Enclosure (7)

CA06604 WGI

Radiological Consequence

Design Basis Calculation

Using AST

Calvert Cliffs Nuclear Power, Inc.
November 3, 2005

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FORM 19, CALCULATION COVER SHEET

A. INITIATION (Control Doc Type - DCALC) Page 1 of 1

DCALC No.: CA06604 Revision No.: 0000

Vendor Calculation (Check one): ☐ Yes ☒ No

Responsible Group: Fuel Operations Support Unit

Responsible Engineer: J. R. Massari

B. CALCULATION

ENGINEERING DISCIPLINE: ☐ Civil ☐ Instr & Controls ☒ Nuc Engrg ☐ Electrical ☐ Mechanical ☐ Nuc Fuel Mngmt ☐ Other: ☐ Reliability Engrg

Title: WASTE GAS INCIDENT FOR ALTERNATE SOURCE TERM

Unit ☐ 1 ☐ 2 ☒ COMMON

Proprietary or Safeguards Calculation ☐ YES ☒ NO

Comments:

Vendor Calc No.: N/A REVISION NO.:

Vendor Name: N/A

Safety Class (Check one): ☒ SR ☐ AQ ☐ NSR

There are assumptions that require Verification during walkdown: AIT #:

This calculation SUPERSEDES: WASTE GAS INCIDENT PORTIONS OF CA05994 WHEN LAR APPROVED

C. REVIEW AND APPROVAL:

Responsible Engineer: J. R. Massari — Printed Name and Signature — 8/3/05 Date

Independent Reviewer/Verifier: J. B. Couch — Printed Name and Signature — 8 Aug 2005 Date

Approval: P. I. Wengloski — Printed Name and Signature — 8/12/05 Date

IF the results or conclusions of this calculation or revision might affect a procedure or the basis of a procedure, a Change Notification Form (Form 14) shall be forwarded to the Procedure Development Unit with a summary of the calculation's purpose and results.

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1.0 INTRODUCTION AND OBJECTIVE

The most limiting waste gas incident is defined as an unexpected and uncontrolled release to the atmosphere of the radioactive xenon and krypton fission gases that are stored in one waste gas decay tank. As the components of the waste gas system are subjected to pressures no greater than 150 psig, a failure is not likely. However, a non-mechanistic rupture of a waste gas decay tank is analyzed to define the limit of the hazard that could result from any malfunction in the radioactive waste gas system.

The original analysis for this event was performed as part of Bechtel Calculation 6750-620-1, "Gaseous Waste Effluents," dated December 8, 1970 (included as Attachment A because it is only available on microfilm) to satisfy the requirements of Draft GDC Criterion 70 that gaseous, liquid, and solid waste system accident dose consequences be "substantially below" the limits of 10CFR100 (Reference 1). This calculation assumed an instantaneous and complete release of a waste gas decay tank containing all noble gases from a complete letdown of the entire volume of one Reactor Coolant System (RCS) that has been operating for an extended period of time with 1% failed fuel (with specific activities from the preoperational estimates in UFSAR Table 11-5) and neglecting decay during the time required to transfer gases from the RCS to the waste gas decay tank. A whole body site boundary dose of 464 mrem was calculated using Eisenbud's equation, which was approximately a factor of 50 below the 10CFR100 limits of 25 rem whole body and 300 rem thyroid. This dose was also below the 500 mrem site boundary whole body dose limit that Branch Technical Position 11-5 of NRC Standard Review Plan (Rev. 0 - July 1981) later considered as "substantially below" the 10CFR100 limit and consistent with the requirements of 10CFR20.

The waste gas incident doses were recalculated in Reference 3 when the 1% failed fuel RCS specific activities were recalculated for 24-month cycles with Value Added Pellet fuel as part of the engineering to install the NUKEM waste processing skid. ICRP 30 dose conversion factors and calculational methodology were utilized, as they had been previously approved by the NRC for other Chapter 14 accidents. The assumption that no radiological decay occurred during the time that the gases were being transferred from the RCS to the waste gas decay tank was maintained. A whole body site boundary dose of 182 mrem was calculated. In addition, a 30-day control room whole body dose of 87.7 mrem was calculated using the AX2 code, which was well within the 10CFR50 Appendix A GDC 19 limits of 5 rem whole body.

The objective of this calculation is to utilize the alternate source term (AST) methodology of 10 CFR 50.67 and Regulatory Guide 1.183 (Reference 2) to calculate offsite and control room doses for a Waste Gas Incident. A bounding control room inleakage value of 3500 cfm was assumed. Also credited was installation of automatic isolation dampers and radiation monitors at Access Controls 11 and 13 on the Auxiliary Building Roof. This modification limits activity egress into the control room from either the West Road Inlet or the Turbine Building, thus limiting the atmospheric dispersion coefficient value.

2.0 INPUT

2.1 Reactor Coolant System Noble Gas Inventory

Regulatory Guide 1.183 (Reference 2) does not specifically provide guidance for a waste gas decay tank failure, but requires that if no or minimal fuel damage is postulated for a particular design basis accident, the activity released should be the maximum coolant activity allowed by the technical specifications. Calvert Cliffs Technical Specification 3.4.15 requires that in Modes 1 and 2 and in Mode 3 with RCS average temperature greater than 500°F that the noble gas activity be less than 100/Ebar μCi/gm. Calvert Cliffs UFSAR 14.22, Regulatory Guide 1.24 (Reference 1), and NRC Standard Review Plan Branch Technical Position 11-5 all require that evaluation of a waste gas decay tank failure consider the maximum reactor coolant noble gas activity corresponding to that which would occur during operation for an extended period of time with 1% failed fuel.

Reference 4 calculates the total RCS noble gas equilibrium activities for 1% failed fuel and for the 100/Ebar μCi/gm condition with an activity distribution based on 1% failed fuel. Both are presented along with their half-lives in Table 2.1 below. The 100/Ebar μCi/gm noble gas activities will be utilized for this calculation since they are more limiting than the 1% failed fuel activities and are based on an administrative limit.

Table 2.1 - 1% Failed Fuel and 100/Ebar μCi/gm RCS Noble Gas Activity

Isotope	1% Failed Fuel Total Activity (Ci)	100/Ebar μCi/gm Total Activity (Ci)	Half-life (sec)
Kr-85	3.323E+02	7.997E+03	3.39E+08
Kr-85m	6.332E+03	4.198E+02	1.61E+04
Kr-87	1.919E+02	2.424E+02	4.57E+03
Kr-88	5.975E+02	7.547E+02	1.02E+04
Xe-133	6.538E+04	8.257E+04	4.53E+05
Xe-133m	9.314E+02	1.176E+03	1.89E+05
Xe-135	1.562E+03	1.973E+03	3.28E+04
Xe-135m	2.044E+02	2.581E+02	9.18E+02
Xe138	1.078E+02	1.362E+02	8.46E+02
Total	75636	95532	-
Reference	4 (Table 4, Col. P)	4 (Table 4, Col. S)	4 (Table 4, Col. A)

In addition, for cases which consider the effects of radiological decay during transfer of the noble gases from the RCS to the waste gas decay tanks, the 1% failed fuel total equilibrium inventories of parent halogen isotopes contained in both the reactor coolant and CVCS purification ion exchangers must also be known. These inventories may be obtained from Reference 4, Table 4, Column H, as that table accounts for halogens trapped on the CVCS purification ion exchangers contributing to the RCS noble gas inventory by using only the feed-and-bleed rate as the removal constant. The Reference 4 values are presented in Table 2-2 in terms of Ci/MWt and total curies for a 2754 MWt core. Only I-133 and I-135 are considered as other parent halogens (e.g., Br-85, Br-87, Br-88, and I-138) are not present in sufficient quantities to significantly alter the concentrations their noble gas daughters at the decay times considered.

