Body	Thyroid	Skin	TEDE
Delta dose (rem)	4.0111E-08	6.4357-202	5.4453E-06	4.0111E-08
Accumulated dose (rem)	9.6404E-04	8.3714E+00	5.0109E-02	2.6277E-01

PCS Compartment Atmosphere Nuclide Inventory:

Time (h) = 720.0000	Ci	kg	Atoms	Bq
I-131	3.1304E+03	2.5250E-05	1.1608E+20	1.1583E+14
I-133	2.4508E-06	2.1635E-15	9.7960E+09	9.0679E+04
Xe-133	2.2168E+02	1.1843E-06	5.3623E+18	8.2020E+12
Xe-131m	9.4320E+01	1.1261E-06	5.1765E+18	3.4898E+12
Xe-133m	8.4512E-02	1.8835E-10	8.5282E+14	3.1270E+09

PCS Transport Group Inventory:

Time (h) = 720.0000	Atmosphere	Sump	Overlying Pool
Noble gases (atoms)	1.0540E+19	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	2.5250E-05	0.0000E+00	0.0000E+00

Time (h) = 720.0000	Surfaces	Filter
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00

Small Line Break Transport Group Inventory:

Time (h) = 720.0000	Pathway
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Environment Integral Nuclide Release:

Time (h) = 720.0000	Ci	kg	Atoms	Bq
Xe-131m	9.9616E-02	1.1893E-09	5.4672E+15	3.6858E+09

Environment Transport Group Inventory:

Time (h) = 720.0000	Present Release	Release Rate/s	Integral Release
Noble gases (atoms)	6.8319E+07	9.4887E+05	1.1680E+16
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	2.6449E-08

Small Line Break Transport Group Inventory:

Time (h) = 720.0000	Pathway
	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Unfiltered Makeup Transport Group Inventory:



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	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) = 720.0000	Ci	kg	Atoms	Bq
I-131	1.6101E-03	1.2987E-11	5.9704E+13	5.9574E+07

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	1.2987E-11

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Compartment Atmosphere Nuclide Inventory:

Time (h) = 720.0000	Ci	kg	Atoms	Bq
Xe-131m	2.5247E-08	3.0141E-16	1.3856E+09	9.3413E+02

Control Room Transport Group Inventory:

			Overlying
Time (h) = 720.0000	Atmosphere	Sump	Pool
Noble gases (atoms)	1.3856E+09	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	0.0000E+00	0.0000E+00

Recirculating Filter Inventory

Time (h) = 720.0000	Ci	kg	Atoms	Bq
I-131	6.9908E-04	5.6389E-12	2.5922E+13	2.5866E+07

Deposition Recirculating

	Surfaces	Filter
Time (h) = 720.0000		
Noble gases (atoms)	0.0000E+00	0.0000E+00
Elemental I (atoms)	0.0000E+00	0.0000E+00
Organic I (atoms)	0.0000E+00	0.0000E+00
Aerosols (kg)	0.0000E+00	5.6389E-12

Control Room Unfiltered Makeup Transport Group Inventory:

	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

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Filter Pathway Nuclide Inventory for Control Room Filtered Makeup

Time (h) = 720.0000	Ci	kg	Atoms	Bq
I-131	1.6101E-03	1.2987E-11	5.9704E+13	5.9574E+07

Control Room Filtered Makeup Transport Group Inventory:

	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	1.2987E-11

Control Room Unfiltered Inleakage Transport Group Inventory:

	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Exhaust Transport Group Inventory:

	Pathway
Time (h) = 720.0000	Filter
Noble gases (atoms)	0.0000E+00
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	0.0000E+00

Control Room Total Filter Nuclide Inventory:

Time (h) = 720.0000	Ci	kg	Atoms	Bq
I-131	2.3092E-03	1.8626E-11	8.5626E+13	8.5440E+07

-----  
Transport Group Totals in Model:  
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Noble Gases (atoms)	1.0551E+19
Elemental I (atoms)	0.0000E+00
Organic I (atoms)	0.0000E+00
Aerosols (kg)	2.5277E-05

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36005

#####  
I-131 Summary  
#####

	PCS	Environment	Control Room
Time (hr)	I-131 (Curies)	I-131 (Curies)	I-131 (Curies)
0.001	0.0000E+00	0.0000E+00	0.0000E+00
0.010	0.0000E+00	0.0000E+00	0.0000E+00
0.280	1.4018E+03	3.2461E+00	5.6082E-03
0.333	1.6774E+03	4.6520E+00	7.8892E-03
0.600	3.0512E+03	1.5467E+01	4.0412E-03
0.860	4.3819E+03	3.2029E+01	4.0029E-03
1.000	5.0950E+03	4.3392E+01	4.4685E-03
1.260	6.4385E+03	4.3353E+01	1.2600E-03
1.520	7.7794E+03	4.3313E+01	3.5527E-04
1.780	9.1179E+03	4.3273E+01	1.0017E-04
2.000	1.0248E+04	4.3239E+01	3.4319E-05
2.260	1.1582E+04	4.3198E+01	9.6768E-06
2.520	1.2914E+04	4.3158E+01	2.7285E-06
2.780	1.4242E+04	4.3118E+01	7.6935E-07
3.040	1.5569E+04	4.3078E+01	2.1693E-07
3.300	1.6893E+04	4.3037E+01	6.1167E-08
3.560	1.8214E+04	4.2997E+01	1.7247E-08
3.820	1.9533E+04	4.2957E+01	4.8631E-09

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4.080	2.0849E+04	4.2917E+01	1.3712E-09
4.340	2.2163E+04	4.2877E+01	3.8664E-10
4.600	2.3475E+04	4.2837E+01	1.0902E-10
4.860	2.4784E+04	4.2797E+01	3.0740E-11
5.120	2.6090E+04	4.2757E+01	8.6677E-12
5.380	2.7394E+04	4.2717E+01	2.4440E-12
5.640	2.8696E+04	4.2677E+01	6.8912E-13
5.900	2.9995E+04	4.2637E+01	1.9431E-13
6.160	3.1292E+04	4.2598E+01	5.4789E-14
6.420	3.2586E+04	4.2558E+01	1.5449E-14
6.680	3.3878E+04	4.2518E+01	4.3560E-15
6.940	3.5167E+04	4.2478E+01	1.2282E-15
7.200	3.6454E+04	4.2439E+01	3.4632E-16
7.460	3.7739E+04	4.2399E+01	9.7651E-17
7.720	3.9021E+04	4.2359E+01	2.7534E-17
7.980	4.0300E+04	4.2320E+01	7.7638E-18
8.000	4.0399E+04	4.2317E+01	7.0434E-18
8.260	4.0361E+04	4.2277E+01	1.9860E-18
8.520	4.0323E+04	4.2238E+01	5.5998E-19
8.780	4.0286E+04	4.2198E+01	1.5790E-19
9.040	4.0248E+04	4.2159E+01	4.4521E-20
9.300	4.0210E+04	4.2120E+01	1.2554E-20
9.560	4.0173E+04	4.2080E+01	3.5397E-21
9.820	4.0135E+04	4.2041E+01	9.9807E-22
10.080	4.0098E+04	4.2002E+01	2.8142E-22
24.000	3.8142E+04	3.9953E+01	1.0322E-51
96.000	2.9450E+04	3.0848E+01	5.7639E-204
720.000	3.1304E+03	3.2790E+00	0.0000E+00

#####  
 Cumulative Dose Summary  
 #####

Time (hr)	EAB		LPZ		Control Room	
	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)
0.001	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.010	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.280	8.6005E-01	2.9844E-02	1.0627E-01	3.6876E-03	9.0172E-01	2.8339E-02
0.333	1.2321E+00	4.2699E-02	1.5225E-01	5.2760E-03	1.5241E+00	4.7890E-02
0.600	4.0902E+00	1.4086E-01	5.0540E-01	1.7405E-02	4.0279E+00	1.2648E-01
0.860	8.4571E+00	2.8965E-01	1.0450E+00	3.5790E-02	5.7712E+00	1.8113E-01
1.000	1.1449E+01	3.9103E-01	1.4146E+00	4.8317E-02	6.7908E+00	2.1307E-01
1.260	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	7.9269E+00	2.4864E-01
1.520	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.2464E+00	2.5864E-01
1.780	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3363E+00	2.6145E-01
2.000	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3594E+00	2.6218E-01
2.260	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3680E+00	2.6246E-01
2.520	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3705E+00	2.6254E-01
2.780	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3712E+00	2.6257E-01
3.040	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6258E-01
3.300	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6259E-01
3.560	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6259E-01
3.820	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6260E-01
4.080	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6260E-01
4.340	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6261E-01
4.600	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6261E-01
4.860	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6262E-01
5.120	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6262E-01
5.380	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6262E-01
5.640	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6263E-01
5.900	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6263E-01
6.160	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6264E-01
6.420	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6264E-01
6.680	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6264E-01
6.940	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6265E-01
7.200	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6265E-01
7.460	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6266E-01
7.720	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6266E-01
7.980	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6266E-01
8.000	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6266E-01
8.260	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6267E-01
8.520	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6267E-01

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8.780	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6267E-01
9.040	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6267E-01
9.300	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6268E-01
9.560	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6268E-01
9.820	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6268E-01
10.080	1.1449E+01	3.9105E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6269E-01
24.000	1.1449E+01	3.9106E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6276E-01
96.000	1.1449E+01	3.9106E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6277E-01
720.000	1.1449E+01	3.9106E-01	1.4147E+00	4.8319E-02	8.3714E+00	2.6277E-01

#####  
Worst Two-Hour Dose  
(Provided for Dose Location 1)  
#####

EAB

Time (hr)	Whole Body (rem)	Thyroid (rem)	Skin (rem)	TEDE (rem)
0.0	3.3000E-02	1.1449E+01	4.9259E-02	3.9105E-01

#####  
30 Day Control Room Skin Dose  
#####

Control Room

Time (hr)	Skin (rem)
720.0	5.0109E-02

Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

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**Attachment 6 RADTRAD-NAI Dose Conversion Factor File**

NAI-1101-001rev0.DCF

Includes 107 istopes

9 ORGANS DEFINED IN THIS FILE:

GONADS  
BREAST  
LUNGS  
RED MARR  
BONE SUR  
THYROID  
REMAINDER  
EFFECTIVE  
SKIN(FGR)

107 NUCLIDES DEFINED IN THIS FILE:

Co-58 Y  
Co-60 Y  
Kr-85  
Kr-85m  
Kr-87  
Kr-88  
Rb-86 D  
Sr-89 Y  
Sr-90 Y  
Sr-91 Y  
Sr-92 Y  
Y-90 Y  
Y-91 Y  
Y-92 Y  
Y-93 Y  
Zr-95 D  
Zr-97 Y  
Nb-95 Y  
Mo-99 Y  
Tc-99m D  
Ru-103 Y  
Ru-105 Y  
Ru-106 Y  
Rh-105 Y  
Sb-127 W  
Sb-129 W  
Te-127 W  
Te-127m W  
Te-129 D  
Te-129m W  
Te-131m W  
Te-132 W  
I-131 D  
I-132 D  
I-133 D  
I-134 D  
I-135 D  
Xe-133  
Xe-135  
Cs-134 D  
Cs-136 D  
Cs-137 D  
Ba-139 D  
Ba-140 D  
La-140 W  
La-141 D  
La-142 D  
Ce-141 Y  
Ce-143 Y  
Ce-144 Y  
Pr-143 Y  
Nd-147 Y  
Np-239 W  
Pu-238 W  
Pu-239 W  
Pu-240 W  
Pu-241 W



## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

GONADS	1.170E-16	8.121E-14	1.704E-12	2.820E-18	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.340E-16	7.891E-14	1.656E-12	2.740E-18	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.140E-16	7.056E-14	1.481E-12	2.450E-18	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.090E-16	6.998E-14	1.469E-12	2.430E-18	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	2.200E-16	1.287E-13	2.702E-12	4.470E-18	-1.000E+00	0.000E+00	0.000E+00
THYROID	1.180E-16	7.459E-14	1.565E-12	2.590E-18	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	1.090E-16	6.941E-14	1.457E-12	2.410E-18	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.190E-16	7.603E-14	1.596E-12	2.640E-18	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	1.320E-14	2.304E-11	4.835E-10	8.000E-16	-1.000E+00	0.000E+00	0.000E+00
Kr-85m							
GONADS	7.310E-15	2.594E-12	3.653E-12	1.570E-16	-1.000E+00	0.000E+00	0.000E+00
BREAST	8.410E-15	2.527E-12	3.560E-12	1.530E-16	-1.000E+00	0.000E+00	0.000E+00
LUNGS	7.040E-15	2.379E-12	3.351E-12	1.440E-16	-1.000E+00	0.000E+00	0.000E+00
RED MARR	6.430E-15	2.346E-12	3.304E-12	1.420E-16	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	1.880E-14	5.286E-12	7.446E-12	3.200E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	7.330E-15	2.395E-12	3.374E-12	1.450E-16	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	6.640E-15	2.313E-12	3.257E-12	1.400E-16	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	7.480E-15	2.511E-12	3.537E-12	1.520E-16	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	2.240E-14	2.247E-11	3.164E-11	1.360E-15	-1.000E+00	0.000E+00	0.000E+00
Kr-87							
GONADS	4.000E-14	4.962E-12	5.026E-12	7.610E-16	-1.000E+00	0.000E+00	0.000E+00
BREAST	4.500E-14	4.740E-12	4.802E-12	7.270E-16	-1.000E+00	0.000E+00	0.000E+00
LUNGS	4.040E-14	4.603E-12	4.663E-12	7.060E-16	-1.000E+00	0.000E+00	0.000E+00
RED MARR	4.000E-14	4.708E-12	4.769E-12	7.220E-16	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	6.020E-14	6.514E-12	6.598E-12	9.990E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	4.130E-14	4.473E-12	4.531E-12	6.860E-16	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	3.910E-14	4.590E-12	4.650E-12	7.040E-16	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	4.120E-14	4.773E-12	4.835E-12	7.320E-16	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	1.370E-13	8.802E-11	8.916E-11	1.350E-14	-1.000E+00	0.000E+00	0.000E+00
Kr-88							
GONADS	9.900E-14	2.278E-11	2.655E-11	1.800E-15	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.110E-13	2.177E-11	2.537E-11	1.720E-15	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.010E-13	2.139E-11	2.493E-11	1.690E-15	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.000E-13	2.190E-11	2.552E-11	1.730E-15	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	1.390E-13	2.886E-11	3.363E-11	2.280E-15	-1.000E+00	0.000E+00	0.000E+00
THYROID	1.030E-13	2.012E-11	2.345E-11	1.590E-15	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	9.790E-14	2.139E-11	2.493E-11	1.690E-15	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.020E-13	2.202E-11	2.567E-11	1.740E-15	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	1.350E-13	5.607E-11	6.534E-11	4.430E-15	-1.000E+00	0.000E+00	0.000E+00
Rb-86							
GONADS	4.710E-15	2.788E-12	5.187E-11	9.740E-17	-1.000E+00	1.340E-09	2.150E-09
BREAST	5.340E-15	2.662E-12	4.953E-11	9.300E-17	-1.000E+00	1.330E-09	2.140E-09
LUNGS	4.710E-15	2.553E-12	4.750E-11	8.920E-17	-1.000E+00	3.300E-09	2.140E-09
RED MARR	4.640E-15	2.619E-12	4.873E-11	9.150E-17	-1.000E+00	2.320E-09	3.720E-09
BONE SUR	7.050E-15	3.635E-12	6.764E-11	1.270E-16	-1.000E+00	4.270E-09	6.860E-09
THYROID	4.840E-15	2.599E-12	4.836E-11	9.080E-17	-1.000E+00	1.330E-09	2.140E-09
REMAINDER	4.520E-15	2.542E-12	4.729E-11	8.880E-17	-1.000E+00	1.380E-09	2.330E-09
EFFECTIVE	4.810E-15	2.665E-12	4.958E-11	9.310E-17	-1.000E+00	1.790E-09	2.530E-09
SKIN (FGR)	4.850E-14	2.210E-10	4.111E-09	7.720E-15	-1.000E+00	0.000E+00	0.000E+00
Sr-89							
GONADS	7.730E-17	7.155E-14	1.436E-12	2.490E-18	-1.000E+00	7.950E-12	8.050E-12
BREAST	9.080E-17	7.212E-14	1.447E-12	2.510E-18	-1.000E+00	7.960E-12	7.980E-12
LUNGS	7.080E-17	5.689E-14	1.142E-12	1.980E-18	-1.000E+00	8.350E-08	7.970E-12
RED MARR	6.390E-17	5.345E-14	1.073E-12	1.860E-18	-1.000E+00	1.070E-10	1.080E-10
BONE SUR	1.940E-16	1.560E-13	3.131E-12	5.430E-18	-1.000E+00	1.590E-10	1.610E-10
THYROID	7.600E-17	6.063E-14	1.217E-12	2.110E-18	-1.000E+00	7.960E-12	7.970E-12
REMAINDER	6.710E-17	5.603E-14	1.124E-12	1.950E-18	-1.000E+00	3.970E-09	8.250E-09
EFFECTIVE	7.730E-17	6.523E-14	1.309E-12	2.270E-18	-1.000E+00	1.120E-08	2.500E-09
SKIN (FGR)	3.690E-14	1.914E-10	3.841E-09	6.660E-15	-1.000E+00	0.000E+00	0.000E+00
Sr-90							
GONADS	7.780E-18	9.590E-15	2.014E-13	3.330E-19	-1.000E+00	2.690E-10	5.040E-11
BREAST	9.490E-18	1.008E-14	2.116E-13	3.500E-19	-1.000E+00	2.690E-10	5.040E-11
LUNGS	6.440E-18	6.307E-15	1.324E-13	2.190E-19	-1.000E+00	2.860E-06	5.040E-11
RED MARR	5.440E-18	5.558E-15	1.167E-13	1.930E-19	-1.000E+00	3.280E-08	6.450E-09
BONE SUR	2.280E-17	2.393E-14	5.025E-13	8.310E-19	-1.000E+00	7.090E-08	1.390E-08
THYROID	7.330E-18	7.171E-15	1.506E-13	2.490E-19	-1.000E+00	2.690E-10	5.040E-11
REMAINDER	6.110E-18	6.422E-15	1.348E-13	2.230E-19	-1.000E+00	5.730E-09	6.700E-09
EFFECTIVE	7.530E-18	8.179E-15	1.717E-13	2.840E-19	-1.000E+00	3.510E-07	3.230E-09
SKIN (FGR)	9.200E-15	4.032E-12	8.465E-11	1.400E-16	-1.000E+00	0.000E+00	0.000E+00
Sr-91							
GONADS	3.380E-14	2.155E-11	5.062E-11	1.026E-15	-1.000E+00	5.650E-11	2.520E-10
BREAST	3.830E-14	2.059E-11	4.838E-11	9.806E-16	-1.000E+00	1.740E-11	3.676E-11
LUNGS	3.370E-14	1.970E-11	4.626E-11	9.376E-16	-1.000E+00	2.130E-09	1.055E-11

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

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RED MARR	3.310E-14	2.011E-11	4.722E-11	9.570E-16	-1.000E+00	2.230E-11	5.659E-11
BONE SUR	5.200E-14	2.852E-11	6.709E-11	1.360E-15	-1.000E+00	1.270E-11	2.070E-11
THYROID	3.470E-14	2.035E-11	4.782E-11	9.693E-16	-1.000E+00	9.640E-12	1.968E-12
REMAINDER	3.240E-14	1.948E-11	4.573E-11	9.268E-16	-1.000E+00	5.780E-10	2.557E-09
EFFECTIVE	3.450E-14	2.057E-11	4.832E-11	9.793E-16	-1.000E+00	4.490E-10	8.455E-10
SKIN (FGR)	8.140E-14	1.748E-10	3.987E-10	8.080E-15	-1.000E+00	0.000E+00	0.000E+00
Sr-92							
GONADS	6.610E-14	1.593E-11	1.830E-11	1.300E-15	-1.000E+00	1.020E-11	8.180E-11
BREAST	7.480E-14	1.520E-11	1.745E-11	1.240E-15	-1.000E+00	6.490E-12	1.700E-11
LUNGS	6.670E-14	1.483E-11	1.703E-11	1.210E-15	-1.000E+00	1.050E-09	7.220E-12
RED MARR	6.620E-14	1.520E-11	1.745E-11	1.240E-15	-1.000E+00	6.980E-12	2.290E-11
BONE SUR	9.490E-14	2.010E-11	2.308E-11	1.640E-15	-1.000E+00	4.360E-12	8.490E-12
THYROID	6.820E-14	1.446E-11	1.661E-11	1.180E-15	-1.000E+00	3.920E-12	1.300E-12
REMAINDER	6.450E-14	1.471E-11	1.689E-11	1.200E-15	-1.000E+00	2.900E-10	1.720E-09
EFFECTIVE	6.790E-14	1.532E-11	1.759E-11	1.250E-15	-1.000E+00	2.180E-10	5.430E-10
SKIN (FGR)	8.560E-14	2.280E-11	2.618E-11	1.860E-15	-1.000E+00	0.000E+00	0.000E+00
Y-90							
GONADS	1.890E-16	1.586E-13	1.601E-12	5.750E-18	-1.000E+00	5.170E-13	1.430E-14
BREAST	2.200E-16	1.578E-13	1.593E-12	5.720E-18	-1.000E+00	5.170E-13	1.270E-14
LUNGS	1.770E-16	1.313E-13	1.326E-12	4.760E-18	-1.000E+00	9.310E-09	1.260E-14
RED MARR	1.620E-16	1.261E-13	1.273E-12	4.570E-18	-1.000E+00	1.520E-11	3.700E-13
BONE SUR	4.440E-16	3.228E-13	3.259E-12	1.170E-17	-1.000E+00	1.510E-11	3.670E-13
THYROID	1.870E-16	1.385E-13	1.398E-12	5.020E-18	-1.000E+00	5.170E-13	1.260E-14
REMAINDER	1.680E-16	1.291E-13	1.303E-12	4.680E-18	-1.000E+00	3.870E-09	9.680E-09
EFFECTIVE	1.900E-16	1.468E-13	1.482E-12	5.320E-18	-1.000E+00	2.280E-09	2.910E-09
SKIN (FGR)	6.240E-14	2.897E-10	2.924E-09	1.050E-14	-1.000E+00	0.000E+00	0.000E+00
Y-91							
GONADS	2.560E-16	1.756E-13	3.546E-12	6.110E-18	-1.000E+00	8.200E-12	3.540E-12
BREAST	2.930E-16	1.713E-13	3.459E-12	5.960E-18	-1.000E+00	8.920E-12	5.540E-13
LUNGS	2.500E-16	1.526E-13	3.082E-12	5.310E-18	-1.000E+00	9.870E-08	2.020E-13
RED MARR	2.410E-16	1.521E-13	3.070E-12	5.290E-18	-1.000E+00	3.190E-10	6.590E-12
BONE SUR	4.560E-16	2.903E-13	5.862E-12	1.010E-17	-1.000E+00	3.180E-10	6.130E-12
THYROID	2.600E-16	1.564E-13	3.157E-12	5.440E-18	-1.000E+00	8.500E-12	1.290E-13
REMAINDER	2.390E-16	1.509E-13	3.047E-12	5.250E-18	-1.000E+00	4.200E-09	8.570E-09
EFFECTIVE	2.600E-16	1.650E-13	3.332E-12	5.740E-18	-1.000E+00	1.320E-08	2.570E-09
SKIN (FGR)	3.850E-14	1.989E-10	4.016E-09	6.920E-15	-1.000E+00	0.000E+00	0.000E+00
Y-92							
GONADS	1.270E-14	3.855E-12	4.872E-12	2.650E-16	-1.000E+00	2.610E-12	1.960E-11
BREAST	1.440E-14	3.680E-12	4.652E-12	2.530E-16	-1.000E+00	1.500E-12	3.550E-12
LUNGS	1.270E-14	3.535E-12	4.468E-12	2.430E-16	-1.000E+00	1.240E-09	1.390E-12
RED MARR	1.250E-14	3.608E-12	4.560E-12	2.480E-16	-1.000E+00	2.070E-12	4.910E-12
BONE SUR	1.950E-14	5.091E-12	6.435E-12	3.500E-16	-1.000E+00	1.510E-12	1.750E-12
THYROID	1.300E-14	3.579E-12	4.523E-12	2.460E-16	-1.000E+00	1.050E-12	1.770E-13
REMAINDER	1.220E-14	3.506E-12	4.431E-12	2.410E-16	-1.000E+00	2.030E-10	1.700E-09
EFFECTIVE	1.300E-14	3.680E-12	4.652E-12	2.530E-16	-1.000E+00	2.110E-10	5.150E-10
SKIN (FGR)	1.140E-13	2.022E-10	2.556E-10	1.390E-14	-1.000E+00	0.000E+00	0.000E+00
Y-93							
GONADS	4.670E-15	2.108E-12	4.989E-12	9.510E-17	-1.000E+00	5.310E-12	2.200E-11
BREAST	5.300E-15	2.026E-12	4.794E-12	9.140E-17	-1.000E+00	1.740E-12	3.130E-12
LUNGS	4.680E-15	1.937E-12	4.585E-12	8.740E-17	-1.000E+00	2.520E-09	8.670E-13
RED MARR	4.580E-15	1.972E-12	4.669E-12	8.900E-17	-1.000E+00	4.040E-12	4.930E-12
BONE SUR	7.580E-15	2.948E-12	6.977E-12	1.330E-16	-1.000E+00	3.140E-12	1.730E-12
THYROID	4.790E-15	1.908E-12	4.516E-12	8.610E-17	-1.000E+00	9.260E-13	1.260E-13
REMAINDER	4.510E-15	1.919E-12	4.543E-12	8.660E-17	-1.000E+00	9.250E-10	4.090E-09
EFFECTIVE	4.800E-15	2.021E-12	4.784E-12	9.120E-17	-1.000E+00	5.820E-10	1.230E-09
SKIN (FGR)	8.500E-14	2.726E-10	6.452E-10	1.230E-14	-1.000E+00	0.000E+00	0.000E+00
Zr-95							
GONADS	3.530E-14	2.182E-11	4.421E-10	7.590E-16	-1.000E+00	1.880E-09	8.160E-10
BREAST	4.010E-14	2.084E-11	4.223E-10	7.250E-16	-1.000E+00	1.910E-09	1.050E-10
LUNGS	3.510E-14	1.989E-11	4.030E-10	6.920E-16	-1.000E+00	2.170E-09	2.340E-11
RED MARR	3.430E-14	2.030E-11	4.112E-10	7.060E-16	-1.000E+00	1.300E-08	2.140E-10
BONE SUR	5.620E-14	2.875E-11	5.824E-10	1.000E-15	-1.000E+00	1.030E-07	4.860E-10
THYROID	3.610E-14	2.076E-11	4.205E-10	7.220E-16	-1.000E+00	1.440E-09	8.270E-12
REMAINDER	3.360E-14	1.963E-11	3.978E-10	6.830E-16	-1.000E+00	2.280E-09	2.530E-09
EFFECTIVE	3.600E-14	2.078E-11	4.211E-10	7.230E-16	-1.000E+00	6.390E-09	1.020E-09
SKIN (FGR)	4.500E-14	2.561E-11	5.190E-10	8.910E-16	-1.000E+00	0.000E+00	0.000E+00
Zr-97							
GONADS	8.800E-15	2.179E-11	7.799E-11	9.253E-16	-1.000E+00	1.840E-10	6.228E-10
BREAST	9.990E-15	2.083E-11	7.455E-11	8.846E-16	-1.000E+00	4.700E-11	8.137E-11
LUNGS	8.810E-15	1.992E-11	7.127E-11	8.456E-16	-1.000E+00	4.100E-09	1.770E-11
RED MARR	8.640E-15	2.034E-11	7.279E-11	8.634E-16	-1.000E+00	6.370E-11	1.302E-10
BONE SUR	1.380E-14	2.881E-11	1.031E-10	1.224E-15	-1.000E+00	3.500E-11	4.558E-11
THYROID	9.030E-15	2.061E-11	7.377E-11	8.755E-16	-1.000E+00	2.310E-11	2.671E-12



## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

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REMAINDER	8.480E-15	1.966E-11	7.035E-11	8.345E-16	-1.000E+00	2.040E-09	6.990E-09
EFFECTIVE	9.020E-15	2.078E-11	7.438E-11	8.824E-16	-1.000E+00	1.170E-09	2.283E-09
SKIN (FGR)	5.550E-14	2.281E-10	8.148E-10	9.587E-15	-1.000E+00	0.000E+00	0.000E+00
Nb-95							
GONADS	3.660E-14	2.253E-11	4.435E-10	7.850E-16	-1.000E+00	4.320E-10	8.050E-10
BREAST	4.160E-14	2.150E-11	4.231E-10	7.490E-16	-1.000E+00	4.070E-10	1.070E-10
LUNGS	3.650E-14	2.055E-11	4.045E-10	7.160E-16	-1.000E+00	8.320E-09	2.740E-11
RED MARR	3.560E-14	2.101E-11	4.135E-10	7.320E-16	-1.000E+00	4.420E-10	1.990E-10
BONE SUR	5.790E-14	2.957E-11	5.819E-10	1.030E-15	-1.000E+00	5.130E-10	2.940E-10
THYROID	3.750E-14	2.144E-11	4.220E-10	7.470E-16	-1.000E+00	3.580E-10	1.180E-11
REMAINDER	3.490E-14	2.032E-11	4.000E-10	7.080E-16	-1.000E+00	1.070E-09	1.470E-09
EFFECTIVE	3.740E-14	2.147E-11	4.226E-10	7.480E-16	-1.000E+00	1.570E-09	6.950E-10
SKIN (FGR)	4.300E-14	2.598E-11	5.112E-10	9.050E-16	-1.000E+00	0.000E+00	0.000E+00
Mo-99							
GONADS	7.130E-15	4.282E-12	4.403E-11	1.550E-16	-1.000E+00	9.510E-11	2.180E-10
BREAST	8.130E-15	4.116E-12	4.233E-11	1.490E-16	-1.000E+00	2.750E-11	3.430E-11
LUNGS	7.060E-15	3.867E-12	3.977E-11	1.400E-16	-1.000E+00	4.290E-09	1.510E-11
RED MARR	6.820E-15	3.923E-12	4.034E-11	1.420E-16	-1.000E+00	5.240E-11	8.320E-11
BONE SUR	1.240E-14	6.105E-12	6.278E-11	2.210E-16	-1.000E+00	4.130E-11	6.320E-11
THYROID	7.270E-15	4.033E-12	4.147E-11	1.460E-16	-1.000E+00	1.520E-11	1.030E-11
REMAINDER	6.740E-15	3.812E-12	3.920E-11	1.380E-16	-1.000E+00	1.740E-09	4.280E-09
EFFECTIVE	7.280E-15	4.061E-12	4.176E-11	1.470E-16	-1.000E+00	1.070E-09	1.360E-09
SKIN (FGR)	3.140E-14	1.039E-10	1.068E-09	3.760E-15	-1.000E+00	0.000E+00	0.000E+00
Tc-99m							
GONADS	5.750E-15	2.334E-12	3.877E-12	1.240E-16	-1.000E+00	2.770E-12	9.750E-12
BREAST	6.650E-15	2.258E-12	3.752E-12	1.200E-16	-1.000E+00	2.150E-12	3.570E-12
LUNGS	5.490E-15	2.127E-12	3.533E-12	1.130E-16	-1.000E+00	2.280E-11	3.140E-12
RED MARR	4.910E-15	2.070E-12	3.439E-12	1.100E-16	-1.000E+00	3.360E-12	6.290E-12
BONE SUR	1.630E-14	5.383E-12	8.942E-12	2.860E-16	-1.000E+00	2.620E-12	4.060E-12
THYROID	5.750E-15	2.145E-12	3.564E-12	1.140E-16	-1.000E+00	5.010E-11	8.460E-11
REMAINDER	5.150E-15	2.070E-12	3.439E-12	1.100E-16	-1.000E+00	1.020E-11	3.340E-11
EFFECTIVE	5.890E-15	2.277E-12	3.783E-12	1.210E-16	-1.000E+00	8.800E-12	1.680E-11
SKIN (FGR)	7.140E-15	2.710E-12	4.502E-12	1.440E-16	-1.000E+00	0.000E+00	0.000E+00
Ru-103							
GONADS	2.190E-14	1.404E-11	2.783E-10	4.892E-16	-1.000E+00	3.070E-10	5.720E-10
BREAST	2.510E-14	1.350E-11	2.677E-10	4.705E-16	-1.000E+00	3.110E-10	1.200E-10
LUNGS	2.180E-14	1.273E-11	2.522E-10	4.432E-16	-1.000E+00	1.560E-08	7.310E-11
RED MARR	2.100E-14	1.287E-11	2.551E-10	4.483E-16	-1.000E+00	3.190E-10	1.660E-10
BONE SUR	3.890E-14	1.958E-11	3.882E-10	6.823E-16	-1.000E+00	2.370E-10	9.631E-11
THYROID	2.240E-14	1.331E-11	2.639E-10	4.638E-16	-1.000E+00	2.570E-10	6.250E-11
REMAINDER	2.080E-14	1.248E-11	2.472E-10	4.346E-16	-1.000E+00	1.250E-09	2.110E-09
EFFECTIVE	2.250E-14	1.332E-11	2.641E-10	4.642E-16	-1.000E+00	2.420E-09	8.271E-10
SKIN (FGR)	2.770E-14	1.785E-11	3.543E-10	6.229E-16	-1.000E+00	0.000E+00	0.000E+00
Ru-105							
GONADS	3.720E-14	1.327E-11	1.861E-11	8.070E-16	-1.000E+00	1.590E-11	9.670E-11
BREAST	4.240E-14	1.271E-11	1.783E-11	7.730E-16	-1.000E+00	6.610E-12	1.590E-11
LUNGS	3.700E-14	1.210E-11	1.697E-11	7.360E-16	-1.000E+00	5.730E-10	6.210E-12
RED MARR	3.590E-14	1.230E-11	1.725E-11	7.480E-16	-1.000E+00	7.700E-12	2.350E-11
BONE SUR	6.280E-14	1.809E-11	2.537E-11	1.100E-15	-1.000E+00	4.620E-12	8.890E-12
THYROID	3.800E-14	1.260E-11	1.766E-11	7.660E-16	-1.000E+00	4.150E-12	1.820E-12
REMAINDER	3.540E-14	1.189E-11	1.667E-11	7.230E-16	-1.000E+00	1.610E-10	8.540E-10
EFFECTIVE	3.810E-14	1.265E-11	1.773E-11	7.690E-16	-1.000E+00	1.230E-10	2.870E-10
SKIN (FGR)	6.730E-14	7.368E-11	1.033E-10	4.480E-15	-1.000E+00	0.000E+00	0.000E+00
Ru-106							
GONADS	0.000E+00	6.411E-12	1.340E-10	2.230E-16	-1.000E+00	1.300E-09	1.640E-09
BREAST	0.000E+00	6.152E-12	1.286E-10	2.140E-16	-1.000E+00	1.780E-09	1.440E-09
LUNGS	0.000E+00	5.836E-12	1.220E-10	2.030E-16	-1.000E+00	1.040E-06	1.420E-09
RED MARR	0.000E+00	5.893E-12	1.232E-10	2.050E-16	-1.000E+00	1.760E-09	1.460E-09
BONE SUR	0.000E+00	8.883E-12	1.856E-10	3.090E-16	-1.000E+00	1.610E-09	1.430E-09
THYROID	0.000E+00	6.066E-12	1.268E-10	2.110E-16	-1.000E+00	1.720E-09	1.410E-09
REMAINDER	0.000E+00	5.721E-12	1.196E-10	1.990E-16	-1.000E+00	1.200E-08	2.110E-08
EFFECTIVE	0.000E+00	6.095E-12	1.274E-10	2.120E-16	-1.000E+00	1.290E-07	7.400E-09
SKIN (FGR)	0.000E+00	4.082E-10	8.531E-09	1.420E-14	-1.000E+00	0.000E+00	0.000E+00
Rh-105							
GONADS	3.640E-15	2.127E-12	1.411E-11	7.980E-17	-1.000E+00	2.110E-11	5.800E-11
BREAST	4.160E-15	2.063E-12	1.369E-11	7.740E-17	-1.000E+00	5.610E-12	8.970E-12
LUNGS	3.570E-15	1.935E-12	1.284E-11	7.260E-17	-1.000E+00	9.580E-10	3.860E-12
RED MARR	3.380E-15	1.946E-12	1.291E-11	7.300E-17	-1.000E+00	7.770E-12	1.470E-11
BONE SUR	7.530E-15	3.332E-12	2.210E-11	1.250E-16	-1.000E+00	4.460E-12	6.750E-12
THYROID	3.680E-15	1.983E-12	1.316E-11	7.440E-17	-1.000E+00	2.880E-12	2.910E-12
REMAINDER	3.390E-15	1.885E-12	1.250E-11	7.070E-17	-1.000E+00	4.530E-10	1.270E-09
EFFECTIVE	3.720E-15	2.031E-12	1.347E-11	7.620E-17	-1.000E+00	2.580E-10	3.990E-10
SKIN (FGR)	1.070E-14	4.691E-12	3.112E-11	1.760E-16	-1.000E+00	0.000E+00	0.000E+00