Table 2.2 –1% Failed Fuel Combined RCS & CVCS IX Activity for Parent Halogen Isotopes

Isotope	Total Activity (Ci)	Total Activity (Ci/MWt)	Half-life (sec)
I-133	3.775E+03	1.371E+00	7.49E+04
I-135	1.141E+03	4.142E-01	2.37E+04

2.2 Waste Gas Decay Tank Volume and Gas Transfer Time

As mentioned previously, earlier calculations have conservatively assumed that no radiological decay occurs during the time that the gases were being transferred from the RCS to the waste gas decay tank. This will continue to be the primary case evaluated for this calculation. The waste gas decay tank has a volume of 4550 gallons (Ref. 16) or 608.25 ft^3.

However, NRC Regulatory Guide 1.24 (Reference 1) Section C.b indicates that "radiological decay may be taken into account in the computation only for the minimum time period required to transfer the gases from the primary system to the decay tanks." Hydrogen and fission gases are removed from the RCS during shutdown using a mechanical degassing process which involves lowering the Volume Control Tank (VCT) water level to create a large void space that is filled with nitrogen, allowing it to "soak" for ~1.5 hours to allow the gasses to come out of solution, and then venting the VCT to the waste gas system while raising the VCT water level (Refs. 10-12). These purge cycles are begun as soon as Mode 3 is achieved, and are repeated several times during the 9 - 11 hours required to complete the degassing process. Several purges of the pressurizer gas space to the waste gas system (via the quench tank) are also used to speed the degassing process, starting ~ 4 hours after Mode 3 is achieved. Therefore, based on the actual times required to perform the degassing process, decay times of 4 hours and 8 hours will also be evaluated.

2.3 Dose Conversion Factors

Dose conversion factors (DCFs) for submersion were obtained from Reference 13 and are summarized in Table 2.3 below. Submersion DCFs may be converted to conventional units of mrem per μCi y cm^{-3} by multiplying by 1.168E23 (Ref. 13, p. 57). This data is included in the Conversion Factor File WasteGas14.INP in Attachment B for use by RADTRAD. Note that the cloudshine data in WasteGas14.INP corresponds to the FGR-12 data, while the inhaled chronic data in WasteGas14.INP corresponds to the worst-case effective data in FGR-11. The remaining data in WasteGas14.INP is extraneous and not used by RADTRAD. Dose conversion factors for inhalation were not required for this calculation as only noble gases are released.

Table 2.3 Submersion Dose Conversion Factors

Isotope	Submersion Dose Conversion Factors	
	Thyroid (Sv/Bq per s/m^3)	Effective (Sv/Bq per s/m^3)
Kr-85m	7.33E-15	7.48E-15
Kr-85	1.18E-16	1.19E-16
Kr-87	4.13E-14	4.12E-14
Kr-88	1.03E-13	1.02E-13
Xe-133	1.51E-15	1.56E-15
Xe-133m	1.36E-15	1.37E-15
Xe-135	1.18E-14	1.19E-14
Xe-135m	2.04E-14	2.04E-14
Xe138	5.77E-14	5.77E-14

2.4 Atmospheric Dispersion Factors

The ventilation stack-to-site boundary, two-hour, atmospheric dispersion coefficient of 1.44E-4 sec/m^3 was calculated via the Gifford wake model extracted from UFSAR 2.3.6 (Ref. 14), as follows

$$\chi/Q = 1/[\mu * (\pi\sigma_y\sigma_z + cA)] = 1.44E\text{-}4 \text{ sec/m}^3$$

where for 1150 m exclusion area boundary distance and 5% frequency

μ = average wind speed = 1 m/sec
σ_y= standard deviation of the distribution in the lateral direction = 92 m (UFSAR Table 2-14)
σ_z= standard deviation of the distribution in the vertical direction = 24 m (UFSAR Table 2-14)
c= wake factor
A= cross-sectional area of structure from which material is released = 0 m

Atmospheric dispersion coefficients from containment to low population zone (2 miles; UFSAR Fig.2.3-3/UFSAR 14.24.3) are given in Table 2.4 below. Note that the 0-2 hour value was adjusted via the Gifford wake model for a vent stack release rather than a containment release.

Table 2.4 Low Population Zone Atmospheric Dispersion Factors

Time (hours)	χ/Q (sec/m^3)
0-2	3.39E-05
2-24	2.20E-06
24-720	5.40E-07

The waste gas decay tanks are located on Auxiliary Building elevation -10 ft (below ground level). A failure of a waste gas decay tank would release the contents into the Auxiliary Building, where it would be drawn into the ventilation system and discharged to the atmosphere through the plant vent stack. The main control room inleakage points include the west road inlets, the turbine building, and Access Controls 11 and 13 on the Auxiliary Building roof. Installation of automatic isolation dampers and radiation monitors at Access Controls 11 and 13 on the Auxiliary Building Roof are credited in this work. Atmospheric dispersion factors for the west road inlets and turbine building are obtained from Reference 17 and given in Table 2.5 below. The atmospheric dispersion coefficients corresponding to the Unit 2 vent stack to the turbine building will be conservatively utilized for this calculation.

Table 2.5 Control Room Atmospheric Dispersion Factors

Time (hours)	vs1-wr χ/Q (sec/m^3)	vs2-tb χ/Q (sec/m^3)
0-2	9.54E-04	1.68E-03
2-8	6.86E-04	1.34E-03
8-24	2.95E-04	5.14E-04
24-96	2.13E-04	3.84E-04
96-720	1.56E-04	3.12E-04

2.5 Breathing Rates

The breathing rates are extracted from Reference 2 and are given in Table 2.6 below.

Table 2.6 Breathing Rates

Time (hours)	Off-site Breathing Rate (m^3/sec)	Control Room Breathing Rate (m^3/sec)
0-8	3.5E-04	3.5E-04
8-24	1.8E-04	3.5E-04
24-720	2.3E-04	3.5E-04

2.6 Control Room Input Parameters

The control room volume of 289194 ft^3 is extracted from Reference 17. The control room occupancy factors are extracted from Reference 2 and are given in Table 2.7 below. No credit for control room recirculation filters is utilized in this calculation.

Table 2.7 Control Room Occupancy Factors

Time (hours)	Occupancy Factor
0-24	1.0
24-96	0.6
96-720	0.4

The control room inleakages for the two trains Air Conditioning Units (ACU) 11 and 12 were measured by NUCON International Inc. via sulfur hexaflouride (SF_6) tracer gas tests as documented in References 18-21. An additional inleakage test was performed by Brookhaven National Laboratory (BNL) via a perfluorocarbon tracer gas (PFT) test as documented in Ref.22. The results are summarized in Table 2.8 below. The latest SF_6 and PFT tests show fairly good agreement. A conservative inleakage value of 3500 cfm will be utilized in this calculation, since some sealing was performed after the initial tests.

Table 2.8 Control Room In-leakage Test Results

	ACU 11	ACU 12
SF_6 Test 11/11/97	4300±300 cfm	3000±300 cfm
SF_6 Test 11/11/97	3600±600 cfm	2550±450 cfm
SF_6 Test 11/11/97	2900±250 cfm	2750±380 cfm
SF_6 Test 1/18/00	3000±250 cfm	2600±200 cfm
PFT Test 5/1/02	2930±185 cfm	2930±185 cfm

The control room inleakage points were deduced from the PFT testing carried out by Brookhaven National Laboratory and include the Auxiliary Building West Road inlet (WR), the Turbine Building inlet (TB), Access Control 11 (AC11), Access Control 13 (AC13), the Switchgear Rooms (SWGRs), and the Main Steam Isolation Valve Rooms (MSIVs). AC11 and AC13 will be equipped with dampers and radiation monitors, which will isolate this leakage path in case of an accident. The SWGRs are in continual recirculation mode and thus are also isolated from the environment. The MSIV rooms are also isolated from the environment, except for the Main Steam Line Break Accident which occurs in these rooms, due to the thermal buoyancy of the air in these rooms and due to the J-neck exhaust. For conservatism, all of the measured inleakage will be assumed to enter the control room from the most conservative pathway of either the West Road or Turbine Building inlets.