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

## Sb-127

GONADS	3.260E-14	1.985E-11	2.441E-10	7.100E-16	-1.000E+00	2.520E-10	6.140E-10
BREAST	3.720E-14	1.904E-11	2.341E-10	6.810E-16	-1.000E+00	9.120E-11	7.600E-11
LUNGS	3.240E-14	1.809E-11	2.224E-10	6.470E-16	-1.000E+00	6.940E-09	1.570E-11
RED MARR	3.140E-14	1.834E-11	2.255E-10	6.560E-16	-1.000E+00	1.610E-10	1.330E-10
BONE SUR	5.520E-14	2.720E-11	3.345E-10	9.730E-16	-1.000E+00	1.340E-10	5.240E-11
THYROID	3.330E-14	1.884E-11	2.317E-10	6.740E-16	-1.000E+00	6.150E-11	4.640E-12
REMAINDER	3.090E-14	1.775E-11	2.183E-10	6.350E-16	-1.000E+00	2.330E-09	5.870E-09
EFFECTIVE	3.330E-14	1.890E-11	2.324E-10	6.760E-16	-1.000E+00	1.630E-09	1.950E-09
SKIN (FGR)	5.580E-14	7.967E-11	9.799E-10	2.850E-15	-1.000E+00	0.000E+00	0.000E+00

## Sb-129

GONADS	6.970E-14	2.336E-11	3.231E-11	1.440E-15	-1.000E+00	2.150E-11	1.510E-10
BREAST	7.910E-14	2.222E-11	3.074E-11	1.370E-15	-1.000E+00	1.280E-11	2.560E-11
LUNGS	6.980E-14	2.141E-11	2.962E-11	1.320E-15	-1.000E+00	8.980E-10	9.390E-12
RED MARR	6.860E-14	2.190E-11	3.029E-11	1.350E-15	-1.000E+00	1.700E-11	3.670E-11
BONE SUR	1.070E-13	3.033E-11	4.196E-11	1.870E-15	-1.000E+00	1.460E-11	1.340E-11
THYROID	7.160E-14	2.174E-11	3.007E-11	1.340E-15	-1.000E+00	9.720E-12	1.470E-12
REMAINDER	6.710E-14	2.125E-11	2.939E-11	1.310E-15	-1.000E+00	1.870E-10	1.450E-09
EFFECTIVE	7.140E-14	2.238E-11	3.096E-11	1.380E-15	-1.000E+00	1.740E-10	4.840E-10
SKIN (FGR)	1.050E-13	8.273E-11	1.144E-10	5.100E-15	-1.000E+00	0.000E+00	0.000E+00

## Te-127

GONADS	2.370E-16	1.191E-13	2.661E-13	5.480E-18	-1.000E+00	2.020E-12	4.020E-12
BREAST	2.730E-16	1.158E-13	2.588E-13	5.330E-18	-1.000E+00	1.880E-12	3.000E-12
LUNGS	2.320E-16	1.060E-13	2.370E-13	4.880E-18	-1.000E+00	4.270E-10	2.890E-12
RED MARR	2.210E-16	1.058E-13	2.365E-13	4.870E-18	-1.000E+00	4.090E-12	6.570E-12
BONE SUR	4.650E-16	1.862E-13	4.162E-13	8.570E-18	-1.000E+00	4.090E-12	6.460E-12
THYROID	2.400E-16	1.106E-13	2.472E-13	5.090E-18	-1.000E+00	1.840E-12	2.860E-12
REMAINDER	2.210E-16	1.036E-13	2.316E-13	4.770E-18	-1.000E+00	1.110E-10	6.130E-10
EFFECTIVE	2.420E-16	1.125E-13	2.515E-13	5.180E-18	-1.000E+00	8.600E-11	1.870E-10
SKIN (FGR)	1.140E-14	1.173E-11	2.622E-11	5.400E-16	-1.000E+00	0.000E+00	0.000E+00

## Te-127m

GONADS	1.900E-16	4.689E-13	9.642E-12	1.630E-17	-1.000E+00	1.100E-10	1.250E-10
BREAST	2.690E-16	5.150E-13	1.059E-11	1.790E-17	-1.000E+00	1.100E-10	9.740E-11
LUNGS	7.620E-17	1.602E-13	3.295E-12	5.570E-18	-1.000E+00	3.340E-08	9.620E-11
RED MARR	6.430E-17	1.249E-13	2.567E-12	4.340E-18	-1.000E+00	5.360E-09	5.430E-09
BONE SUR	3.940E-16	9.005E-13	1.852E-11	3.130E-17	-1.000E+00	2.040E-08	2.070E-08
THYROID	1.500E-16	2.779E-13	5.714E-12	9.660E-18	-1.000E+00	9.660E-11	9.430E-11
REMAINDER	8.640E-17	1.999E-13	4.111E-12	6.950E-18	-1.000E+00	1.660E-09	2.980E-09
EFFECTIVE	1.470E-16	3.251E-13	6.684E-12	1.130E-17	-1.000E+00	5.810E-09	2.230E-09
SKIN (FGR)	8.490E-16	1.496E-12	3.076E-11	5.200E-17	-1.000E+00	0.000E+00	0.000E+00

## Te-129

GONADS	2.710E-15	3.889E-13	3.922E-13	6.510E-17	-1.000E+00	1.750E-12	1.590E-12
BREAST	3.120E-15	3.800E-13	3.832E-13	6.360E-17	-1.000E+00	1.680E-12	6.050E-13
LUNGS	2.640E-15	3.298E-13	3.326E-13	5.520E-17	-1.000E+00	1.330E-10	4.910E-13
RED MARR	2.540E-15	3.298E-13	3.326E-13	5.520E-17	-1.000E+00	1.970E-12	7.640E-13
BONE SUR	4.880E-15	5.753E-13	5.802E-13	9.630E-17	-1.000E+00	2.030E-12	5.400E-13
THYROID	2.740E-15	3.525E-13	3.555E-13	5.900E-17	-1.000E+00	1.630E-12	3.360E-13
REMAINDER	2.520E-15	3.262E-13	3.289E-13	5.460E-17	-1.000E+00	2.400E-11	1.790E-10
EFFECTIVE	2.750E-15	3.590E-13	3.621E-13	6.010E-17	-1.000E+00	2.420E-11	5.450E-11
SKIN (FGR)	3.570E-14	3.429E-11	3.458E-11	5.740E-15	-1.000E+00	0.000E+00	0.000E+00

## Te-129m

GONADS	1.560E-15	2.206E-12	4.799E-11	8.561E-17	-1.000E+00	1.780E-10	2.420E-10
BREAST	1.810E-15	2.181E-12	4.739E-11	8.454E-17	-1.000E+00	1.690E-10	1.664E-10
LUNGS	1.460E-15	1.741E-12	3.815E-11	6.808E-17	-1.000E+00	4.030E-08	1.593E-10
RED MARR	1.420E-15	1.729E-12	3.793E-11	6.768E-17	-1.000E+00	3.100E-09	3.500E-09
BONE SUR	2.600E-15	3.287E-12	7.147E-11	1.275E-16	-1.000E+00	7.050E-09	7.990E-09
THYROID	1.560E-15	1.923E-12	4.201E-11	7.495E-17	-1.000E+00	1.560E-10	1.572E-10
REMAINDER	1.410E-15	1.746E-12	3.822E-11	6.819E-17	-1.000E+00	3.270E-09	7.196E-09
EFFECTIVE	1.550E-15	1.974E-12	4.308E-11	7.686E-17	-1.000E+00	6.470E-09	2.925E-09
SKIN (FGR)	1.490E-14	1.501E-10	3.360E-09	6.001E-15	-1.000E+00	0.000E+00	0.000E+00

## Te-131m

GONADS	6.850E-14	4.020E-11	2.343E-10	1.535E-15	-1.000E+00	2.340E-10	7.415E-10
BREAST	7.780E-14	3.853E-11	2.246E-10	1.472E-15	-1.000E+00	9.250E-11	1.361E-10
LUNGS	6.830E-14	3.657E-11	2.131E-10	1.397E-15	-1.000E+00	2.230E-09	6.335E-11
RED MARR	6.680E-14	3.736E-11	2.178E-10	1.427E-15	-1.000E+00	1.410E-10	2.435E-10
BONE SUR	1.090E-13	5.467E-11	3.189E-10	2.090E-15	-1.000E+00	2.270E-10	3.248E-10
THYROID	7.020E-14	3.741E-11	2.181E-10	1.429E-15	-1.000E+00	3.610E-08	4.383E-08
REMAINDER	6.550E-14	3.626E-11	2.113E-10	1.385E-15	-1.000E+00	9.460E-10	3.153E-09
EFFECTIVE	7.010E-14	3.825E-11	2.229E-10	1.461E-15	-1.000E+00	1.730E-09	2.514E-09
SKIN (FGR)	8.850E-14	1.033E-10	6.188E-10	4.056E-15	-1.000E+00	0.000E+00	0.000E+00

## Te-132

GONADS	1.020E-14	6.812E-12	7.706E-11	2.450E-16	-1.000E+00	4.150E-10	5.410E-10
BREAST	1.180E-14	6.756E-12	7.643E-11	2.430E-16	-1.000E+00	3.630E-10	3.500E-10

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

LUNGS	9.650E-15	5.727E-12	6.479E-11	2.060E-16	-1.000E+00	1.670E-09	3.300E-10
RED MARR	8.950E-15	5.588E-12	6.322E-11	2.010E-16	-1.000E+00	4.270E-10	4.440E-10
BONE SUR	2.420E-14	1.273E-11	1.441E-10	4.580E-16	-1.000E+00	7.120E-10	8.300E-10
THYROID	1.020E-14	5.978E-12	6.762E-11	2.150E-16	-1.000E+00	6.280E-08	5.950E-08
REMAINDER	9.160E-15	5.644E-12	6.385E-11	2.030E-16	-1.000E+00	7.890E-10	1.490E-09
EFFECTIVE	1.030E-14	6.339E-12	7.171E-11	2.280E-16	-1.000E+00	2.550E-09	2.540E-09
SKIN (FGR)	1.390E-14	8.313E-12	9.405E-11	2.990E-16	-1.000E+00	0.000E+00	0.000E+00
I-131							
GONADS	1.780E-14	1.119E-11	1.789E-10	3.940E-16	-1.000E+00	2.530E-11	4.070E-11
BREAST	2.040E-14	1.082E-11	1.730E-10	3.810E-16	-1.000E+00	7.880E-11	1.210E-10
LUNGS	1.760E-14	1.016E-11	1.626E-10	3.580E-16	-1.000E+00	6.570E-10	1.020E-10
RED MARR	1.680E-14	1.022E-11	1.635E-10	3.600E-16	-1.000E+00	6.260E-11	9.440E-11
BONE SUR	3.450E-14	1.675E-11	2.679E-10	5.900E-16	-1.000E+00	5.730E-11	8.720E-11
THYROID	1.810E-14	1.053E-11	1.685E-10	3.710E-16	-1.000E+00	2.920E-07	4.760E-07
REMAINDER	1.670E-14	9.908E-12	1.585E-10	3.490E-16	-1.000E+00	8.030E-11	1.570E-10
EFFECTIVE	1.820E-14	1.067E-11	1.707E-10	3.760E-16	-1.000E+00	8.890E-09	1.440E-08
SKIN (FGR)	2.980E-14	1.825E-11	2.920E-10	6.430E-16	-1.000E+00	0.000E+00	0.000E+00
I-132							
GONADS	1.090E-13	2.523E-11	2.771E-11	2.320E-15	-1.000E+00	9.950E-12	2.330E-11
BREAST	1.240E-13	2.414E-11	2.652E-11	2.220E-15	-1.000E+00	1.410E-11	2.520E-11
LUNGS	1.090E-13	2.305E-11	2.532E-11	2.120E-15	-1.000E+00	2.710E-10	2.640E-11
RED MARR	1.070E-13	2.360E-11	2.592E-11	2.170E-15	-1.000E+00	1.400E-11	2.460E-11
BONE SUR	1.730E-13	3.327E-11	3.655E-11	3.060E-15	-1.000E+00	1.240E-11	2.190E-11
THYROID	1.120E-13	2.381E-11	2.616E-11	2.190E-15	-1.000E+00	1.740E-09	3.870E-09
REMAINDER	1.050E-13	2.283E-11	2.509E-11	2.100E-15	-1.000E+00	3.780E-11	1.650E-10
EFFECTIVE	1.120E-13	2.403E-11	2.640E-11	2.210E-15	-1.000E+00	1.030E-10	1.820E-10
SKIN (FGR)	1.580E-13	8.199E-11	9.007E-11	7.540E-15	-1.000E+00	0.000E+00	0.000E+00
I-133							
GONADS	2.870E-14	1.585E-11	6.748E-11	6.270E-16	-1.000E+00	1.950E-11	3.630E-11
BREAST	3.280E-14	1.519E-11	6.468E-11	6.010E-16	-1.000E+00	2.940E-11	4.680E-11
LUNGS	2.860E-14	1.446E-11	6.156E-11	5.720E-16	-1.000E+00	8.200E-10	4.530E-11
RED MARR	2.770E-14	1.466E-11	6.242E-11	5.800E-16	-1.000E+00	2.720E-11	4.300E-11
BONE SUR	4.870E-14	2.161E-11	9.202E-11	8.550E-16	-1.000E+00	2.520E-11	4.070E-11
THYROID	2.930E-14	1.502E-11	6.393E-11	5.940E-16	-1.000E+00	4.860E-08	9.100E-08
REMAINDER	2.730E-14	1.418E-11	6.038E-11	5.610E-16	-1.000E+00	5.000E-11	1.550E-10
EFFECTIVE	2.940E-14	1.509E-11	6.425E-11	5.970E-16	-1.000E+00	1.580E-09	2.800E-09
SKIN (FGR)	5.830E-14	1.150E-10	4.897E-10	4.550E-15	-1.000E+00	0.000E+00	0.000E+00
I-134							
GONADS	1.270E-13	1.200E-11	1.202E-11	2.640E-15	-1.000E+00	4.250E-12	1.100E-11
BREAST	1.440E-13	1.145E-11	1.147E-11	2.520E-15	-1.000E+00	6.170E-12	1.170E-11
LUNGS	1.270E-13	1.100E-11	1.102E-11	2.420E-15	-1.000E+00	1.430E-10	1.260E-11
RED MARR	1.250E-13	1.127E-11	1.129E-11	2.480E-15	-1.000E+00	6.080E-12	1.090E-11
BONE SUR	1.960E-13	1.568E-11	1.571E-11	3.450E-15	-1.000E+00	5.310E-12	9.320E-12
THYROID	1.300E-13	1.127E-11	1.129E-11	2.480E-15	-1.000E+00	2.880E-10	6.210E-10
REMAINDER	1.220E-13	1.091E-11	1.093E-11	2.400E-15	-1.000E+00	2.270E-11	1.340E-10
EFFECTIVE	1.300E-13	1.150E-11	1.152E-11	2.530E-15	-1.000E+00	3.550E-11	6.660E-11
SKIN (FGR)	1.870E-13	4.477E-11	4.485E-11	9.850E-15	-1.000E+00	0.000E+00	0.000E+00
I-135							
GONADS	7.770E-14	3.113E-11	5.489E-11	1.599E-15	-1.000E+00	1.700E-11	3.610E-11
BREAST	8.790E-14	2.971E-11	5.240E-11	1.526E-15	-1.000E+00	2.340E-11	3.850E-11
LUNGS	7.840E-14	2.886E-11	5.089E-11	1.482E-15	-1.000E+00	4.410E-10	3.750E-11
RED MARR	7.760E-14	2.965E-11	5.228E-11	1.523E-15	-1.000E+00	2.240E-11	3.650E-11
BONE SUR	1.130E-13	3.983E-11	7.024E-11	2.046E-15	-1.000E+00	2.010E-11	3.360E-11
THYROID	8.010E-14	2.852E-11	5.030E-11	1.465E-15	-1.000E+00	8.460E-09	1.790E-08
REMAINDER	7.570E-14	2.883E-11	5.084E-11	1.481E-15	-1.000E+00	4.700E-11	1.540E-10
EFFECTIVE	7.980E-14	2.989E-11	5.271E-11	1.535E-15	-1.000E+00	3.320E-10	6.080E-10
SKIN (FGR)	1.110E-13	9.826E-11	1.733E-10	5.047E-15	-1.000E+00	0.000E+00	0.000E+00
Xe-133							
GONADS	1.610E-15	1.465E-12	2.052E-11	5.200E-17	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.960E-15	1.505E-12	2.107E-11	5.340E-17	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.320E-15	1.045E-12	1.464E-11	3.710E-17	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.070E-15	8.791E-13	1.231E-11	3.120E-17	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	5.130E-15	4.254E-12	5.958E-11	1.510E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	1.510E-15	1.181E-12	1.653E-11	4.190E-17	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	1.240E-15	1.042E-12	1.460E-11	3.700E-17	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.560E-15	1.299E-12	1.819E-11	4.610E-17	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	4.970E-15	1.953E-12	2.734E-11	6.930E-17	-1.000E+00	0.000E+00	0.000E+00
Xe-135							
GONADS	1.170E-14	5.455E-12	1.194E-11	2.530E-16	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.330E-14	5.325E-12	1.166E-11	2.470E-16	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.130E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.070E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	2.570E-14	9.120E-12	1.997E-11	4.230E-16	-1.000E+00	0.000E+00	0.000E+00

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

THYROID	1.180E-14	5.023E-12	1.100E-11	2.330E-16	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	1.080E-14	4.829E-12	1.058E-11	2.240E-16	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.190E-14	5.217E-12	1.142E-11	2.420E-16	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	3.120E-14	4.506E-11	9.867E-11	2.090E-15	-1.000E+00	0.000E+00	0.000E+00
Cs-134							
GONADS	7.400E-14	4.607E-11	9.646E-10	1.600E-15	-1.000E+00	1.300E-08	2.060E-08
BREAST	8.430E-14	4.406E-11	9.224E-10	1.530E-15	-1.000E+00	1.080E-08	1.720E-08
LUNGS	7.370E-14	4.204E-11	8.802E-10	1.460E-15	-1.000E+00	1.180E-08	1.760E-08
RED MARR	7.190E-14	4.262E-11	8.922E-10	1.480E-15	-1.000E+00	1.180E-08	1.870E-08
BONE SUR	1.200E-13	6.105E-11	1.278E-09	2.120E-15	-1.000E+00	1.100E-08	1.740E-08
THYROID	7.570E-14	4.377E-11	9.163E-10	1.520E-15	-1.000E+00	1.110E-08	1.760E-08
REMAINDER	7.060E-14	4.147E-11	8.681E-10	1.440E-15	-1.000E+00	1.390E-08	2.210E-08
EFFECTIVE	7.570E-14	4.377E-11	9.163E-10	1.520E-15	-1.000E+00	1.250E-08	1.980E-08
SKIN (FGR)	9.450E-14	6.249E-11	1.308E-09	2.170E-15	-1.000E+00	0.000E+00	0.000E+00
Cs-136							
GONADS	1.040E-13	6.223E-11	1.102E-09	2.180E-15	-1.000E+00	1.880E-09	3.040E-09
BREAST	1.180E-13	5.966E-11	1.056E-09	2.090E-15	-1.000E+00	1.670E-09	2.650E-09
LUNGS	1.040E-13	5.710E-11	1.011E-09	2.000E-15	-1.000E+00	2.320E-09	2.620E-09
RED MARR	1.010E-13	5.824E-11	1.031E-09	2.040E-15	-1.000E+00	1.860E-09	2.950E-09
BONE SUR	1.660E-13	8.422E-11	1.491E-09	2.950E-15	-1.000E+00	1.700E-09	2.710E-09
THYROID	1.070E-13	5.852E-11	1.036E-09	2.050E-15	-1.000E+00	1.730E-09	2.740E-09
REMAINDER	9.950E-14	5.652E-11	1.001E-09	1.980E-15	-1.000E+00	2.190E-09	3.520E-09
EFFECTIVE	1.060E-13	5.966E-11	1.056E-09	2.090E-15	-1.000E+00	1.980E-09	3.040E-09
SKIN (FGR)	1.250E-13	7.251E-11	1.284E-09	2.540E-15	-1.000E+00	0.000E+00	0.000E+00
Cs-137							
GONADS	7.960E-18	1.669E-11	3.530E-10	5.840E-16	-1.000E+00	8.760E-09	1.390E-08
BREAST	9.670E-18	1.596E-11	3.376E-10	5.585E-16	-1.000E+00	7.840E-09	1.240E-08
LUNGS	6.680E-18	1.517E-11	3.209E-10	5.309E-16	-1.000E+00	8.820E-09	1.270E-08
RED MARR	5.700E-18	1.542E-11	3.260E-10	5.394E-16	-1.000E+00	8.300E-09	1.320E-08
BONE SUR	2.290E-17	2.238E-11	4.734E-10	7.832E-16	-1.000E+00	7.940E-09	1.260E-08
THYROID	7.550E-18	1.588E-11	3.358E-10	5.556E-16	-1.000E+00	7.930E-09	1.260E-08
REMAINDER	6.340E-18	1.490E-11	3.152E-10	5.215E-16	-1.000E+00	9.120E-09	1.450E-08
EFFECTIVE	7.740E-18	1.585E-11	3.353E-10	5.546E-16	-1.000E+00	8.630E-09	1.350E-08
SKIN (FGR)	8.630E-15	5.253E-11	1.110E-09	1.836E-15	-1.000E+00	0.000E+00	0.000E+00
Ba-139							
GONADS	2.130E-15	3.368E-13	3.429E-13	4.790E-17	-1.000E+00	2.560E-12	1.560E-12
BREAST	2.450E-15	3.297E-13	3.357E-13	4.690E-17	-1.000E+00	2.460E-12	5.170E-13
LUNGS	2.030E-15	3.002E-13	3.057E-13	4.270E-17	-1.000E+00	2.530E-10	3.890E-13
RED MARR	1.870E-15	2.932E-13	2.985E-13	4.170E-17	-1.000E+00	3.410E-12	8.590E-13
BONE SUR	5.290E-15	6.841E-13	6.965E-13	9.730E-17	-1.000E+00	2.490E-12	4.380E-13
THYROID	2.130E-15	3.044E-13	3.100E-13	4.330E-17	-1.000E+00	2.400E-12	2.660E-13
REMAINDER	1.920E-15	2.932E-13	2.985E-13	4.170E-17	-1.000E+00	4.820E-11	3.570E-10
EFFECTIVE	2.170E-15	3.227E-13	3.286E-13	4.590E-17	-1.000E+00	4.640E-11	1.080E-10
SKIN (FGR)	6.160E-14	7.241E-11	7.373E-11	1.030E-14	-1.000E+00	0.000E+00	0.000E+00
Ba-140							
GONADS	8.410E-15	5.451E-12	9.607E-11	1.910E-16	-1.000E+00	4.300E-10	9.960E-10
BREAST	9.640E-15	5.280E-12	9.305E-11	1.850E-16	-1.000E+00	2.870E-10	1.590E-10
LUNGS	8.270E-15	4.852E-12	8.550E-11	1.700E-16	-1.000E+00	1.660E-09	6.630E-11
RED MARR	7.930E-15	4.880E-12	8.601E-11	1.710E-16	-1.000E+00	1.290E-09	4.390E-10
BONE SUR	1.550E-14	8.020E-12	1.413E-10	2.810E-16	-1.000E+00	2.410E-09	5.530E-10
THYROID	8.530E-15	5.109E-12	9.003E-11	1.790E-16	-1.000E+00	2.560E-10	5.250E-11
REMAINDER	7.890E-15	4.766E-12	8.399E-11	1.670E-16	-1.000E+00	1.410E-09	7.370E-09
EFFECTIVE	8.580E-15	5.137E-12	9.053E-11	1.800E-16	-1.000E+00	1.010E-09	2.560E-09
SKIN (FGR)	2.520E-14	5.565E-11	9.808E-10	1.950E-15	-1.000E+00	0.000E+00	0.000E+00
La-140							
GONADS	1.140E-13	6.027E-11	4.425E-10	2.240E-15	-1.000E+00	4.540E-10	1.340E-09
BREAST	1.290E-13	5.758E-11	4.228E-10	2.140E-15	-1.000E+00	1.450E-10	1.800E-10
LUNGS	1.150E-13	5.596E-11	4.109E-10	2.080E-15	-1.000E+00	4.210E-09	4.010E-11
RED MARR	1.140E-13	5.731E-11	4.208E-10	2.130E-15	-1.000E+00	2.140E-10	2.810E-10
BONE SUR	1.690E-13	7.776E-11	5.709E-10	2.890E-15	-1.000E+00	1.410E-10	9.770E-11
THYROID	1.180E-13	5.462E-11	4.010E-10	2.030E-15	-1.000E+00	6.870E-11	6.400E-12
REMAINDER	1.110E-13	5.569E-11	4.089E-10	2.070E-15	-1.000E+00	2.120E-09	6.260E-09
EFFECTIVE	1.170E-13	5.812E-11	4.267E-10	2.160E-15	-1.000E+00	1.310E-09	2.280E-09
SKIN (FGR)	1.660E-13	2.217E-10	1.628E-09	8.240E-15	-1.000E+00	0.000E+00	0.000E+00
La-141							
GONADS	2.330E-15	7.315E-13	9.675E-13	4.740E-17	-1.000E+00	1.010E-11	3.770E-12
BREAST	2.640E-15	7.007E-13	9.267E-13	4.540E-17	-1.000E+00	9.840E-12	7.070E-13
LUNGS	2.340E-15	6.713E-13	8.879E-13	4.350E-17	-1.000E+00	6.460E-10	2.720E-13
RED MARR	2.310E-15	6.852E-13	9.063E-13	4.440E-17	-1.000E+00	2.930E-11	1.070E-12
BONE SUR	3.490E-15	9.923E-13	1.312E-12	6.430E-17	-1.000E+00	1.200E-10	6.060E-13
THYROID	2.390E-15	6.590E-13	8.716E-13	4.270E-17	-1.000E+00	9.400E-12	5.290E-14
REMAINDER	2.260E-15	6.682E-13	8.838E-13	4.330E-17	-1.000E+00	2.280E-10	1.240E-09
EFFECTIVE	2.390E-15	7.007E-13	9.267E-13	4.540E-17	-1.000E+00	1.570E-10	3.740E-10

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

SKIN (FGR)	6.580E-14	1.667E-10	2.204E-10	1.080E-14	-1.000E+00	0.000E+00	0.000E+00
La-142							
GONADS	1.400E-13	1.978E-11	2.034E-11	2.540E-15	-1.000E+00	1.660E-11	6.990E-11
BREAST	1.570E-13	1.885E-11	1.938E-11	2.420E-15	-1.000E+00	1.130E-11	1.540E-11
LUNGS	1.420E-13	1.846E-11	1.898E-11	2.370E-15	-1.000E+00	3.010E-10	8.400E-12
RED MARR	1.420E-13	1.900E-11	1.954E-11	2.440E-15	-1.000E+00	1.360E-11	1.930E-11
BONE SUR	1.950E-13	2.484E-11	2.554E-11	3.190E-15	-1.000E+00	1.110E-11	7.400E-12
THYROID	1.450E-13	1.768E-11	1.818E-11	2.270E-15	-1.000E+00	8.740E-12	1.160E-12
REMAINDER	1.380E-13	1.853E-11	1.906E-11	2.380E-15	-1.000E+00	8.070E-11	5.200E-10
EFFECTIVE	1.440E-13	1.916E-11	1.970E-11	2.460E-15	-1.000E+00	6.840E-11	1.790E-10
SKIN (FGR)	2.160E-13	9.111E-11	9.368E-11	1.170E-14	-1.000E+00	0.000E+00	0.000E+00
Ce-141							
GONADS	3.380E-15	2.213E-12	4.332E-11	7.710E-17	-1.000E+00	5.540E-11	1.080E-10
BREAST	3.930E-15	2.170E-12	4.247E-11	7.560E-17	-1.000E+00	4.460E-11	1.110E-11
LUNGS	3.170E-15	1.951E-12	3.820E-11	6.800E-17	-1.000E+00	1.670E-08	1.430E-12
RED MARR	2.830E-15	1.860E-12	3.641E-11	6.480E-17	-1.000E+00	8.960E-11	3.390E-11
BONE SUR	9.410E-15	5.166E-12	1.011E-10	1.800E-16	-1.000E+00	2.540E-10	2.300E-11
THYROID	3.350E-15	2.003E-12	3.922E-11	6.980E-17	-1.000E+00	2.550E-11	1.800E-13
REMAINDER	2.980E-15	1.894E-12	3.708E-11	6.600E-17	-1.000E+00	1.260E-09	2.500E-09
EFFECTIVE	3.430E-15	2.118E-12	4.146E-11	7.380E-17	-1.000E+00	2.420E-09	7.830E-10
SKIN (FGR)	1.020E-14	3.788E-12	7.416E-11	1.320E-16	-1.000E+00	0.000E+00	0.000E+00
Ce-143							
GONADS	1.280E-14	7.900E-12	4.958E-11	2.980E-16	-1.000E+00	7.530E-11	2.120E-10
BREAST	1.470E-14	7.688E-12	4.825E-11	2.900E-16	-1.000E+00	1.660E-11	2.320E-11
LUNGS	1.230E-14	6.893E-12	4.325E-11	2.600E-16	-1.000E+00	3.880E-09	3.820E-12
RED MARR	1.170E-14	6.787E-12	4.259E-11	2.560E-16	-1.000E+00	2.960E-11	5.070E-11
BONE SUR	2.520E-14	1.323E-11	8.302E-11	4.990E-16	-1.000E+00	1.640E-11	1.610E-11
THYROID	1.280E-14	7.211E-12	4.525E-11	2.720E-16	-1.000E+00	6.230E-12	4.350E-13
REMAINDER	1.170E-14	6.734E-12	4.226E-11	2.540E-16	-1.000E+00	1.420E-09	3.890E-09
EFFECTIVE	1.290E-14	7.396E-12	4.642E-11	2.790E-16	-1.000E+00	9.160E-10	1.230E-09
SKIN (FGR)	3.960E-14	1.058E-10	6.638E-10	3.990E-15	-1.000E+00	0.000E+00	0.000E+00
Ce-144							
GONADS	8.530E-16	6.328E-13	1.319E-11	6.088E-17	-1.000E+00	2.390E-10	6.987E-11
BREAST	1.010E-15	6.274E-13	1.307E-11	5.922E-17	-1.000E+00	3.480E-10	1.223E-11
LUNGS	7.690E-16	5.228E-13	1.089E-11	5.362E-17	-1.000E+00	7.910E-07	6.551E-12
RED MARR	6.680E-16	4.755E-13	9.907E-12	5.247E-17	-1.000E+00	2.880E-09	8.923E-11
BONE SUR	2.490E-15	1.646E-12	3.429E-11	1.127E-16	-1.000E+00	4.720E-09	1.280E-10
THYROID	8.330E-16	5.529E-13	1.152E-11	5.418E-17	-1.000E+00	2.920E-10	5.154E-12
REMAINDER	7.230E-16	5.086E-13	1.060E-11	5.283E-17	-1.000E+00	1.910E-08	1.890E-08
EFFECTIVE	8.530E-16	5.909E-13	1.231E-11	5.766E-17	-1.000E+00	1.010E-07	5.711E-09
SKIN (FGR)	2.930E-15	7.648E-13	1.594E-11	1.250E-14	-1.000E+00	0.000E+00	0.000E+00
Pr-143							
GONADS	2.130E-17	2.264E-14	4.032E-13	7.930E-19	-1.000E+00	4.370E-18	8.990E-18
BREAST	2.550E-17	2.330E-14	4.149E-13	8.160E-19	-1.000E+00	2.220E-18	1.090E-18
LUNGS	1.860E-17	1.642E-14	2.923E-13	5.750E-19	-1.000E+00	1.330E-08	1.910E-19
RED MARR	1.620E-17	1.493E-14	2.659E-13	5.230E-19	-1.000E+00	1.480E-11	1.030E-12
BONE SUR	5.930E-17	5.454E-14	9.711E-13	1.910E-18	-1.000E+00	1.490E-11	1.030E-12
THYROID	2.050E-17	1.802E-14	3.208E-13	6.310E-19	-1.000E+00	1.680E-18	2.660E-20
REMAINDER	1.760E-17	1.642E-14	2.923E-13	5.750E-19	-1.000E+00	1.970E-09	4.220E-09
EFFECTIVE	2.100E-17	2.002E-14	3.564E-13	7.010E-19	-1.000E+00	2.190E-09	1.270E-09
SKIN (FGR)	1.760E-14	5.711E-11	1.017E-09	2.000E-15	-1.000E+00	0.000E+00	0.000E+00
Nd-147							
GONADS	6.130E-15	4.218E-12	7.235E-11	1.480E-16	-1.000E+00	8.410E-11	1.790E-10
BREAST	7.120E-15	4.132E-12	7.088E-11	1.450E-16	-1.000E+00	3.450E-11	1.870E-11
LUNGS	5.820E-15	3.648E-12	6.257E-11	1.280E-16	-1.000E+00	1.060E-08	2.440E-12
RED MARR	5.400E-15	3.505E-12	6.013E-11	1.230E-16	-1.000E+00	9.190E-11	5.050E-11
BONE SUR	1.320E-14	8.265E-12	1.418E-10	2.900E-16	-1.000E+00	3.260E-10	2.220E-11
THYROID	6.120E-15	3.876E-12	6.648E-11	1.360E-16	-1.000E+00	1.820E-11	2.640E-13
REMAINDER	5.530E-15	3.562E-12	6.111E-11	1.250E-16	-1.000E+00	1.760E-09	3.760E-09
EFFECTIVE	6.190E-15	3.961E-12	6.795E-11	1.390E-16	-1.000E+00	1.850E-09	1.180E-09
SKIN (FGR)	1.950E-14	3.135E-11	5.377E-10	1.100E-15	-1.000E+00	0.000E+00	0.000E+00
Np-239							
GONADS	7.530E-15	4.691E-12	4.380E-11	1.710E-16	-1.000E+00	7.450E-11	1.620E-10
BREAST	8.730E-15	4.636E-12	4.329E-11	1.690E-16	-1.000E+00	1.630E-11	1.720E-11
LUNGS	7.180E-15	4.115E-12	3.842E-11	1.500E-16	-1.000E+00	2.360E-09	2.400E-12
RED MARR	6.500E-15	4.005E-12	3.740E-11	1.460E-16	-1.000E+00	2.080E-10	4.660E-11
BONE SUR	2.000E-14	1.001E-11	9.349E-11	3.650E-16	-1.000E+00	2.030E-09	3.590E-11
THYROID	7.520E-15	4.197E-12	3.919E-11	1.530E-16	-1.000E+00	7.620E-12	2.070E-13
REMAINDER	6.760E-15	4.005E-12	3.740E-11	1.460E-16	-1.000E+00	9.590E-10	2.770E-09
EFFECTIVE	7.690E-15	4.471E-12	4.175E-11	1.630E-16	-1.000E+00	6.780E-10	8.820E-10
SKIN (FGR)	1.600E-14	7.215E-12	6.737E-11	2.630E-16	-1.000E+00	0.000E+00	0.000E+00
Pu-238							
GONADS	6.560E-18	4.291E-14	9.011E-13	1.490E-18	-1.000E+00	2.800E-05	2.330E-09