3.0 ASSUMPTIONS

This calculation package assumes the following:

1. A non-mechanistic failure of a waste gas decay tank is assumed to occur immediately and instantaneously following completion of the RCS degassification process, which is evaluated as requiring from 0 to 8 hours to complete. The basis for this assumption is that it is consistent with the requirements of Reference 1 and Branch Technical Positon 11-5.

2. No automatic or manual actions are taken to isolate or terminate the release before its release to the environment.

3. The waste gas decay tank noble gas activity is assumed to be the maximum that could occur following shutdown and degasification of a reactor coolant system containing the maximum noble gas inventory allowed by the Technical Specifications.

4. Decay of parent halogen isotopes in the RCS and CVCS system to noble gas daughters during the gas transfer time is taken into account.

5. Only noble gases are assumed to be in the waste gas decay tank. The basis for this assumption is that the CVCS ion exchangers and filters, and the waste gas system moisture removal equipment would prevent halogens and particulates from reaching the tank. This assumption is consistent with previous analysis of this event, the requirements of Reference 1, and Branch Technical Position 11-5.

6. No credit is taken for control room recirculation filters.

7. Buildup of daughter nuclides is taken into account as source term nuclides decay.

8. A control room inleakage rate of 3500 cfm is conservatively assumed.

4.0 REFERENCES

1. NRC Regulatory Guide 1.24, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Pressurized Water Reactor Radioactive Gas Storage Tank Failure," U.S Nuclear Regulatory Commission, Regulatory Guide 1.24, March 23, 1972.
2. NRC Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," July 2000.
3. CCNPP Calculation CA05994, "Reactor Coolant Waste Processing System Incident and Waste Gas Incident Dose Analysis," Rev. 0000.
4. CCNPP Calculation CA06422, "Primary and Secondary Isotopic Calculations," Rev. 0000.
5. NUREG/CR-6604, "RADTRAD: A Simplified Model for Radionuclide Transport and Removal and Dose Estimation," U.S. Nuclear Regulatory Commision, April 1998.
6. NUREG/CR-6604 Supplement 1, "RADTRAD: A Simplified Model for Radionuclide Transport and Removal and Dose Estimation," U.S. Nuclear Regulatory Commision, June 1999.
7. NUREG/CR-6604 Supplement 2, "RADTRAD: A Simplified Model for Radionuclide Transport and Removal and Dose Estimation," U.S. Nuclear Regulatory Commision, October 2002.
8. CCNPP Calculation CA06209, "RADTRAD 3.03 Installation and Verification on PC0496," Rev. 0000.
9. CCNPP Calculation CA06207, "RADTRAD 3.03 Validation," Rev. 0000.
10. "RFO Script Primary Systems, Calvert Cliffs Unit 2, 2005," February 18, 2005.
11. CCNPP Operating Instruction OI-2A-1, "Unit 1 – Chemical and Volume Control System," Rev. 0048.
12. Westinghouse Report CENPD-28, "Combustion Engineering Nuclear Steam Supply System Chemistry Manual," Rev. 5.
13. EPA Report EPA-402-R-93-081, "Federal Guidance Report No. 12: External Exposure to Radionuclides in Air, Water, and Soil," U.S. Environmental Protection Agency, September 1993.
14. CCNPP Updated Final Safety Analysis Report, Rev. 34.
15. Lamarsh, J. R., "Introduction to Nuclear Engineering - 2nd edition," Addison-Wesley Publishing Company, 1983.
16. CCNPP Drawing 92772SH0003T, "CCNPP Units 1 and 2, Equipment List – Tanks and Pressure Vessels,", Rev. 0010.
17. CCNPP Calculation CA06012, "CRHVAC Atmospheric Dispersion Coefficient Calculations," Rev. 0000.
18. CCNPP ETP-97-064R, "Control Room HVAC Inleakage Test", Rev.0, 11/11/1997 (First Run)
19. CCNPP ETP-97-064R, "Control Room HVAC Inleakage Test", Rev.0, 11/11/1997 (Third Run)
20. CCNPP ETP-97-064R, "Control Room HVAC Inleakage Test", Rev.0, 11/11/1997 (Fourth Run)
21. CCNPP ETP-97-064R, "Control Room HVAC Inleakage Test", Rev.0, 1/18/2000.
22. CCNPP ETP-01-035R, "Perfluorocarbon Tracer Gas Testing", Rev.0, 5/1/2002.
23. NRC ADAMS Accession No. ML013030027, "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 201 to Facility Operating License No. DPR-40, Omaha Public Power District, Fort Calhoun Station, Unit No. 1, Docket No. 50-285," December 5, 2001.

5.0 METHOD OF ANALYSIS

This calculation reanalyzes control room habitability and off-site doses for the waste gas incident based on the alternate source term methodology of Reference 2 and control room inleakage of 3500 cfm. This was accomplished by utilizing the RADTRAD computer code (References 5 - 7).

The RADTRAD computer code calculates TEDE and thyroid doses to personnel at the site boundary, low population zone, and control room per 10 CFR 50.67 resulting from any postulated accident which releases radioactivity within the containment, spent fuel pool, or within any other area. RADTRAD models the transport of radioactivity (elemental, particulate, and/or organic) from the sprayed and unsprayed regions of a primary containment, spent fuel pool, or other area where a release can occur, through the secondary containment if any, and then to the environment and to the control room. The code includes the capability to model time-dependent activity release; containment spray, filtration, and leakage; control room filtration and inleakage; primary and secondary containment purge filters; control room intake and recirculation filters; atmospheric dispersion; and natural decay. Doses are calculated for individuals residing at the site boundary or low population zone and in the control room. RADTRAD is documented and benchmarked in References 5 - 9.

The waste gas incident model is constructed assuming that a waste gas decay tank failure occurs at time t=0 and assuming that 100% of the noble gas isotopes given in Table 2.1 are released at time t=0 to the waste gas decay tank. The halogen isotopes given in Table 2.2 are also included in the nuclear inventory file WasteGas0.NIF, however, their release fraction is set to 0 so they are not actually assumed to be in the waste gas decay tank. This was done to allow the "delay time" feature of RADTRAD to be utilized to evaluate the various gas transfer times considered (allowing parent iodines in the RCS and CVCS ion exchanger to decay to xenon during the transfer process). Therefore, the decay and daughtering option of RATRAD is utilized. No cleanup mechanisms (spray, filtration, plateout) are assumed in containment, thus the sprayed/unsprayed classification has no effect on the results. The rate of escape of this activity to the environment is assumed to occur with a matter of minutes (an escape rate of one WGDT volume per minute is utilized) and is transported to the site boundary and to the control room via appropriate atmospheric dispersion coefficients. While time-dependent control room inleakage can be modeled by RADTRAD, it is a constant in this work. The control room and site boundary doses are calculated based on appropriate breathing rates and occupancy factors and on ICRP 30 dose conversion factors. Figure 5.1 provides simple schematic of the RADTRAD model utilized for this calculation.