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

BREAST	1.270E-17	5.558E-14	1.167E-12	1.930E-18	-1.000E+00	1.000E-09	1.800E-13
LUNGS	1.060E-18	2.267E-15	4.759E-14	7.870E-20	-1.000E+00	1.840E-05	8.640E-14
RED MARR	1.680E-18	5.587E-15	1.173E-13	1.940E-19	-1.000E+00	1.520E-04	1.270E-08
BONE SUR	9.300E-18	3.514E-14	7.378E-13	1.220E-18	-1.000E+00	1.900E-03	1.580E-07
THYROID	4.010E-18	9.792E-15	2.056E-13	3.400E-19	-1.000E+00	9.620E-10	7.990E-14
REMAINDER	1.990E-18	9.216E-15	1.935E-13	3.200E-19	-1.000E+00	7.020E-05	2.180E-08
EFFECTIVE	4.880E-18	2.413E-14	5.068E-13	8.380E-19	-1.000E+00	1.060E-04	1.340E-08
SKIN (FGR)	4.090E-17	2.776E-13	5.830E-12	9.640E-18	-1.000E+00	0.000E+00	0.000E+00
Pu-239							
GONADS	4.840E-18	1.768E-14	3.713E-13	6.140E-19	-1.000E+00	3.180E-05	2.640E-09
BREAST	7.550E-18	2.238E-14	4.699E-13	7.770E-19	-1.000E+00	9.220E-10	1.210E-13
LUNGS	2.650E-18	2.267E-15	4.760E-14	7.870E-20	-1.000E+00	1.730E-05	7.890E-14
RED MARR	2.670E-18	3.456E-15	7.258E-14	1.200E-19	-1.000E+00	1.690E-04	1.410E-08
BONE SUR	9.470E-18	1.673E-14	3.514E-13	5.810E-19	-1.000E+00	2.110E-03	1.760E-07
THYROID	3.880E-18	5.126E-15	1.077E-13	1.780E-19	-1.000E+00	9.030E-10	7.500E-14
REMAINDER	2.860E-18	4.838E-15	1.016E-13	1.680E-19	-1.000E+00	7.560E-05	2.120E-08
EFFECTIVE	4.240E-18	1.057E-14	2.220E-13	3.670E-19	-1.000E+00	1.160E-05	1.400E-08
SKIN (FGR)	1.860E-17	1.057E-13	2.220E-12	3.670E-18	-1.000E+00	0.000E+00	0.000E+00
Pu-240							
GONADS	6.360E-18	4.118E-14	8.649E-13	1.430E-18	-1.000E+00	3.180E-05	2.640E-09
BREAST	1.230E-17	5.328E-14	1.119E-12	1.850E-18	-1.000E+00	9.510E-10	1.730E-13
LUNGS	1.090E-18	2.249E-15	4.723E-14	7.810E-20	-1.000E+00	1.730E-05	8.220E-14
RED MARR	1.650E-18	5.386E-15	1.131E-13	1.870E-19	-1.000E+00	1.690E-04	1.410E-08
BONE SUR	9.260E-18	3.398E-14	7.137E-13	1.180E-18	-1.000E+00	2.110E-03	1.760E-07
THYROID	3.920E-18	9.446E-15	1.984E-13	3.280E-19	-1.000E+00	9.050E-10	7.510E-14
REMAINDER	1.960E-18	8.870E-15	1.863E-13	3.080E-19	-1.000E+00	7.560E-05	2.130E-08
EFFECTIVE	4.750E-18	2.313E-14	4.857E-13	8.030E-19	-1.000E+00	1.160E-04	1.400E-08
SKIN (FGR)	3.920E-17	2.644E-13	5.552E-12	9.180E-18	-1.000E+00	0.000E+00	0.000E+00
Pu-241							
GONADS	7.190E-20	6.653E-17	1.396E-15	2.310E-21	-1.000E+00	6.820E-07	5.660E-11
BREAST	8.670E-20	7.229E-17	1.517E-15	2.510E-21	-1.000E+00	3.060E-11	2.790E-15
LUNGS	6.480E-20	4.090E-17	8.584E-16	1.420E-21	-1.000E+00	7.420E-09	4.480E-15
RED MARR	5.630E-20	4.003E-17	8.403E-16	1.390E-21	-1.000E+00	3.360E-06	2.780E-10
BONE SUR	2.190E-19	1.385E-16	2.908E-15	4.810E-21	-1.000E+00	4.200E-05	3.480E-09
THYROID	6.980E-20	4.522E-17	9.491E-16	1.570E-21	-1.000E+00	1.240E-11	1.010E-15
REMAINDER	6.090E-20	4.291E-17	9.007E-16	1.490E-21	-1.000E+00	1.310E-06	1.850E-10
EFFECTIVE	7.250E-20	5.558E-17	1.167E-15	1.930E-21	-1.000E+00	2.230E-06	2.070E-10
SKIN (FGR)	1.170E-19	2.033E-16	4.268E-15	7.060E-21	-1.000E+00	0.000E+00	0.000E+00
Am-241							
GONADS	8.580E-16	9.360E-13	1.966E-11	3.250E-17	-1.000E+00	3.250E-05	2.700E-07
BREAST	1.070E-15	1.014E-12	2.129E-11	3.520E-17	-1.000E+00	2.670E-09	2.620E-11
LUNGS	6.740E-16	5.789E-13	1.216E-11	2.010E-17	-1.000E+00	1.840E-05	3.360E-11
RED MARR	5.210E-16	4.838E-13	1.016E-11	1.680E-17	-1.000E+00	1.740E-04	1.450E-06
BONE SUR	2.870E-15	2.678E-12	5.625E-11	9.300E-17	-1.000E+00	2.170E-03	1.810E-05
THYROID	7.830E-16	6.365E-13	1.337E-11	2.210E-17	-1.000E+00	1.600E-09	1.320E-11
REMAINDER	6.340E-16	5.933E-13	1.246E-11	2.060E-17	-1.000E+00	7.820E-05	6.660E-07
EFFECTIVE	8.180E-16	7.920E-13	1.663E-11	2.750E-17	-1.000E+00	1.200E-04	9.840E-07
SKIN (FGR)	1.280E-15	2.396E-12	5.032E-11	8.320E-17	-1.000E+00	0.000E+00	0.000E+00
Cm-242							
GONADS	7.830E-18	4.893E-14	1.013E-12	1.700E-18	-1.000E+00	5.700E-07	5.200E-09
BREAST	1.480E-17	6.159E-14	1.275E-12	2.140E-18	-1.000E+00	9.440E-10	8.950E-12
LUNGS	1.130E-18	3.022E-15	6.257E-14	1.050E-19	-1.000E+00	1.550E-05	8.840E-12
RED MARR	1.890E-18	6.562E-15	1.359E-13	2.280E-19	-1.000E+00	3.900E-06	3.570E-08
BONE SUR	1.060E-17	4.231E-14	8.759E-13	1.470E-18	-1.000E+00	4.870E-05	4.460E-07
THYROID	4.910E-18	1.261E-14	2.610E-13	4.380E-19	-1.000E+00	9.410E-10	8.820E-12
REMAINDER	2.270E-18	1.079E-14	2.235E-13	3.750E-19	-1.000E+00	2.450E-06	4.020E-08
EFFECTIVE	5.690E-18	2.751E-14	5.697E-13	9.560E-19	-1.000E+00	4.670E-06	3.100E-08
SKIN (FGR)	4.290E-17	2.700E-13	5.589E-12	9.380E-18	-1.000E+00	0.000E+00	0.000E+00
Cm-244							
GONADS	6.900E-18	4.522E-14	9.492E-13	1.570E-18	-1.000E+00	1.590E-05	1.330E-07
BREAST	1.330E-17	5.702E-14	1.197E-12	1.980E-18	-1.000E+00	1.040E-09	8.820E-12
LUNGS	7.080E-19	2.592E-15	5.441E-14	9.000E-20	-1.000E+00	1.930E-05	8.810E-12
RED MARR	1.460E-18	5.875E-15	1.233E-13	2.040E-19	-1.000E+00	9.380E-05	7.820E-07
BONE SUR	8.820E-18	3.859E-14	8.101E-13	1.340E-18	-1.000E+00	1.170E-03	9.770E-06
THYROID	4.190E-18	1.146E-14	2.406E-13	3.980E-19	-1.000E+00	1.010E-09	8.440E-12
REMAINDER	1.810E-18	9.821E-15	2.062E-13	3.410E-19	-1.000E+00	4.780E-05	4.150E-07
EFFECTIVE	4.910E-18	2.529E-14	5.308E-13	8.780E-19	-1.000E+00	6.700E-05	5.450E-07
SKIN (FGR)	3.910E-17	2.506E-13	5.260E-12	8.700E-18	-1.000E+00	0.000E+00	0.000E+00
I-130							
GONADS	1.010E-13	2.867E-11	5.828E-10	9.970E-16	-1.000E+00	2.810E-11	1.040E-09
BREAST	1.160E-13	2.737E-11	5.565E-10	9.520E-16	-1.000E+00	4.870E-11	1.790E-10
LUNGS	1.010E-13	2.617E-11	5.319E-10	9.100E-16	-1.000E+00	6.030E-10	8.530E-11
RED MARR	9.820E-14	2.671E-11	5.430E-10	9.290E-16	-1.000E+00	4.550E-11	2.600E-10

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

BONE SUR	1.680E-13	3.795E-11	7.716E-10	1.320E-15	-1.000E+00	4.030E-11	1.250E-10
THYROID	1.040E-13	2.720E-11	5.530E-10	9.460E-16	-1.000E+00	1.990E-08	6.310E-11
REMAINDER	9.660E-14	2.585E-11	5.255E-10	8.990E-16	-1.000E+00	8.020E-11	1.580E-09
EFFECTIVE	1.040E-13	2.732E-11	5.553E-10	9.500E-16	-1.000E+00	7.140E-10	8.090E-10
SKIN (FGR)	1.360E-13	3.278E-11	6.664E-10	1.140E-15	-1.000E+00	0.000E+00	0.000E+00
Kr-83m							
GONADS	1.710E-18	7.056E-11	1.480E-09	2.450E-15	-1.000E+00	0.000E+00	3.190E-09
BREAST	5.050E-18	6.739E-11	1.413E-09	2.340E-15	-1.000E+00	0.000E+00	1.100E-09
LUNGS	1.640E-19	6.537E-11	1.371E-09	2.270E-15	-1.000E+00	0.000E+00	8.770E-10
RED MARR	3.830E-19	6.710E-11	1.407E-09	2.330E-15	-1.000E+00	0.000E+00	1.320E-09
BONE SUR	2.250E-18	8.956E-11	1.879E-09	3.110E-15	-1.000E+00	0.000E+00	9.390E-10
THYROID	6.430E-19	6.480E-11	1.359E-09	2.250E-15	-1.000E+00	0.000E+00	7.880E-10
REMAINDER	5.300E-19	6.508E-11	1.365E-09	2.260E-15	-1.000E+00	0.000E+00	4.970E-09
EFFECTIVE	1.500E-18	6.768E-11	1.419E-09	2.350E-15	-1.000E+00	0.000E+00	2.770E-09
SKIN (FGR)	3.560E-17	7.948E-11	1.667E-09	2.760E-15	-1.000E+00	0.000E+00	0.000E+00
Xe-138							
GONADS	5.590E-14	8.121E-14	1.704E-12	2.820E-18	-1.000E+00	0.000E+00	0.000E+00
BREAST	6.320E-14	7.891E-14	1.656E-12	2.740E-18	-1.000E+00	0.000E+00	0.000E+00
LUNGS	5.660E-14	7.056E-14	1.481E-12	2.450E-18	-1.000E+00	0.000E+00	0.000E+00
RED MARR	5.600E-14	6.998E-14	1.469E-12	2.430E-18	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	8.460E-14	1.287E-13	2.702E-12	4.470E-18	-1.000E+00	0.000E+00	0.000E+00
THYROID	5.770E-14	7.459E-14	1.565E-12	2.590E-18	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	5.490E-14	6.941E-14	1.457E-12	2.410E-18	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	5.770E-14	7.603E-14	1.596E-12	2.640E-18	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	1.070E-13	2.304E-11	4.835E-10	8.000E-16	-1.000E+00	0.000E+00	0.000E+00
Xe-131m							
GONADS	4.570E-16	2.594E-12	3.653E-12	1.570E-16	-1.000E+00	0.000E+00	0.000E+00
BREAST	6.020E-16	2.527E-12	3.560E-12	1.530E-16	-1.000E+00	0.000E+00	0.000E+00
LUNGS	2.670E-16	2.379E-12	3.351E-12	1.440E-16	-1.000E+00	0.000E+00	0.000E+00
RED MARR	2.270E-16	2.346E-12	3.304E-12	1.420E-16	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	1.060E-15	5.286E-12	7.446E-12	3.200E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	3.910E-16	2.395E-12	3.374E-12	1.450E-16	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	2.710E-16	2.313E-12	3.257E-12	1.400E-16	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	3.890E-16	2.511E-12	3.537E-12	1.520E-16	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	4.820E-15	2.247E-11	3.164E-11	1.360E-15	-1.000E+00	0.000E+00	0.000E+00
Xe-133m							
GONADS	1.420E-15	4.962E-12	5.026E-12	7.610E-16	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.700E-15	4.740E-12	4.802E-12	7.270E-16	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.190E-15	4.603E-12	4.663E-12	7.060E-16	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.100E-15	4.708E-12	4.769E-12	7.220E-16	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	3.230E-15	6.514E-12	6.598E-12	9.990E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	1.360E-15	4.473E-12	4.531E-12	6.860E-16	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	1.150E-15	4.590E-12	4.650E-12	7.040E-16	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.370E-15	4.773E-12	4.835E-12	7.320E-16	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	1.040E-14	8.802E-11	8.916E-11	1.350E-14	-1.000E+00	0.000E+00	0.000E+00
Xe-135m							
GONADS	2.000E-14	2.278E-11	2.655E-11	1.800E-15	-1.000E+00	0.000E+00	0.000E+00
BREAST	2.290E-14	2.177E-11	2.537E-11	1.720E-15	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.980E-14	2.139E-11	2.493E-11	1.690E-15	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.910E-14	2.190E-11	2.552E-11	1.730E-15	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	3.500E-14	2.886E-11	3.363E-11	2.280E-15	-1.000E+00	0.000E+00	0.000E+00
THYROID	2.040E-14	2.012E-11	2.345E-11	1.590E-15	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	1.890E-14	2.139E-11	2.493E-11	1.690E-15	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	2.040E-14	2.202E-11	2.567E-11	1.740E-15	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	2.970E-14	5.607E-11	6.534E-11	4.430E-15	-1.000E+00	0.000E+00	0.000E+00
Cs-138							
GONADS	1.170E-13	2.788E-12	5.187E-11	9.740E-17	-1.000E+00	3.280E-12	2.150E-09
BREAST	1.330E-13	2.662E-12	4.953E-11	9.300E-17	-1.000E+00	4.020E-12	2.140E-09
LUNGS	1.190E-13	2.553E-12	4.750E-11	8.920E-17	-1.000E+00	1.590E-10	2.140E-09
RED MARR	1.180E-13	2.619E-12	4.873E-11	9.150E-17	-1.000E+00	3.950E-12	3.720E-09
BONE SUR	1.700E-13	3.635E-12	6.764E-11	1.270E-16	-1.000E+00	3.550E-12	6.860E-09
THYROID	1.210E-13	2.599E-12	4.836E-11	9.080E-17	-1.000E+00	3.570E-12	2.140E-09
REMAINDER	1.150E-13	2.542E-12	4.729E-11	8.880E-17	-1.000E+00	2.060E-11	2.330E-09
EFFECTIVE	1.210E-13	2.665E-12	4.958E-11	9.310E-17	-1.000E+00	2.740E-11	2.530E-09
SKIN (FGR)	2.170E-13	2.210E-10	4.111E-09	7.720E-15	-1.000E+00	0.000E+00	0.000E+00
Cs-134m							
GONADS	9.300E-16	7.155E-14	1.436E-12	2.490E-18	-1.000E+00	3.610E-12	8.050E-12
BREAST	1.120E-15	7.212E-14	1.447E-12	2.510E-18	-1.000E+00	3.390E-12	7.980E-12
LUNGS	7.840E-16	5.689E-14	1.142E-12	1.980E-18	-1.000E+00	6.400E-11	7.970E-12
RED MARR	6.810E-16	5.345E-14	1.073E-12	1.860E-18	-1.000E+00	3.760E-12	1.080E-10
BONE SUR	2.610E-15	1.560E-13	3.131E-12	5.430E-18	-1.000E+00	3.550E-12	1.610E-10
THYROID	8.880E-16	6.063E-14	1.217E-12	2.110E-18	-1.000E+00	3.340E-12	7.970E-12
REMAINDER	7.450E-16	5.603E-14	1.124E-12	1.950E-18	-1.000E+00	6.900E-12	8.250E-09