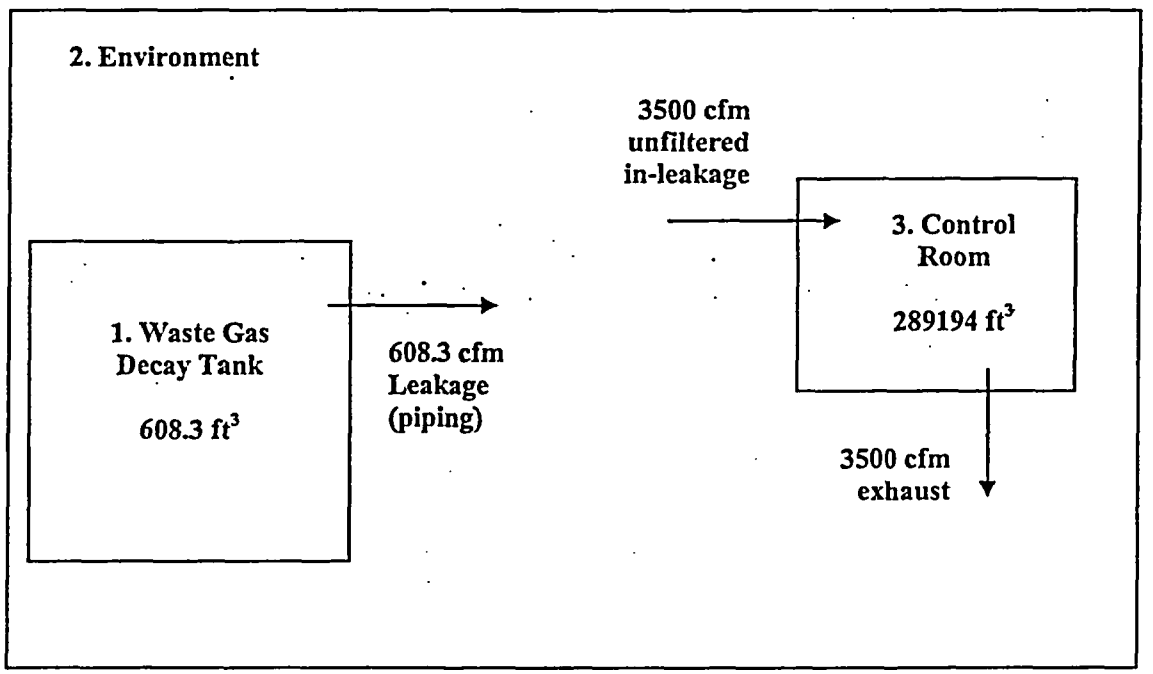

Figure 5.1 – Schematic of Waste Gas Incident RADTRAD Model

6.0 CALCULATION AND COMPUTATIONS

Table 6.1 summarizes the RADTRAD calculations that were performed as described in Section 5.

Table 6.1 Summary of RADTRAD Cases

Parameter	Cases		
	WasteGas0	WasteGas4	WasteGas8
Location	Waste Gas Decay Tank, Aux. Bldg. El 5'	Waste Gas Decay Tank, Aux. Bldg. El 5'	Waste Gas Decay Tank, Aux. Bldg. El 5'
Gas Transfer Decay Time	0 hours	4 hours	8 hours
Nuclear Inventory File	WasteGas.NIF	WasteGas.NIF	WasteGas.NIF
Release Fraction File	WasgeGas0.RFT	WasgeGas0.RFT	WasgeGas0.RFT
DCF File	WasteGas14.INP	WasteGas14.INP	WasteGas14.INP
Case File	WasteGas0.PSF	WasteGas4.PSF	WasteGas8.PSF
Output File	WasteGas0.o0	WasteGas4.o0	WasteGas8.o0
Control Room Inleakage	3500 cfm	3500 cfm	3500 cfm
Control Room Filtration	Not Credited	Not Credited	Not Credited
Release Point to Environment	Unit 2 Vent Stack	Unit 2 Vent Stack	Unit 2 Vent Stack
Entrance Point to Control Room	Turbine Building	Turbine Building	Turbine Building

The RADTRAD output provided no indication that the parent halogens were being utilized in the calculation of noble gas activities for the 4 hour and 8 hour decay cases. Therefore, a manual verification of the site boundary dose was performed in Excel, and is summarized below. Noble gas activities (A_d) were calculated with contribution from parent nuclides (A_p) using $A_d(t) = A_{d0}\exp(-\lambda_d t) + A_{p0}[\lambda_d/(\lambda_d-\lambda_p)][\exp(-\lambda_p t)-\exp(-\lambda_d t)]$ from Reference 15 (p.25). Site boundary doses were then calculated for using the general equation for submersion in a semi-infinite cloud: $D_{sb} = \chi/Q_{sb} \cdot \Sigma A_i DCF_i$. The results show good agreement with RADTRAD.

					Decay Time (hours)	0	4	8	FGR12
Nuclide		RCS Activity	Halflife	lambda	Parent Branching	WGDT Activity	WGDT Activity	WGDT Activity	Submersion DCFs - Effective
Daughter	Parent	Ci	sec	1/sec	Fraction	Ci	Ci	Ci	Sv per Bq-sec/m^3
Kr-85m		4.20E+02	1.61E+04	4.2978E-05	-	420	227	122	7.48E-15
	Br-85	1.25E+00	1.72E+02	4.0252E-03	100%	-	-	-	-
Kr-85		8.00E+03	3.39E+08	2.0427E-09	-	7997	8026	7997	1.19E-16
	Kr-85m	4.20E+02	1.61E+04	4.2978E-05	21%	-	-	-	-
Kr-87		2.42E+02	4.57E+03	1.5161E-04	-	242	27	3	4.12E-14
	Br-87	6.58E-01	5.59E+01	1.2400E-02	100%	-	-	-	-
Kr-88		7.55E+02	1.02E+04	6.7796E-05	-	755	285	107	1.02E-13
	Br-88	1.93E-01	1.64E+01	4.2265E-02	100%	-	-	-	-
Xe-133		8.26E+04	4.53E+05	1.5301E-06	-	82574	81163	79201	1.56E-15
	Xe-133m	1.18E+03	1.89E+05	3.6632E-06	100%	-	-	-	-
	I-133	3.78E+03	7.49E+04	9.2568E-06	97%	-	-	-	-
Xe-133m		1.18E+03	1.89E+05	3.6632E-06	-	1176	1125	1069	1.37E-15
	I-133	3.78E+03	7.49E+04	9.2568E-06	3%	-	-	-	-
Xe-135		1.97E+03	3.28E+04	2.1158E-05	-	1973	1553	1363	1.19E-14
	Xe-135m	2.58E+02	9.18E+02	7.5506E-04	100%	-	-	-	-
	I-135	1.14E+03	2.37E+04	2.9306E-05	85%	-	-	-	-
Xe-135m		2.58E+02	9.18E+02	7.5506E-04	-	258	73	77	2.04E-14
	I-135	1.14E+03	2.37E+04	2.9306E-05	15%	-	-	-	-
Xe138		1.36E+02	8.46E+02	8.1932E-04	-	136	1.0E-03	7.7E-09	5.77E-14
	I-138	8.04E-02	6.50E+00	1.0664E-01	100%	-	-	-	-
Site Boundary X/Q		1.44E-04	sec/m^3		Total WGDT Ci	95532	92479	89938	
					Site Boundary TEDE (mrem)	137.6	96.5	83.0	

7.0 DOCUMENTATION OF COMPUTER CODES

This work employed the RADTRAD computer code, which was verified, benchmarked, and documented in References 5 – 9 and which models the transport of radionuclides from a primary containment to a secondary containment and thence to the environment and control room. The installation of RADTRAD is detailed in Reference 8 and the validation in Reference 9. RADTRAD was executed on Constellation Energy personal computer PC0496 running the Windows NT4 operating system.