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

EFFECTIVE	9.050E-16	6.523E-14	1.309E-12	2.270E-18	-1.000E+00	1.180E-11	2.500E-09
SKIN (FGR)	2.880E-15	1.914E-10	3.841E-09	6.660E-15	-1.000E+00	0.000E+00	0.000E+00
Rb-88							
GONADS	3.260E-14	9.590E-15	2.014E-13	3.330E-19	-1.000E+00	1.310E-12	5.040E-11
BREAST	3.670E-14	1.008E-14	2.116E-13	3.500E-19	-1.000E+00	1.430E-12	5.040E-11
LUNGS	3.310E-14	6.307E-15	1.324E-13	2.190E-19	-1.000E+00	1.470E-10	5.040E-11
RED MARR	3.300E-14	5.558E-15	1.167E-13	1.930E-19	-1.000E+00	1.450E-12	6.450E-09
BONE SUR	4.620E-14	2.393E-14	5.025E-13	8.310E-19	-1.000E+00	1.470E-12	1.390E-08
THYROID	3.370E-14	7.171E-15	1.506E-13	2.490E-19	-1.000E+00	1.370E-12	5.040E-11
REMAINDER	3.210E-14	6.422E-15	1.348E-13	2.230E-19	-1.000E+00	1.380E-11	6.700E-09
EFFECTIVE	3.360E-14	8.179E-15	1.717E-13	2.840E-19	-1.000E+00	2.260E-11	3.230E-09
SKIN (FGR)	1.830E-13	4.032E-12	8.465E-11	1.400E-16	-1.000E+00	0.000E+00	0.000E+00
Rb-89							
GONADS	1.030E-13	2.155E-11	5.062E-11	1.026E-15	-1.000E+00	1.340E-12	2.520E-10
BREAST	1.170E-13	2.059E-11	4.838E-11	9.806E-16	-1.000E+00	1.730E-12	3.676E-11
LUNGS	1.040E-13	1.970E-11	4.626E-11	9.376E-16	-1.000E+00	6.800E-11	1.055E-11
RED MARR	1.040E-13	2.011E-11	4.722E-11	9.570E-16	-1.000E+00	2.020E-12	5.659E-11
BONE SUR	1.480E-13	2.852E-11	6.709E-11	1.360E-15	-1.000E+00	2.540E-12	2.070E-11
THYROID	1.070E-13	2.035E-11	4.782E-11	9.693E-16	-1.000E+00	1.610E-12	1.968E-12
REMAINDER	1.010E-13	1.948E-11	4.573E-11	9.268E-16	-1.000E+00	8.140E-12	2.557E-09
EFFECTIVE	1.060E-13	2.057E-11	4.832E-11	9.793E-16	-1.000E+00	1.160E-11	8.455E-10
SKIN (FGR)	1.870E-13	1.748E-10	3.987E-10	8.080E-15	-1.000E+00	0.000E+00	0.000E+00
Sb-124							
GONADS	8.890E-14	1.593E-11	1.830E-11	1.300E-15	-1.000E+00	1.040E-09	8.180E-11
BREAST	1.010E-13	1.520E-11	1.745E-11	1.240E-15	-1.000E+00	8.940E-10	1.700E-11
LUNGS	8.970E-14	1.483E-11	1.703E-11	1.210E-15	-1.000E+00	4.140E-08	7.220E-12
RED MARR	8.850E-14	1.520E-11	1.745E-11	1.240E-15	-1.000E+00	1.090E-09	2.290E-11
BONE SUR	1.340E-13	2.010E-11	2.308E-11	1.640E-15	-1.000E+00	1.240E-09	8.490E-12
THYROID	9.150E-14	1.446E-11	1.661E-11	1.180E-15	-1.000E+00	6.740E-10	1.300E-12
REMAINDER	8.660E-14	1.471E-11	1.689E-11	1.200E-15	-1.000E+00	4.180E-09	1.720E-09
EFFECTIVE	9.150E-14	1.532E-11	1.759E-11	1.250E-15	-1.000E+00	6.800E-09	5.430E-10
SKIN (FGR)	1.260E-13	2.280E-11	2.618E-11	1.860E-15	-1.000E+00	0.000E+00	0.000E+00
Sb-125							
GONADS	1.980E-14	1.586E-13	1.601E-12	5.750E-18	-1.000E+00	3.600E-10	1.430E-14
BREAST	2.270E-14	1.578E-13	1.593E-12	5.720E-18	-1.000E+00	4.160E-10	1.270E-14
LUNGS	1.950E-14	1.313E-13	1.326E-12	4.760E-18	-1.000E+00	2.170E-08	1.260E-14
RED MARR	1.870E-14	1.261E-13	1.273E-12	4.570E-18	-1.000E+00	5.350E-10	3.700E-13
BONE SUR	3.530E-14	3.228E-13	3.259E-12	1.170E-17	-1.000E+00	9.780E-10	3.670E-13
THYROID	2.010E-14	1.385E-13	1.398E-12	5.020E-18	-1.000E+00	3.240E-10	1.260E-14
REMAINDER	1.860E-14	1.291E-13	1.303E-12	4.680E-18	-1.000E+00	1.450E-09	9.680E-09
EFFECTIVE	2.020E-14	1.468E-13	1.482E-12	5.320E-18	-1.000E+00	3.300E-09	2.910E-09
SKIN (FGR)	2.650E-14	2.897E-10	2.924E-09	1.050E-14	-1.000E+00	0.000E+00	0.000E+00
Sb-126							
GONADS	1.350E-13	1.756E-13	3.546E-12	6.110E-18	-1.000E+00	1.320E-09	3.540E-12
BREAST	1.530E-13	1.713E-13	3.459E-12	5.960E-18	-1.000E+00	6.440E-10	5.540E-13
LUNGS	1.340E-13	1.526E-13	3.082E-12	5.310E-18	-1.000E+00	1.380E-08	2.020E-13
RED MARR	1.300E-13	1.521E-13	3.070E-12	5.290E-18	-1.000E+00	7.970E-10	6.590E-12
BONE SUR	2.220E-13	2.903E-13	5.862E-12	1.010E-17	-1.000E+00	6.750E-10	6.130E-12
THYROID	1.370E-13	1.564E-13	3.157E-12	5.440E-18	-1.000E+00	4.800E-10	1.290E-13
REMAINDER	1.280E-13	1.509E-13	3.047E-12	5.250E-18	-1.000E+00	3.190E-09	8.570E-09
EFFECTIVE	1.370E-13	1.650E-13	3.332E-12	5.740E-18	-1.000E+00	3.170E-09	2.570E-09
SKIN (FGR)	1.730E-13	1.989E-10	4.016E-09	6.920E-15	-1.000E+00	0.000E+00	0.000E+00
Te-131							
GONADS	1.990E-14	3.855E-12	4.872E-12	2.650E-16	-1.000E+00	6.140E-12	1.960E-11
BREAST	2.280E-14	3.680E-12	4.652E-12	2.530E-16	-1.000E+00	5.530E-12	3.550E-12
LUNGS	1.960E-14	3.535E-12	4.468E-12	2.430E-16	-1.000E+00	2.540E-10	1.390E-12
RED MARR	1.880E-14	3.608E-12	4.560E-12	2.480E-16	-1.000E+00	6.640E-12	4.910E-12
BONE SUR	3.800E-14	5.091E-12	6.435E-12	3.500E-16	-1.000E+00	6.210E-12	1.750E-12
THYROID	2.030E-14	3.579E-12	4.523E-12	2.460E-16	-1.000E+00	2.630E-09	1.770E-13
REMAINDER	1.870E-14	3.506E-12	4.431E-12	2.410E-16	-1.000E+00	5.420E-11	1.700E-09
EFFECTIVE	2.040E-14	3.680E-12	4.652E-12	2.530E-16	-1.000E+00	1.290E-10	5.150E-10
SKIN (FGR)	6.890E-14	2.022E-10	2.556E-10	1.390E-14	-1.000E+00	0.000E+00	0.000E+00
Te-133							
GONADS	4.490E-14	2.108E-12	4.989E-12	9.510E-17	-1.000E+00	6.700E-13	2.200E-11
BREAST	5.100E-14	2.026E-12	4.794E-12	9.140E-17	-1.000E+00	8.480E-13	3.130E-12
LUNGS	4.470E-14	1.937E-12	4.585E-12	8.740E-17	-1.000E+00	4.390E-11	8.670E-13
RED MARR	4.360E-14	1.972E-12	4.669E-12	8.900E-17	-1.000E+00	8.390E-13	4.930E-12
BONE SUR	7.500E-14	2.948E-12	6.977E-12	1.330E-16	-1.000E+00	7.490E-13	1.730E-12
THYROID	4.590E-14	1.908E-12	4.516E-12	8.610E-17	-1.000E+00	5.910E-10	1.260E-13
REMAINDER	4.290E-14	1.919E-12	4.543E-12	8.660E-17	-1.000E+00	5.020E-12	4.090E-09
EFFECTIVE	4.600E-14	2.021E-12	4.784E-12	9.120E-17	-1.000E+00	2.490E-11	1.230E-09
SKIN (FGR)	1.060E-13	2.726E-10	6.452E-10	1.230E-14	-1.000E+00	0.000E+00	0.000E+00
Te-134							



## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

GONADS	4.160E-14	2.182E-11	4.421E-10	7.590E-16	-1.000E+00	9.000E-12	8.160E-10
BREAST	4.750E-14	2.084E-11	4.223E-10	7.250E-16	-1.000E+00	8.720E-12	1.050E-10
LUNGS	4.100E-14	1.989E-11	4.030E-10	6.920E-16	-1.000E+00	6.020E-11	2.340E-11
RED MARR	3.940E-14	2.030E-11	4.112E-10	7.060E-16	-1.000E+00	9.300E-12	2.140E-10
BONE SUR	7.560E-14	2.875E-11	5.824E-10	1.000E-15	-1.000E+00	8.580E-12	4.860E-10
THYROID	4.230E-14	2.076E-11	4.205E-10	7.220E-16	-1.000E+00	5.540E-10	8.270E-12
REMAINDER	3.910E-14	1.963E-11	3.978E-10	6.830E-16	-1.000E+00	1.880E-11	2.530E-09
EFFECTIVE	4.240E-14	2.078E-11	4.211E-10	7.230E-16	-1.000E+00	3.440E-11	1.020E-09
SKIN (FGR)	6.350E-14	2.561E-11	5.190E-10	8.910E-16	-1.000E+00	0.000E+00	0.000E+00
Te-125m							
GONADS	5.960E-16	2.179E-11	7.799E-11	9.253E-16	-1.000E+00	7.930E-11	6.228E-10
BREAST	8.480E-16	2.083E-11	7.455E-11	8.846E-16	-1.000E+00	7.080E-11	8.137E-11
LUNGS	2.230E-16	1.992E-11	7.127E-11	8.456E-16	-1.000E+00	1.040E-08	1.770E-11
RED MARR	1.860E-16	2.034E-11	7.279E-11	8.634E-16	-1.000E+00	1.150E-09	1.302E-10
BONE SUR	1.220E-15	2.881E-11	1.031E-10	1.224E-15	-1.000E+00	1.180E-08	4.558E-11
THYROID	4.640E-16	2.061E-11	7.377E-11	8.755E-16	-1.000E+00	3.870E-11	2.671E-12
REMAINDER	2.590E-16	1.966E-11	7.035E-11	8.345E-16	-1.000E+00	6.750E-10	6.990E-09
EFFECTIVE	4.530E-16	2.078E-11	7.438E-11	8.824E-16	-1.000E+00	1.970E-09	2.283E-09
SKIN (FGR)	1.940E-15	2.281E-10	8.148E-10	9.587E-15	-1.000E+00	0.000E+00	0.000E+00
Te-133m							
GONADS	1.120E-13	2.253E-11	4.435E-10	7.850E-16	-1.000E+00	8.970E-12	8.050E-10
BREAST	1.270E-13	2.150E-11	4.231E-10	7.490E-16	-1.000E+00	7.820E-12	1.070E-10
LUNGS	1.120E-13	2.055E-11	4.045E-10	7.160E-16	-1.000E+00	1.820E-10	2.740E-11
RED MARR	1.090E-13	2.101E-11	4.135E-10	7.320E-16	-1.000E+00	8.320E-12	1.990E-10
BONE SUR	1.750E-13	2.957E-11	5.819E-10	1.030E-15	-1.000E+00	6.940E-12	2.940E-10
THYROID	1.150E-13	2.144E-11	4.220E-10	7.470E-16	-1.000E+00	2.610E-09	1.180E-11
REMAINDER	1.070E-13	2.032E-11	4.000E-10	7.080E-16	-1.000E+00	4.140E-11	1.470E-09
EFFECTIVE	1.140E-13	2.147E-11	4.226E-10	7.480E-16	-1.000E+00	1.170E-10	6.950E-10
SKIN (FGR)	1.740E-13	2.598E-11	5.112E-10	9.050E-16	-1.000E+00	0.000E+00	0.000E+00
Ba-141							
GONADS	4.060E-14	4.282E-12	4.403E-11	1.550E-16	-1.000E+00	1.410E-12	2.180E-10
BREAST	4.630E-14	4.116E-12	4.233E-11	1.490E-16	-1.000E+00	1.470E-12	3.430E-11
LUNGS	4.030E-14	3.867E-12	3.977E-11	1.400E-16	-1.000E+00	1.160E-10	1.510E-11
RED MARR	3.910E-14	3.923E-12	4.034E-11	1.420E-16	-1.000E+00	2.490E-12	8.320E-11
BONE SUR	7.170E-14	6.105E-12	6.278E-11	2.210E-16	-1.000E+00	4.730E-12	6.320E-11
THYROID	4.150E-14	4.033E-12	4.147E-11	1.460E-16	-1.000E+00	1.330E-12	1.030E-11
REMAINDER	3.870E-14	3.812E-12	3.920E-11	1.380E-16	-1.000E+00	2.270E-11	4.280E-09
EFFECTIVE	4.160E-14	4.061E-12	4.176E-11	1.470E-16	-1.000E+00	2.180E-11	1.360E-09
SKIN (FGR)	1.070E-13	1.039E-10	1.068E-09	3.760E-15	-1.000E+00	0.000E+00	0.000E+00
Ba-137m							
GONADS	2.820E-14	2.334E-12	3.877E-12	1.240E-16	-1.000E+00	0.000E+00	9.750E-12
BREAST	3.220E-14	2.258E-12	3.752E-12	1.200E-16	-1.000E+00	0.000E+00	3.570E-12
LUNGS	2.800E-14	2.127E-12	3.533E-12	1.130E-16	-1.000E+00	0.000E+00	3.140E-12
RED MARR	2.730E-14	2.070E-12	3.439E-12	1.100E-16	-1.000E+00	0.000E+00	6.290E-12
BONE SUR	4.630E-14	5.383E-12	8.942E-12	2.860E-16	-1.000E+00	0.000E+00	4.060E-12
THYROID	2.880E-14	2.145E-12	3.564E-12	1.140E-16	-1.000E+00	0.000E+00	8.460E-11
REMAINDER	2.680E-14	2.070E-12	3.439E-12	1.100E-16	-1.000E+00	0.000E+00	3.340E-11
EFFECTIVE	2.880E-14	2.277E-12	3.783E-12	1.210E-16	-1.000E+00	0.000E+00	1.680E-11
SKIN (FGR)	3.730E-14	2.710E-12	4.502E-12	1.440E-16	-1.000E+00	0.000E+00	0.000E+00
Pd-109							
GONADS	2.710E-16	1.404E-11	2.783E-10	4.892E-16	-1.000E+00	2.130E-12	5.720E-10
BREAST	3.520E-16	1.350E-11	2.677E-10	4.705E-16	-1.000E+00	5.110E-13	1.200E-10
LUNGS	1.940E-16	1.273E-11	2.522E-10	4.432E-16	-1.000E+00	1.200E-09	7.310E-11
RED MARR	1.740E-16	1.287E-11	2.551E-10	4.483E-16	-1.000E+00	9.820E-13	1.660E-10
BONE SUR	7.020E-16	1.958E-11	3.882E-10	6.823E-16	-1.000E+00	9.580E-13	9.631E-11
THYROID	2.460E-16	1.331E-11	2.639E-10	4.638E-16	-1.000E+00	1.550E-13	6.250E-11
REMAINDER	1.920E-16	1.248E-11	2.472E-10	4.346E-16	-1.000E+00	5.040E-10	2.110E-09
EFFECTIVE	2.510E-16	1.332E-11	2.641E-10	4.642E-16	-1.000E+00	2.960E-10	8.271E-10
SKIN (FGR)	2.150E-14	1.785E-11	3.543E-10	6.229E-16	-1.000E+00	0.000E+00	0.000E+00
Rh-106							
GONADS	1.010E-14	1.327E-11	1.861E-11	8.070E-16	-1.000E+00	0.000E+00	9.670E-11
BREAST	1.160E-14	1.271E-11	1.783E-11	7.730E-16	-1.000E+00	0.000E+00	1.590E-11
LUNGS	1.010E-14	1.210E-11	1.697E-11	7.360E-16	-1.000E+00	0.000E+00	6.210E-12
RED MARR	9.750E-15	1.230E-11	1.725E-11	7.480E-16	-1.000E+00	0.000E+00	2.350E-11
BONE SUR	1.720E-14	1.809E-11	2.537E-11	1.100E-15	-1.000E+00	0.000E+00	8.890E-12
THYROID	1.030E-14	1.260E-11	1.766E-11	7.660E-16	-1.000E+00	0.000E+00	1.820E-12
REMAINDER	9.630E-15	1.189E-11	1.667E-11	7.230E-16	-1.000E+00	0.000E+00	8.540E-10
EFFECTIVE	1.040E-14	1.265E-11	1.773E-11	7.690E-16	-1.000E+00	0.000E+00	2.870E-10
SKIN (FGR)	1.090E-13	7.368E-11	1.033E-10	4.480E-15	-1.000E+00	0.000E+00	0.000E+00
Rh-103m							
GONADS	1.250E-17	6.411E-12	1.340E-10	2.230E-16	-1.000E+00	8.910E-14	1.640E-09
BREAST	2.150E-17	6.152E-12	1.286E-10	2.140E-16	-1.000E+00	8.800E-14	1.440E-09
LUNGS	1.870E-18	5.836E-12	1.220E-10	2.030E-16	-1.000E+00	7.750E-12	1.420E-09