The RADTRAD computer code calculated TEDE and thyroid doses to personnel at the site boundary, low population zone, and control room per the alternate source term methodology 10CFR50.67 and Regulatory Guide 1.183 or calculates whole body and thyroid doses to personnel at the site boundary, low population zone, and control room per the standard source term methodology of TID-14844 (Reference 10) resulting from any postulated accident which releases radioactivity within the containment, spent fuel pool, or any other area where a radionuclide release can occur. RADTRAD models the transport of radioactivity from up to 63 radionuclides from the sprayed and unsprayed regions of a primary containment, spent fuel pool, or other auxiliary building area, through the secondary containment if any, and then to the environment and control room. The code includes the capability to model time-dependent activity; containment spray, filtration, and leakage; control room filtration and in-leakage; primary and secondary containment purge filters; control room intake filters; atmospheric dispersion; and natural decay. Doses are calculated for individuals residing at the site boundary or low population zone and in the control room.

All inputs, outputs, and spreadsheets used in this calculation are included on the CD-ROM associated with this calculation and are summarized in Table 7.1 below. Microsoft Excel was also utilized to prepare input, tabulate results, and check RADTRAD site boundary dose results.

Table 7-1. Directory Listing of CD-ROM

```
Volume in drive D is CA06604
 Volume Serial Number is E687-4ADF

 Directory of D:\Waste Gas Incident for AST - CA06604

08/03/2005  06:09 PM    <DIR>          .
08/03/2005  06:09 PM    <DIR>          ..
07/18/2005  10:11 AM           316,928 Final Final Ircs.xls
07/06/2005  05:20 PM           529,920 Primary_Script_2005_rev1.doc
08/03/2005  05:49 PM           620,032 Waste Gas Incident for AST - CA06604b.doc
08/01/2005  05:44 PM            32,256 Waste Gas Incident using AST - CA06604.xls
08/01/2005  05:39 PM             2,123 WasteGas.nif
07/09/2005  02:34 PM               839 WasteGas0.RFT
08/01/2005  05:43 PM            52,814 WasteGas0.o0
08/01/2005  05:43 PM             2,873 WasteGas0.psf
05/18/2004  06:58 PM            11,076 WasteGas14.inp
08/01/2005  05:46 PM            52,885 WasteGas4.o0
08/01/2005  05:46 PM             2,873 WasteGas4.psf
08/01/2005  05:47 PM            52,741 WasteGas8.o0
08/01/2005  05:47 PM             2,873 WasteGas8.psf
               13 File(s)      1,680,233 bytes
                2 Dir(s)               0 bytes free
```

8.0 RESULTS AND CONCLUSIONS

The RADTRAD calculated Total Effective Dose Equivalent (TEDE) for each of the waste gas incident cases evaluated are presented in Table 8.1 below. Reference 2 (Table 6) does not provide TEDE acceptance criteria for the waste gas incident. In all cases, the site boundary TEDE is more than a factor of 50 below the 10CFR100 limit of 25 rem whole body (i.e., below 500 mrem) originally used as the acceptance criteria for this calculation, and below the 500 mrem site boundary dose limit established later in Branch Technical Position 11-5 of the NRC Standard Review Plan (Rev. 0 - July 1981). The NRC reaffirmed the use of the 500 mrem as a site boundary TEDE limit for evaluation of the waste gas incident in their approval of the Fort Calhoun AST submittal (Reference 23, Table 2). No limit for this event was previously established for the LPZ, so the site-boundary dose limit is utilized. The 0-30 day control room dose is below the 5 rem TEDE limit established in 10CFR50.67(b)(2)(iii).

Table 8.1 Summary of RADTRAD Results for the Waste Gas Incident

Case	0-2 hr Site Boundary TEDE (mrem)	0-30 day Low Population Zone TEDE (mrem)	0-30 day Control Room TEDE (mrem)
No Credit For Decay During Gas Transfer	137.14 ✓	32.28 ✓	80.70 ✓
4-Hour Gas Transfer Credit	97.60 ✓	22.98 ✓	62.38 ✓
8-Hour Gas Transfer Credit	83.34 ✓	19.62 ✓	54.80 ✓
NRC Limit for Event	**500**	**500**	**5000**

ATTACHMENT A – ORIGINAL BECHTEL WASTE GAS INCIDENT CALCULATION

(best available quality)

FORM E-6V 100M

CALCULATION SHEET 6750-620-1

DESIGNER R L Ashley DATE Dec 7, 1970 CHECKER C O Berg DATE 12/8/7

TITLE _____ JOB NO. _____

SUBJECT _____ SHEET NO. 4

Gaseous Waste Effluent

a.) Calculation of the maximum activity stored in a decay tank:

For a hot reactor coolant system volume of 10,400 ft^3 (=2.9E3), the total activity for each of the gaseous isotopes would be

Isotope	Activity (curies) t=0	decay factor	t=60d
Kr^{85m}	441		
Kr^{85}	262	.99	260
Kr^{87}	240		
Kr^{88}	769		
Xe^{131m}	438	.0312	13.7
Xe^{133}	53,500	3.9(-4)	20.9
Xe^{135}	2230		
Xe^{138}	106		

The whole body immersion dose from release of the entire tank contents to the site boundary at time t=0 could be given

$$R = 0.246\,(\chi/Q)\,Q\,\bar{E}$$ (See FSAR p. 14.14-4

Isotope	Q	$\bar{E}$	$Q\bar{E}$
Kr^{85m}	441	.44	194
Kr^{85}	262	.24	62.9
Kr^{87}	240	2.8	672
Kr^{88}	769	2.3	1770
Xe^{131m}	438	.16	70.1
Xe^{133}	53,500	.19	10165.
Xe^{135}	2230	.62	1383
Xe^{138}	106	1.88	199
			14516.0

FORM E-6V 100M

CALCULATION SHEET

DESIGNER R L Ashley DATE Dec 7, 1970 CHECKER C A Berg DATE 12/8/70

TITLE _____ JOB NO. 6750-0

SUBJECT _____ SHEET NO. 5

From Section 2.3, $\chi/Q = 1.3 \times 10^{-4}$

$$\therefore \quad R = 0.246\,(1.3\times10^{-4})(1.45\times10^{4})$$
$$= 0.464 \text{ rem}$$

b) Maximum Gaseous Activity Release to Plant Vents

The maximum annual discharge of the 3 significant isotopes based on 28 system volumes of reactor coolant being processed per year, would be

$$V = 28\,(10.4\times10^{3})(2.88\times10^{4})$$
$$\frac{\text{sys vol}}{\text{yr}} \cdot \frac{\text{ft}^3}{\text{sys. vol}} \cdot \frac{\text{cc}}{\text{ft}^3}$$
$$= 8.27\times10^{9} \text{ cc/yr.}$$

From a) above, the activity of the 3 significant isotopes, accounting for 60 days decay in the storage tanks prior to release, would be

Isotope	Max. Annual Discharge* (Ci/yr)	Site Boundary Concentration (μCi/cc)
Kr^{85}	7.31×10^{3} 1.99×10^{3}	3.69×10^{-10}
Xe^{133m}	382	1.95×10^{-11}
Xe^{133}	583	2.97×10^{-11}

The site boundary concentrations were obtained as follows:

The avg. annual χ/Q value is 1.6×10^{-6} sec/m³, and since the maximum annual discharges are in units of curies/yr these discharges should be multiplied by:

ATTACHMENT B – RADTRAD NUCLEAR INVENTORY FILE WASTEGAS.NIF

```
Nuclide Inventory Name:
CCNPP Waste Gas Decay Tank Inventory
Power Level:
 2.7540E+03
Nuclides:
 14
Nuclide 001:
Kr-85
  1
 0.3382974720E+09
 0.8500E+02
 7.997E+03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 002:
Kr-85m
  1
 0.1612800000E+05
 0.8500E+02
 4.198E+02
Kr-85     0.2100E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 003:
Kr-87
  1
 0.4578000000E+04
 0.8700E+02
 2.424E+02
Rb-87     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 004:
Kr-88
  1
 0.1022400000E+05
 0.8800E+02
 7.547E+02
Rb-88     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 005:
I-131
  2
 0.6946560000E+06
 0.1310E+03
 0.0
Xe-131m   0.1100E-01
none      0.0000E+00
none      0.0000E+00
Nuclide 006:
I-132
  2
 0.8280000000E+04
 0.1320E+03
 0.0
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 007:
I-133
  2
 0.7488000000E+05
```

```
 0.1330E+03
 3.775E+03
Xe-133m  0.2900E-01
Xe-133   0.9700E+00
none     0.0000E+00
Nuclide 008:
I-134
  2
 0.3156000000E+04
 0.1340E+03
 0.0
none     0.0000E+00
none     0.0000E+00
none     0.0000E+00
Nuclide 009:
I-135
  2
 0.2379600000E+05
 0.1350E+03
 1.141E+03
Xe-135m  0.1500E+00
Xe-135   0.8500E+00
none     0.0000E+00
Nuclide 010:
Xe-133
  1
 0.4531680000E+06 —  Table 2.1 & Ref 4 has
 0.1330E+03          .4530 E+6
 8.257E+04 —
none     0.0000E+00
none     0.0000E+00
none     0.0000E+00
Nuclide 011:
Xe-135
  1
 0.3272400000E+05 —  Table 2.1  3.28E4
 0.1350E+03          Ref 4      3.276E4
 1.973E+03 —
Cs-135   0.1000E+01
none     0.0000E+00
none     0.0000E+00
Nuclide 012:
Xe-133m
  1
 0.1892200000E+06 ✓
 0.1330E+03
 1.176E+03 —
Xe-133   0.1000E+01
none     0.0000E+00
none     0.0000E+00
Nuclide 013:
Xe-135m
  1
 0.9180000000E+03 ✓
 0.1350E+03
 2.581E+02 ✓
Xe-135   0.1000E+01
none     0.0000E+00
none     0.0000E+00
Nuclide 014:
Xe-138
  1
 0.8460000000E+03 ✓
 0.1380E+03
```

```
 1.362E+02
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
End of Nuclear Inventory File
```

ATTACHMENT C – RADTRAD RELEASE FRACTION AND TIMING FILE WASTEGAS0.RTF

```
Release Fraction and Timing Name:
Waste Gas Incident, 5m Rel, No Decay for Transfer
Duration (h):  Design Basis Accident
 1.6666E-02  0.0000E+00  0.0000E+00  0.0000E+00
Noble Gases:
 1.0000E+00  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
```

ATTACHMENT D – RADTRAD DOSE CONVERSION FACTOR FILE WASTEGAS14.INP

FGRDCF 10/24/95 03:24:50 beta-test version 1.10, minor FORTRAN fixes 5/4/95
Implicit daughter halflives (m) less than 90 and less than 0.100 of parent
9 ORGANS DEFINED IN THIS FILE:
GONADS
BREAST
LUNGS
RED MARR
BONE SUR
THYROID
REMAINDER
EFFECTIVE
SKIN(FGR)
14 NUCLIDES DEFINED IN THIS FILE:
Kr-85
Kr-85m
Kr-87
Kr-88
I-131 D
I-132 D
I-133 D
I-134 D
I-135 D Including:Xe-135m
Xe-133
Xe-135
Xe-133m
Xe-135m
Xe-138

	CLOUDSHINE	GROUND SHINE 8HR	GROUND SHINE 7DAY	GROUND SHINE RATE	INHALED ACUTE	INHALED CHRONIC	INGESTION
Kr-85							
GONADS	1.170E-16	8.121E-14	1.704E-12	2.820E-18	-1.000E	0.000E	0.000E
BREAST	1.340E-16	7.891E-14	1.656E-12	2.740E-18	-1.000E	0.000E	0.000E
LUNGS	1.140E-16	7.056E-14	1.481E-12	2.450E-18	-1.000E	0.000E	0.000E
RED MARR	1.090E-16	6.998E-14	1.469E-12	2.430E-18	-1.000E	0.000E	0.000E
BONE SUR	2.200E-16	1.287E-13	2.702E-12	4.470E-18	-1.000E	0.000E	0.000E
THYROID	1.180E-16	7.459E-14	1.565E-12	2.590E-18	-1.000E	0.000E	0.000E
REMAINDER	1.090E-16	6.941E-14	1.457E-12	2.410E-18	-1.000E	0.000E	0.000E
EFFECTIVE	1.190E-16	7.603E-14	1.596E-12	2.640E-18	-1.000E	0.000E	0.000E
SKIN(FGR)	1.320E-14	2.304E-11	4.835E-10	8.000E-16	-1.000E	0.000E	0.000E
Kr-85m							
GONADS	7.310E-15	2.594E-12	3.653E-12	1.570E-16	-1.000E	0.000E	0.000E
BREAST	8.410E-15	2.527E-12	3.560E-12	1.530E-16	-1.000E	0.000E	0.000E
LUNGS	7.040E-15	2.379E-12	3.351E-12	1.440E-16	-1.000E	0.000E	0.000E
RED MARR	6.430E-15	2.346E-12	3.304E-12	1.420E-16	-1.000E	0.000E	0.000E
BONE SUR	1.880E-14	5.286E-12	7.446E-12	3.200E-16	-1.000E	0.000E	0.000E
THYROID	7.330E-15	2.395E-12	3.374E-12	1.450E-16	-1.000E	0.000E	0.000E
REMAINDER	6.640E-15	2.313E-12	3.257E-12	1.400E-16	-1.000E	0.000E	0.000E
EFFECTIVE	7.480E-15	2.511E-12	3.537E-12	1.520E-16	-1.000E	0.000E	0.000E
SKIN(FGR)	2.240E-14	2.247E-11	3.164E-11	1.360E-15	-1.000E	0.000E	0.000E
Kr-87							
GONADS	4.000E-14	4.962E-12	5.026E-12	7.610E-16	-1.000E	0.000E	0.000E
BREAST	4.500E-14	4.740E-12	4.802E-12	7.270E-16	-1.000E	0.000E	0.000E
LUNGS	4.040E-14	4.603E-12	4.663E-12	7.060E-16	-1.000E	0.000E	0.000E
RED MARR	4.000E-14	4.708E-12	4.769E-12	7.220E-16	-1.000E	0.000E	0.000E
BONE SUR	6.020E-14	6.514E-12	6.598E-12	9.990E-16	-1.000E	0.000E	0.000E
THYROID	4.130E-14	4.473E-12	4.531E-12	6.860E-16	-1.000E	0.000E	0.000E
REMAINDER	3.910E-14	4.590E-12	4.650E-12	7.040E-16	-1.000E	0.000E	0.000E
EFFECTIVE	4.120E-14	4.773E-12	4.835E-12	7.320E-16	-1.000E	0.000E	0.000E
SKIN(FGR)	1.370E-13	8.802E-11	8.916E-11	1.350E-14	-1.000E	0.000E	0.000E
Kr-88							
GONADS	9.900E-14	2.278E-11	2.655E-11	1.800E-15	-1.000E	0.000E	0.000E
BREAST	1.110E-13	2.177E-11	2.537E-11	1.720E-15	-1.000E	0.000E	0.000E
LUNGS	1.010E-13	2.139E-11	2.493E-11	1.690E-15	-1.000E	0.000E	0.000E
RED MARR	1.000E-13	2.190E-11	2.552E-11	1.730E-15	-1.000E	0.000E	0.000E