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

RED MARR	2.820E-18	5.893E-12	1.232E-10	2.050E-16	-1.000E+00	8.840E-14	1.460E-09
BONE SUR	1.760E-17	8.883E-12	1.856E-10	3.090E-16	-1.000E+00	8.730E-14	1.430E-09
THYROID	8.550E-18	6.066E-12	1.268E-10	2.110E-16	-1.000E+00	8.490E-14	1.410E-09
REMAINDER	3.680E-18	5.721E-12	1.196E-10	1.990E-16	-1.000E+00	1.340E-12	2.110E-08
EFFECTIVE	8.800E-18	6.095E-12	1.274E-10	2.120E-16	-1.000E+00	1.380E-12	7.400E-09
SKIN (FGR)	4.490E-17	4.082E-10	8.531E-09	1.420E-14	-1.000E+00	0.000E+00	0.000E+00
Tc-101							
GONADS	1.570E-14	2.127E-12	1.411E-11	7.980E-17	-1.000E+00	2.500E-13	5.800E-11
BREAST	1.800E-14	2.063E-12	1.369E-11	7.740E-17	-1.000E+00	3.030E-13	8.970E-12
LUNGS	1.540E-14	1.935E-12	1.284E-11	7.260E-17	-1.000E+00	2.830E-11	3.860E-12
RED MARR	1.460E-14	1.946E-12	1.291E-11	7.300E-17	-1.000E+00	3.190E-13	1.470E-11
BONE SUR	3.210E-14	3.332E-12	2.210E-11	1.250E-16	-1.000E+00	2.800E-13	6.750E-12
THYROID	1.590E-14	1.983E-12	1.316E-11	7.440E-17	-1.000E+00	7.720E-12	2.910E-12
REMAINDER	1.470E-14	1.885E-12	1.250E-11	7.070E-17	-1.000E+00	3.520E-12	1.270E-09
EFFECTIVE	1.610E-14	2.031E-12	1.347E-11	7.620E-17	-1.000E+00	4.840E-12	3.990E-10
SKIN (FGR)	4.770E-14	4.691E-12	3.112E-11	1.760E-16	-1.000E+00	0.000E+00	0.000E+00
Eu-154							
GONADS	6.000E-14	1.985E-11	2.441E-10	7.100E-16	-1.000E+00	1.170E-08	6.140E-10
BREAST	6.810E-14	1.904E-11	2.341E-10	6.810E-16	-1.000E+00	1.550E-08	7.600E-11
LUNGS	5.990E-14	1.809E-11	2.224E-10	6.470E-16	-1.000E+00	7.920E-08	1.570E-11
RED MARR	5.870E-14	1.834E-11	2.255E-10	6.560E-16	-1.000E+00	1.060E-07	1.330E-10
BONE SUR	9.430E-14	2.720E-11	3.345E-10	9.730E-16	-1.000E+00	5.230E-07	5.240E-11
THYROID	6.150E-14	1.884E-11	2.317E-10	6.740E-16	-1.000E+00	7.140E-09	4.640E-12
REMAINDER	5.750E-14	1.775E-11	2.183E-10	6.350E-16	-1.000E+00	1.130E-07	5.870E-09
EFFECTIVE	6.140E-14	1.890E-11	2.324E-10	6.760E-16	-1.000E+00	7.730E-08	1.950E-09
SKIN (FGR)	8.290E-14	7.967E-11	9.799E-10	2.850E-15	-1.000E+00	0.000E+00	0.000E+00
Eu-155							
GONADS	2.490E-15	2.336E-11	3.231E-11	1.440E-15	-1.000E+00	3.560E-10	1.510E-10
BREAST	2.950E-15	2.222E-11	3.074E-11	1.370E-15	-1.000E+00	6.140E-10	2.560E-11
LUNGS	2.220E-15	2.141E-11	2.962E-11	1.320E-15	-1.000E+00	1.190E-08	9.390E-12
RED MARR	1.850E-15	2.190E-11	3.029E-11	1.350E-15	-1.000E+00	1.430E-08	3.670E-11
BONE SUR	8.090E-15	3.033E-11	4.196E-11	1.870E-15	-1.000E+00	1.520E-07	1.340E-11
THYROID	2.410E-15	2.174E-11	3.007E-11	1.340E-15	-1.000E+00	2.400E-10	1.470E-12
REMAINDER	2.070E-15	2.125E-11	2.939E-11	1.310E-15	-1.000E+00	1.110E-08	1.450E-09
EFFECTIVE	2.490E-15	2.238E-11	3.096E-11	1.380E-15	-1.000E+00	1.120E-08	4.840E-10
SKIN (FGR)	3.390E-15	8.273E-11	1.144E-10	5.100E-15	-1.000E+00	0.000E+00	0.000E+00
Eu-156							
GONADS	6.570E-14	1.191E-13	2.661E-13	5.480E-18	-1.000E+00	6.120E-10	4.020E-12
BREAST	7.420E-14	1.158E-13	2.588E-13	5.330E-18	-1.000E+00	3.640E-10	3.000E-12
LUNGS	6.630E-14	1.060E-13	2.370E-13	4.880E-18	-1.000E+00	1.840E-08	2.890E-12
RED MARR	6.560E-14	1.058E-13	2.365E-13	4.870E-18	-1.000E+00	1.140E-09	6.570E-12
BONE SUR	9.580E-14	1.862E-13	4.162E-13	8.570E-18	-1.000E+00	2.760E-09	6.460E-12
THYROID	6.780E-14	1.106E-13	2.472E-13	5.090E-18	-1.000E+00	2.160E-10	2.860E-12
REMAINDER	6.410E-14	1.036E-13	2.316E-13	4.770E-18	-1.000E+00	3.910E-09	6.130E-10
EFFECTIVE	6.750E-14	1.125E-13	2.515E-13	5.180E-18	-1.000E+00	3.820E-09	1.870E-10
SKIN (FGR)	9.980E-14	1.173E-11	2.622E-11	5.400E-16	-1.000E+00	0.000E+00	0.000E+00
La-143							
GONADS	5.040E-15	4.689E-13	9.642E-12	1.630E-17	-1.000E+00	6.530E-13	1.250E-10
BREAST	5.700E-15	5.150E-13	1.059E-11	1.790E-17	-1.000E+00	3.200E-13	9.740E-11
LUNGS	5.070E-15	1.602E-13	3.295E-12	5.570E-18	-1.000E+00	1.060E-10	9.620E-11
RED MARR	5.010E-15	1.249E-13	2.567E-12	4.340E-18	-1.000E+00	7.300E-13	5.430E-09
BONE SUR	7.590E-15	9.005E-13	1.852E-11	3.130E-17	-1.000E+00	7.290E-13	2.070E-08
THYROID	5.190E-15	2.779E-13	5.714E-12	9.660E-18	-1.000E+00	2.440E-13	9.430E-11
REMAINDER	4.900E-15	1.999E-13	4.111E-12	6.950E-18	-1.000E+00	1.050E-11	2.980E-09
EFFECTIVE	5.180E-15	3.251E-13	6.684E-12	1.130E-17	-1.000E+00	1.620E-11	2.230E-09
SKIN (FGR)	9.640E-14	1.496E-12	3.076E-11	5.200E-17	-1.000E+00	0.000E+00	0.000E+00
Nb-97							
GONADS	3.110E-14	3.889E-13	3.922E-13	6.510E-17	-1.000E+00	8.650E-13	1.590E-12
BREAST	3.550E-14	3.800E-13	3.832E-13	6.360E-17	-1.000E+00	1.120E-12	6.050E-13
LUNGS	3.100E-14	3.298E-13	3.326E-13	5.520E-17	-1.000E+00	1.560E-10	4.910E-13
RED MARR	3.010E-14	3.298E-13	3.326E-13	5.520E-17	-1.000E+00	1.140E-12	7.640E-13
BONE SUR	5.110E-14	5.753E-13	5.802E-13	9.630E-17	-1.000E+00	8.260E-13	5.400E-13
THYROID	3.180E-14	3.525E-13	3.555E-13	5.900E-17	-1.000E+00	9.200E-13	3.360E-13
REMAINDER	2.960E-14	3.262E-13	3.289E-13	5.460E-17	-1.000E+00	1.050E-11	1.790E-10
EFFECTIVE	3.180E-14	3.590E-13	3.621E-13	6.010E-17	-1.000E+00	2.240E-11	5.450E-11
SKIN (FGR)	6.510E-14	3.429E-11	3.458E-11	5.740E-15	-1.000E+00	0.000E+00	0.000E+00
Nb-95m							
GONADS	2.880E-15	2.206E-12	4.799E-11	8.561E-17	-1.000E+00	4.960E-11	2.420E-10
BREAST	3.310E-15	2.181E-12	4.739E-11	8.454E-17	-1.000E+00	4.530E-11	1.664E-10
LUNGS	2.770E-15	1.741E-12	3.815E-11	6.808E-17	-1.000E+00	3.070E-09	1.593E-10
RED MARR	2.590E-15	1.729E-12	3.793E-11	6.768E-17	-1.000E+00	5.870E-11	3.500E-09
BONE SUR	6.600E-15	3.287E-12	7.147E-11	1.275E-16	-1.000E+00	6.610E-11	7.990E-09
THYROID	2.890E-15	1.923E-12	4.201E-11	7.495E-17	-1.000E+00	3.860E-11	1.572E-10

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

REMAINDER	2.630E-15	1.746E-12	3.822E-11	6.819E-17	-1.000E+00	8.690E-10	7.196E-09
EFFECTIVE	2.930E-15	1.974E-12	4.308E-11	7.686E-17	-1.000E+00	6.590E-10	2.925E-09
SKIN (FGR)	1.120E-14	1.501E-10	3.360E-09	6.001E-15	-1.000E+00	0.000E+00	0.000E+00
Pm-147							
GONADS	7.480E-19	4.020E-11	2.343E-10	1.535E-15	-1.000E+00	8.250E-15	7.415E-10
BREAST	9.560E-19	3.853E-11	2.246E-10	1.472E-15	-1.000E+00	3.600E-14	1.361E-10
LUNGS	5.450E-19	3.657E-11	2.131E-10	1.397E-15	-1.000E+00	7.740E-08	6.335E-11
RED MARR	4.460E-19	3.736E-11	2.178E-10	1.427E-15	-1.000E+00	1.610E-09	2.435E-10
BONE SUR	2.180E-18	5.467E-11	3.189E-10	2.090E-15	-1.000E+00	2.010E-08	3.248E-10
THYROID	6.750E-19	3.741E-11	2.181E-10	1.429E-15	-1.000E+00	1.980E-14	4.383E-08
REMAINDER	5.260E-19	3.626E-11	2.113E-10	1.385E-15	-1.000E+00	1.560E-09	3.153E-09
EFFECTIVE	6.930E-19	3.825E-11	2.229E-10	1.461E-15	-1.000E+00	1.060E-08	2.514E-09
SKIN (FGR)	8.110E-16	1.033E-10	6.188E-10	4.056E-15	-1.000E+00	0.000E+00	0.000E+00
Pm-148							
GONADS	2.810E-14	6.812E-12	7.706E-11	2.450E-16	-1.000E+00	2.120E-10	5.410E-10
BREAST	3.190E-14	6.756E-12	7.643E-11	2.430E-16	-1.000E+00	7.190E-11	3.500E-10
LUNGS	2.830E-14	5.727E-12	6.479E-11	2.060E-16	-1.000E+00	1.370E-08	3.300E-10
RED MARR	2.790E-14	5.588E-12	6.322E-11	2.010E-16	-1.000E+00	1.070E-10	4.440E-10
BONE SUR	4.240E-14	1.273E-11	1.441E-10	4.580E-16	-1.000E+00	7.080E-11	8.300E-10
THYROID	2.890E-14	5.978E-12	6.762E-11	2.150E-16	-1.000E+00	3.820E-11	5.950E-08
REMAINDER	2.730E-14	5.644E-12	6.385E-11	2.030E-16	-1.000E+00	4.100E-09	1.490E-09
EFFECTIVE	2.890E-14	6.339E-12	7.171E-11	2.280E-16	-1.000E+00	2.950E-09	2.540E-09
SKIN (FGR)	7.970E-14	8.313E-12	9.405E-11	2.990E-16	-1.000E+00	0.000E+00	0.000E+00
Pm-149							
GONADS	5.300E-16	1.119E-11	1.789E-10	3.940E-16	-1.000E+00	3.610E-12	4.070E-11
BREAST	6.070E-16	1.082E-11	1.730E-10	3.810E-16	-1.000E+00	8.200E-13	1.210E-10
LUNGS	5.170E-16	1.016E-11	1.626E-10	3.580E-16	-1.000E+00	3.120E-09	1.020E-10
RED MARR	4.890E-16	1.022E-11	1.635E-10	3.600E-16	-1.000E+00	5.530E-12	9.440E-11
BONE SUR	1.100E-15	1.675E-11	2.679E-10	5.900E-16	-1.000E+00	5.010E-12	8.720E-11
THYROID	5.360E-16	1.053E-11	1.685E-10	3.710E-16	-1.000E+00	3.310E-13	4.760E-07
REMAINDER	4.910E-16	9.908E-12	1.585E-10	3.490E-16	-1.000E+00	1.390E-09	1.570E-10
EFFECTIVE	5.410E-16	1.067E-11	1.707E-10	3.760E-16	-1.000E+00	7.930E-10	1.440E-08
SKIN (FGR)	2.190E-14	1.825E-11	2.920E-10	6.430E-16	-1.000E+00	0.000E+00	0.000E+00
Pm-151							
GONADS	1.480E-14	2.523E-11	2.771E-11	2.320E-15	-1.000E+00	7.170E-11	2.330E-11
BREAST	1.700E-14	2.414E-11	2.652E-11	2.220E-15	-1.000E+00	1.590E-11	2.520E-11
LUNGS	1.440E-14	2.305E-11	2.532E-11	2.120E-15	-1.000E+00	1.640E-09	2.640E-11
RED MARR	1.370E-14	2.360E-11	2.592E-11	2.170E-15	-1.000E+00	2.720E-11	2.460E-11
BONE SUR	2.990E-14	3.327E-11	3.655E-11	3.060E-15	-1.000E+00	1.860E-11	2.190E-11
THYROID	1.500E-14	2.381E-11	2.616E-11	2.190E-15	-1.000E+00	6.180E-12	3.870E-09
REMAINDER	1.370E-14	2.283E-11	2.509E-11	2.100E-15	-1.000E+00	8.390E-10	1.650E-10
EFFECTIVE	1.510E-14	2.403E-11	2.640E-11	2.210E-15	-1.000E+00	4.730E-10	1.820E-10
SKIN (FGR)	3.320E-14	8.199E-11	9.007E-11	7.540E-15	-1.000E+00	0.000E+00	0.000E+00
Pm-148m							
GONADS	9.470E-14	1.585E-11	6.748E-11	6.270E-16	-1.000E+00	1.190E-09	3.630E-11
BREAST	1.080E-13	1.519E-11	6.468E-11	6.010E-16	-1.000E+00	1.240E-09	4.680E-11
LUNGS	9.420E-14	1.446E-11	6.156E-11	5.720E-16	-1.000E+00	3.590E-08	4.530E-11
RED MARR	9.140E-14	1.466E-11	6.242E-11	5.800E-16	-1.000E+00	1.360E-09	4.300E-11
BONE SUR	1.580E-13	2.161E-11	9.202E-11	8.550E-16	-1.000E+00	1.360E-09	4.070E-11
THYROID	9.680E-14	1.502E-11	6.393E-11	5.940E-16	-1.000E+00	1.050E-09	9.100E-08
REMAINDER	9.010E-14	1.418E-11	6.038E-11	5.610E-16	-1.000E+00	3.580E-09	1.550E-10
EFFECTIVE	9.680E-14	1.509E-11	6.425E-11	5.970E-16	-1.000E+00	6.100E-09	2.800E-09
SKIN (FGR)	1.180E-13	1.150E-10	4.897E-10	4.550E-15	-1.000E+00	0.000E+00	0.000E+00
Pr-144							
GONADS	1.900E-15	1.200E-11	1.202E-11	2.640E-15	-1.000E+00	2.410E-15	1.100E-11
BREAST	2.150E-15	1.145E-11	1.147E-11	2.520E-15	-1.000E+00	1.050E-14	1.170E-11
LUNGS	1.900E-15	1.100E-11	1.102E-11	2.420E-15	-1.000E+00	9.400E-11	1.260E-11
RED MARR	1.870E-15	1.127E-11	1.129E-11	2.480E-15	-1.000E+00	1.380E-14	1.090E-11
BONE SUR	2.990E-15	1.568E-11	1.571E-11	3.450E-15	-1.000E+00	1.470E-14	9.320E-12
THYROID	1.950E-15	1.127E-11	1.129E-11	2.480E-15	-1.000E+00	8.470E-15	6.210E-10
REMAINDER	1.840E-15	1.091E-11	1.093E-11	2.400E-15	-1.000E+00	1.400E-12	1.340E-10
EFFECTIVE	1.950E-15	1.150E-11	1.152E-11	2.530E-15	-1.000E+00	1.170E-11	6.660E-11
SKIN (FGR)	8.430E-14	4.477E-11	4.485E-11	9.850E-15	-1.000E+00	0.000E+00	0.000E+00
Pr-144m							
GONADS	3.250E-16	3.113E-11	5.489E-11	1.599E-15	-1.000E+00	0.000E+00	3.610E-11
BREAST	4.200E-16	2.971E-11	5.240E-11	1.526E-15	-1.000E+00	0.000E+00	3.850E-11
LUNGS	2.000E-16	2.886E-11	5.089E-11	1.482E-15	-1.000E+00	0.000E+00	3.750E-11
RED MARR	1.560E-16	2.965E-11	5.228E-11	1.523E-15	-1.000E+00	0.000E+00	3.650E-11
BONE SUR	8.160E-16	3.983E-11	7.024E-11	2.046E-15	-1.000E+00	0.000E+00	3.360E-11
THYROID	2.810E-16	2.852E-11	5.030E-11	1.465E-15	-1.000E+00	0.000E+00	1.790E-08
REMAINDER	1.980E-16	2.883E-11	5.084E-11	1.481E-15	-1.000E+00	0.000E+00	1.540E-10
EFFECTIVE	2.790E-16	2.989E-11	5.271E-11	1.535E-15	-1.000E+00	0.000E+00	6.080E-10
SKIN (FGR)	5.080E-16	9.826E-11	1.733E-10	5.047E-15	-1.000E+00	0.000E+00	0.000E+00

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

## Sm-153

GONADS	2.330E-15	1.465E-12	2.052E-11	5.200E-17	-1.000E+00	2.360E-11	0.000E+00
BREAST	2.820E-15	1.505E-12	2.107E-11	5.340E-17	-1.000E+00	5.670E-12	0.000E+00
LUNGS	1.970E-15	1.045E-12	1.464E-11	3.710E-17	-1.000E+00	2.050E-09	0.000E+00
RED MARR	1.620E-15	8.791E-13	1.231E-11	3.120E-17	-1.000E+00	6.660E-11	0.000E+00
BONE SUR	7.290E-15	4.254E-12	5.958E-11	1.510E-16	-1.000E+00	1.570E-10	0.000E+00
THYROID	2.220E-15	1.181E-12	1.653E-11	4.190E-17	-1.000E+00	1.510E-12	0.000E+00
REMAINDER	1.850E-15	1.042E-12	1.460E-11	3.700E-17	-1.000E+00	8.840E-10	0.000E+00
EFFECTIVE	2.280E-15	1.299E-12	1.819E-11	4.610E-17	-1.000E+00	5.310E-10	0.000E+00
SKIN (FGR)	1.450E-14	1.953E-12	2.734E-11	6.930E-17	-1.000E+00	0.000E+00	0.000E+00

## Y-94

GONADS	5.490E-14	5.455E-12	1.194E-11	2.530E-16	-1.000E+00	1.230E-13	0.000E+00
BREAST	6.210E-14	5.325E-12	1.166E-11	2.470E-16	-1.000E+00	4.400E-13	0.000E+00
LUNGS	5.500E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E+00	1.480E-10	0.000E+00
RED MARR	5.420E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E+00	4.180E-13	0.000E+00
BONE SUR	8.220E-14	9.120E-12	1.997E-11	4.230E-16	-1.000E+00	3.280E-13	0.000E+00
THYROID	5.650E-14	5.023E-12	1.100E-11	2.330E-16	-1.000E+00	4.120E-13	0.000E+00
REMAINDER	5.300E-14	4.829E-12	1.058E-11	2.240E-16	-1.000E+00	3.080E-12	0.000E+00
EFFECTIVE	5.620E-14	5.217E-12	1.142E-11	2.420E-16	-1.000E+00	1.890E-11	0.000E+00
SKIN (FGR)	1.800E-13	4.506E-11	9.867E-11	2.090E-15	-1.000E+00	0.000E+00	0.000E+00

## Y-95

GONADS	4.650E-14	4.607E-11	9.646E-10	1.600E-15	-1.000E+00	1.070E-13	2.060E-08
BREAST	5.190E-14	4.406E-11	9.224E-10	1.530E-15	-1.000E+00	3.170E-13	1.720E-08
LUNGS	4.720E-14	4.204E-11	8.802E-10	1.460E-15	-1.000E+00	8.040E-11	1.760E-08
RED MARR	4.730E-14	4.262E-11	8.922E-10	1.480E-15	-1.000E+00	3.200E-13	1.870E-08
BONE SUR	6.410E-14	6.105E-11	1.278E-09	2.120E-15	-1.000E+00	3.790E-13	1.740E-08
THYROID	4.840E-14	4.377E-11	9.163E-10	1.520E-15	-1.000E+00	2.790E-13	1.760E-08
REMAINDER	4.590E-14	4.147E-11	8.681E-10	1.440E-15	-1.000E+00	1.250E-12	2.210E-08
EFFECTIVE	4.790E-14	4.377E-11	9.163E-10	1.520E-15	-1.000E+00	1.020E-11	1.980E-08
SKIN (FGR)	1.590E-13	6.249E-11	1.308E-09	2.170E-15	-1.000E+00	0.000E+00	0.000E+00

## Y-91m

GONADS	2.490E-14	6.223E-11	1.102E-09	2.180E-15	-1.000E+00	3.210E-13	3.040E-09
BREAST	2.850E-14	5.966E-11	1.056E-09	2.090E-15	-1.000E+00	6.080E-13	2.650E-09
LUNGS	2.480E-14	5.710E-11	1.011E-09	2.000E-15	-1.000E+00	7.000E-11	2.620E-09
RED MARR	2.390E-14	5.824E-11	1.031E-09	2.040E-15	-1.000E+00	7.740E-13	2.950E-09
BONE SUR	4.280E-14	8.422E-11	1.491E-09	2.950E-15	-1.000E+00	6.210E-13	2.710E-09
THYROID	2.540E-14	5.852E-11	1.036E-09	2.050E-15	-1.000E+00	5.020E-13	2.740E-09
REMAINDER	2.370E-14	5.652E-11	1.001E-09	1.980E-15	-1.000E+00	3.740E-12	3.520E-09
EFFECTIVE	2.550E-14	5.966E-11	1.056E-09	2.090E-15	-1.000E+00	9.820E-12	3.040E-09
SKIN (FGR)	3.110E-14	7.251E-11	1.284E-09	2.540E-15	-1.000E+00	0.000E+00	0.000E+00

## Br-82

GONADS	1.270E-13	1.669E-11	3.530E-10	5.840E-16	-1.000E+00	1.690E-10	1.390E-08
BREAST	1.440E-13	1.596E-11	3.376E-10	5.585E-16	-1.000E+00	2.100E-10	1.240E-08
LUNGS	1.270E-13	1.517E-11	3.209E-10	5.309E-16	-1.000E+00	1.680E-09	1.270E-08
RED MARR	1.240E-13	1.542E-11	3.260E-10	5.394E-16	-1.000E+00	2.180E-10	1.320E-08
BONE SUR	1.990E-13	2.238E-11	4.734E-10	7.832E-16	-1.000E+00	1.920E-10	1.260E-08
THYROID	1.300E-13	1.588E-11	3.358E-10	5.556E-16	-1.000E+00	2.060E-10	1.260E-08
REMAINDER	1.220E-13	1.490E-11	3.152E-10	5.215E-16	-1.000E+00	3.310E-10	1.450E-08
EFFECTIVE	1.300E-13	1.585E-11	3.353E-10	5.546E-16	-1.000E+00	4.130E-10	1.350E-08
SKIN (FGR)	1.540E-13	5.253E-11	1.110E-09	1.836E-15	-1.000E+00	0.000E+00	0.000E+00

## Br-83

GONADS	3.740E-16	3.368E-13	3.429E-13	4.790E-17	-1.000E+00	1.130E-12	1.560E-12
BREAST	4.290E-16	3.297E-13	3.357E-13	4.690E-17	-1.000E+00	1.140E-12	5.170E-13
LUNGS	3.690E-16	3.002E-13	3.057E-13	4.270E-17	-1.000E+00	1.820E-10	3.890E-13
RED MARR	3.540E-16	2.932E-13	2.985E-13	4.170E-17	-1.000E+00	1.140E-12	8.590E-13
BONE SUR	6.750E-16	6.841E-13	6.965E-13	9.730E-17	-1.000E+00	1.140E-12	4.380E-13
THYROID	3.800E-16	3.044E-13	3.100E-13	4.330E-17	-1.000E+00	1.140E-12	2.660E-13
REMAINDER	3.520E-16	2.932E-13	2.985E-13	4.170E-17	-1.000E+00	5.310E-12	3.570E-10
EFFECTIVE	3.820E-16	3.227E-13	3.286E-13	4.590E-17	-1.000E+00	2.410E-11	1.080E-10
SKIN (FGR)	1.850E-14	7.241E-11	7.373E-11	1.030E-14	-1.000E+00	0.000E+00	0.000E+00

## Br-84

GONADS	9.160E-14	5.451E-12	9.607E-11	1.910E-16	-1.000E+00	2.840E-12	9.960E-10
BREAST	1.020E-13	5.280E-12	9.305E-11	1.850E-16	-1.000E+00	3.310E-12	1.590E-10
LUNGS	9.270E-14	4.852E-12	8.550E-11	1.700E-16	-1.000E+00	1.560E-10	6.630E-11
RED MARR	2.260E-14	4.880E-12	8.601E-11	1.710E-16	-1.000E+00	3.270E-12	4.390E-10
BONE SUR	1.280E-13	8.020E-12	1.413E-10	2.810E-16	-1.000E+00	2.990E-12	5.530E-10
THYROID	9.500E-14	5.109E-12	9.003E-11	1.790E-16	-1.000E+00	3.120E-12	5.250E-11
REMAINDER	8.990E-14	4.766E-12	8.399E-11	1.670E-16	-1.000E+00	1.870E-11	7.370E-09
EFFECTIVE	9.410E-14	5.137E-12	9.053E-11	1.800E-16	-1.000E+00	2.610E-11	2.560E-09
SKIN (FGR)	1.880E-13	5.565E-11	9.808E-10	1.950E-15	-1.000E+00	0.000E+00	0.000E+00

## Am-242

GONADS	6.090E-16	6.027E-11	4.425E-10	2.240E-15	-1.000E+00	1.940E-09	1.340E-09
BREAST	7.300E-16	5.758E-11	4.228E-10	2.140E-15	-1.000E+00	2.940E-12	1.800E-10

## Palisades Design Basis Small Line Break Outside Containment AST Radiological Analysis

Calculation Number: NAI-1149-020 Rev. 0

LUNGS	5.510E-16	5.596E-11	4.109E-10	2.080E-15	-1.000E+00	5.200E-08	4.010E-11
RED MARR	4.770E-16	5.731E-11	4.208E-10	2.130E-15	-1.000E+00	1.320E-08	2.810E-10
BONE SUR	1.880E-15	7.776E-11	5.709E-10	2.890E-15	-1.000E+00	1.650E-07	9.770E-11
THYROID	5.940E-16	5.462E-11	4.010E-10	2.030E-15	-1.000E+00	2.520E-12	6.400E-12
REMAINDER	5.180E-16	5.569E-11	4.089E-10	2.070E-15	-1.000E+00	8.540E-09	6.260E-09
EFFECTIVE	6.150E-16	5.812E-11	4.267E-10	2.160E-15	-1.000E+00	1.580E-08	2.280E-09
SKIN (FGR)	8.200E-15	2.217E-10	1.628E-09	8.240E-15	-1.000E+00	0.000E+00	0.000E+00
Np-238							
GONADS	2.660E-14	7.315E-13	9.675E-13	4.740E-17	-1.000E+00	1.990E-09	3.770E-12
BREAST	3.020E-14	7.007E-13	9.267E-13	4.540E-17	-1.000E+00	4.180E-11	7.070E-13
LUNGS	2.650E-14	6.713E-13	8.879E-13	4.350E-17	-1.000E+00	3.470E-09	2.720E-13
RED MARR	2.610E-14	6.852E-13	9.063E-13	4.440E-17	-1.000E+00	1.690E-08	1.070E-12
BONE SUR	3.990E-14	9.923E-13	1.312E-12	6.430E-17	-1.000E+00	2.100E-07	6.060E-13
THYROID	2.730E-14	6.590E-13	8.716E-13	4.270E-17	-1.000E+00	2.450E-11	5.290E-14
REMAINDER	2.550E-14	6.682E-13	8.838E-13	4.330E-17	-1.000E+00	2.550E-09	1.240E-09
EFFECTIVE	2.720E-14	7.007E-13	9.267E-13	4.540E-17	-1.000E+00	1.000E-08	3.740E-10
SKIN (FGR)	4.310E-14	1.667E-10	2.204E-10	1.080E-14	-1.000E+00	0.000E+00	0.000E+00
Pu-243							
GONADS	1.020E-15	1.978E-11	2.034E-11	2.540E-15	-1.000E+00	1.670E-12	6.990E-11
BREAST	1.210E-15	1.885E-11	1.938E-11	2.420E-15	-1.000E+00	2.750E-13	1.540E-11
LUNGS	9.280E-16	1.846E-11	1.898E-11	2.370E-15	-1.000E+00	2.270E-10	8.400E-12
RED MARR	7.840E-16	1.900E-11	1.954E-11	2.440E-15	-1.000E+00	5.770E-12	1.930E-11
BONE SUR	3.230E-15	2.484E-11	2.554E-11	3.190E-15	-1.000E+00	6.530E-11	7.400E-12
THYROID	9.910E-16	1.768E-11	1.818E-11	2.270E-15	-1.000E+00	1.130E-13	1.160E-12
REMAINDER	8.660E-16	1.853E-11	1.906E-11	2.380E-15	-1.000E+00	4.690E-11	5.200E-10
EFFECTIVE	1.030E-15	1.916E-11	1.970E-11	2.460E-15	-1.000E+00	4.440E-11	1.790E-10
SKIN (FGR)	8.150E-15	9.111E-11	9.368E-11	1.170E-14	-1.000E+00	0.000E+00	0.000E+00