BONE SUR	1.390E-13	2.886E-11	3.363E-11	2.280E-15	-1.000E	0.000E 0.000E
THYROID	1.030E-13	2.012E-11	2.345E-11	1.590E-15	-1.000E	0.000E 0.000E
REMAINDER	9.790E-14	2.139E-11	2.493E-11	1.690E-15	-1.000E	0.000E 0.000E
EFFECTIVE	1.020E-13	2.202E-11	2.567E-11	1.740E-15	-1.000E	0.000E 0.000E
SKIN(FGR)	1.350E-13	5.607E-11	6.534E-11	4.430E-15	-1.000E	0.000E 0.000E
I-131						
GONADS	1.780E-14	1.119E-11	1.789E-10	3.940E-16	-1.000E	2.530E-11 4.070E-11
BREAST	2.040E-14	1.082E-11	1.730E-10	3.810E-16	-1.000E	7.880E-11 1.210E-10
LUNGS	1.760E-14	1.016E-11	1.626E-10	3.580E-16	-1.000E	6.570E-10 1.020E-10
RED MARR	1.680E-14	1.022E-11	1.635E-10	3.600E-16	-1.000E	6.260E-11 9.440E-11
BONE SUR	3.450E-14	1.675E-11	2.679E-10	5.900E-16	-1.000E	5.730E-11 8.720E-11
THYROID	1.810E-14	1.053E-11	1.685E-10	3.710E-16	-1.000E	2.920E-07 4.760E-07
REMAINDER	1.670E-14	9.908E-12	1.585E-10	3.490E-16	-1.000E	8.030E-11 1.570E-10
EFFECTIVE	1.820E-14	1.067E-11	1.707E-10	3.760E-16	-1.000E	8.890E-09 1.440E-08
SKIN(FGR)	2.980E-14	1.825E-11	2.920E-10	6.430E-16	-1.000E	0.000E 0.000E
I-132						
GONADS	1.090E-13	2.523E-11	2.771E-11	2.320E-15	-1.000E	9.950E-12 2.330E-11
BREAST	1.240E-13	2.414E-11	2.652E-11	2.220E-15	-1.000E	1.410E-11 2.520E-11
LUNGS	1.090E-13	2.305E-11	2.532E-11	2.120E-15	-1.000E	2.710E-10 2.640E-11
RED MARR	1.070E-13	2.360E-11	2.592E-11	2.170E-15	-1.000E	1.400E-11 2.460E-11
BONE SUR	1.730E-13	3.327E-11	3.655E-11	3.060E-15	-1.000E	1.240E-11 2.190E-11
THYROID	1.120E-13	2.381E-11	2.616E-11	2.190E-15	-1.000E	1.740E-09 3.870E-09
REMAINDER	1.050E-13	2.283E-11	2.509E-11	2.100E-15	-1.000E	3.780E-11 1.650E-10
EFFECTIVE	1.120E-13	2.403E-11	2.640E-11	2.210E-15	-1.000E	1.030E-10 1.820E-10
SKIN(FGR)	1.580E-13	8.199E-11	9.007E-11	7.540E-15	-1.000E	0.000E 0.000E
I-133						
GONADS	2.870E-14	1.585E-11	6.748E-11	6.270E-16	-1.000E	1.950E-11 3.630E-11
BREAST	3.280E-14	1.519E-11	6.468E-11	6.010E-16	-1.000E	2.940E-11 4.680E-11
LUNGS	2.860E-14	1.446E-11	6.156E-11	5.720E-16	-1.000E	8.200E-10 4.530E-11
RED MARR	2.770E-14	1.466E-11	6.242E-11	5.800E-16	-1.000E	2.720E-11 4.300E-11
BONE SUR	4.870E-14	2.161E-11	9.202E-11	8.550E-16	-1.000E	2.520E-11 4.070E-11
THYROID	2.930E-14	1.502E-11	6.393E-11	5.940E-16	-1.000E	4.860E-08 9.100E-08
REMAINDER	2.730E-14	1.418E-11	6.038E-11	5.610E-16	-1.000E	5.000E-11 1.550E-10
EFFECTIVE	2.940E-14	1.509E-11	6.425E-11	5.970E-16	-1.000E	1.580E-09 2.800E-09
SKIN(FGR)	5.830E-14	1.150E-10	4.897E-10	4.550E-15	-1.000E	0.000E 0.000E
I-134						
GONADS	1.270E-13	1.200E-11	1.202E-11	2.640E-15	-1.000E	4.250E-12 1.100E-11
BREAST	1.440E-13	1.145E-11	1.147E-11	2.520E-15	-1.000E	6.170E-12 1.170E-11
LUNGS	1.270E-13	1.100E-11	1.102E-11	2.420E-15	-1.000E	1.430E-10 1.260E-11
RED MARR	1.250E-13	1.127E-11	1.129E-11	2.480E-15	-1.000E	6.080E-12 1.090E-11
BONE SUR	1.960E-13	1.568E-11	1.571E-11	3.450E-15	-1.000E	5.310E-12 9.320E-12
THYROID	1.300E-13	1.127E-11	1.129E-11	2.480E-15	-1.000E	2.880E-10 6.210E-10
REMAINDER	1.220E-13	1.091E-11	1.093E-11	2.400E-15	-1.000E	2.270E-11 1.340E-10
EFFECTIVE	1.300E-13	1.150E-11	1.152E-11	2.530E-15	-1.000E	3.550E-11 6.660E-11
SKIN(FGR)	1.870E-13	4.477E-11	4.485E-11	9.850E-15	-1.000E	0.000E 0.000E
I-135						
GONADS	8.078E-14	3.113E-11	5.489E-11	1.599E-15	-1.000E	1.700E-11 3.610E-11
BREAST	9.143E-14	2.971E-11	5.240E-11	1.526E-15	-1.000E	2.340E-11 3.850E-11
LUNGS	8.145E-14	2.886E-11	5.089E-11	1.482E-15	-1.000E	4.410E-10 3.750E-11
RED MARR	8.054E-14	2.965E-11	5.228E-11	1.523E-15	-1.000E	2.240E-11 3.650E-11
BONE SUR	1.184E-13	3.983E-11	7.024E-11	2.046E-15	-1.000E	2.010E-11 3.360E-11
THYROID	8.324E-14	2.852E-11	5.030E-11	1.465E-15	-1.000E	8.460E-09 1.790E-08
REMAINDER	7.861E-14	2.883E-11	5.084E-11	1.481E-15	-1.000E	4.700E-11 1.540E-10
EFFECTIVE	8.294E-14	2.989E-11	5.271E-11	1.535E-15	-1.000E	3.320E-10 6.080E-10
SKIN(FGR)	1.156E-13	9.826E-11	1.733E-10	5.047E-15	-1.000E	0.000E 0.000E
Xe-133						
GONADS	1.610E-15	1.465E-12	2.052E-11	5.200E-17	-1.000E	0.000E 0.000E
BREAST	1.960E-15	1.505E-12	2.107E-11	5.340E-17	-1.000E	0.000E 0.000E
LUNGS	1.320E-15	1.045E-12	1.464E-11	3.710E-17	-1.000E	0.000E 0.000E
RED MARR	1.070E-15	8.791E-13	1.231E-11	3.120E-17	-1.000E	0.000E 0.000E
BONE SUR	5.130E-15	4.254E-12	5.958E-11	1.510E-16	-1.000E	0.000E 0.000E
THYROID	1.510E-15	1.181E-12	1.653E-11	4.190E-17	-1.000E	0.000E 0.000E
REMAINDER	1.240E-15	1.042E-12	1.460E-11	3.700E-17	-1.000E	0.000E 0.000E
EFFECTIVE	1.560E-15	1.299E-12	1.819E-11	4.610E-17	-1.000E	0.000E 0.000E

SKIN(FGR)	4.970E-15	1.953E-12	2.734E-11	6.930E-17	-1.000E	0.000E	0.000E
Xe-135							
GONADS	1.170E-14	5.455E-12	1.194E-11	2.530E-16	-1.000E	0.000E	0.000E
BREAST	1.330E-14	5.325E-12	1.166E-11	2.470E-16	-1.000E	0.000E	0.000E
LUNGS	1.130E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E	0.000E	0.000E
RED MARR	1.070E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E	0.000E	0.000E
BONE SUR	2.570E-14	9.120E-12	1.997E-11	4.230E-16	-1.000E	0.000E	0.000E
THYROID	1.180E-14	5.023E-12	1.100E-11	2.330E-16	-1.000E	0.000E	0.000E
REMAINDER	1.080E-14	4.829E-12	1.058E-11	2.240E-16	-1.000E	0.000E	0.000E
EFFECTIVE	1.190E-14	5.217E-12	1.142E-11	2.420E-16	-1.000E	0.000E	0.000E
SKIN(FGR)	3.120E-14	4.506E-11	9.867E-11	2.090E-15	-1.000E	0.000E	0.000E
Xe-133m							
GONADS	1.420E-15	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
BREAST	1.700E-15	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
LUNGS	1.190E-15	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
RED MARR	1.100E-15	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
BONE SUR	3.230E-15	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
THYROID	1.360E-15	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
REMAINDER	1.150E-15	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
EFFECTIVE	1.370E-15	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
SKIN(FGR)	1.040E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
Xe-135m							
GONADS	2.000E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
BREAST	2.290E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
LUNGS	1.980E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
RED MARR	1.910E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
BONE SUR	3.500E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
THYROID	2.040E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
REMAINDER	1.890E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
EFFECTIVE	2.040E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
SKIN(FGR)	2.970E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
Xe-138							
GONADS	5.590E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
BREAST	6.320E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
LUNGS	5.660E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
RED MARR	5.600E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
BONE SUR	8.460E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
THYROID	5.770E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
REMAINDER	5.490E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
EFFECTIVE	5.770E-14	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E
SKIN(FGR)	1.070E-13	0.000E	0.000E	0.000E	1.000E	0.000E	0.000E

ATTACHMENT E – RADTRAD OUTPUT FILE WASTEGAS0.O0 - NO GAS TRANSFER DECAY TIME CREDIT

```
#######################################################################
   RADTRAD Version 3.03 (Spring 2001) run on  8/01/2005  at 17:43:26
#######################################################################

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

Plant file           = D:\RADTRAD\Defaults\WasteGas0.psf
Inventory file       = d:\radtrad\defaults\wastegas.nif
Release file         = d:\radtrad\defaults\wastegas0.rft
Dose Conversion file = d:\radtrad\defaults\wastegas14.inp



    #####    ####   #####    #  #     #  #####   #    #  #####
    #    #  #       #        #  ##    #  #    #  #    #    #
    #    #  #       #        #  # #   #  #    #  #    #    #
    #####    ####   ####     #  #  #  #  #####   #    #    #
    #            #  #        #  #   # #  #       #    #    #
    #            #  #        #  #    ##  #       #    #    #
    #        ####   #        #  #     #  #        ####     #


Radtrad 3.03 4/15/2001

Nuclide Inventory File:
d:\radtrad\defaults\wastegas.nif
Plant Power Level:
 2.7540E+03
Compartments:
  3
Compartment 1:
Waste Gas Decay Tank
  3
 6.0825E+02
  0
  0
  0
  0
  0
Compartment 2:
Environment
  2
 0.0000E+00
  0
  0
  0
  0
  0
Compartment 3:
Control Room
  1
 2.8919E+05
  0
  0
  0
  0
  0
Pathways:
  3
Pathway 1:
Waste Gas Decay Tank to Environment
  1
  2
  1
```

```
Pathway 2:
Environment to Control Room
  2
  3
  2
Pathway 3:
Control Room to Environment
  3
  2
  2
End of Plant Model File
Scenario Description Name:

Plant Model Filename:

Source Term:
  1
  1   1.0000E+00
d:\radtrad\defaults\wastegas14.inp
d:\radtrad\defaults\wastegas0.rft
  0.0000E+00
  1
  9.5000E-01   4.8500E-02   1.5000E-03   1.0000E+00
Overlying Pool:
  0
  0.0000E+00
  0
  0
  0
  0
Compartments:
  3
Compartment 1:
  1
  1
  0
  0
  0
  0
  0
  0
  0
Compartment 2:
  1
  1
  0
  0
  0
  0
  0
  0
  0
Compartment 3:
  1
  1
  0
  0
  0
  0
  0
  0
  0
Pathways:
  3
Pathway 1:
  0
  0
  1
  1
  0.0000E+00   1.0000E+00   6.0800E+02
  1
```

```
  1
  0.0000E+00   1.0000E+00   6.0800E+02
  1
  1
  0.0000E+00   1.0000E+00   6.0800E+02
  0
  0
  0
  0
  0
  0
  0
Pathway 2:
  0
  0
  0
  0
  0
  1
  1
  0.0000E+00   3.5000E+03   0.0000E+00   0.0000E+00   0.0000E+00
  0
  0
  0
  0
  0
  0
Pathway 3:
  0
  0
  0
  0
  0
  1
  1
  0.0000E+00   3.5000E+03   0.0000E+00   0.0000E+00   0.0000E+00
  0
  0
  0
  0
  0
  0
Dose Locations:
  3
Location 1:
Site Boundary
  2
  1
  2
  0.0000E+00   1.4400E-04
  2.0000E+00   0.0000E+00
  1
  4
  0.0000E+00   3.5000E-04
  8.0000E+00   1.8000E-04
  2.4000E+01   2.3000E-04
  7.2000E+02   0.0000E+00
  0
Location 2:
Low Population Zone
  2
  1
  4
  0.0000E+00   3.3900E-05
  2.0000E+00   2.2000E-06
  2.4000E+01   5.4000E-07
  7.2000E+02   0.0000E+00
  1
  4
  0.0000E+00   3.5000E-04
  8.0000E+00   1.8000E-04
```

```
  2.4000E+01   2.3000E-04
  7.2000E+02   0.0000E+00
  0
Location 3:
Control Room
  3
  0
  1
  2
  0.0000E+00   3.5000E-04
  7.2000E+02   0.0000E+00
  1
  4
  0.0000E+00   1.0000E+00
  2.4000E+01   6.0000E-01
  9.6000E+01   4.0000E-01
  7.2000E+02   0.0000E+00
Effective Volume Location:
  1
  6
  0.0000E+00   1.6800E-03
  2.0000E+00   1.3400E-03
  8.0000E+00   5.1400E-04
  2.4000E+01   3.8400E-04
  9.6000E+01   3.1200E-04
  7.2000E+02   0.0000E+00
Simulation Parameters:
  0
Output Filename:
D:\RADTRAD\Defaults\WasteGas0.o0
  1
  1
  1
  0
  0
End of Scenario File
```

```
#######################################################################
   RADTRAD Version 3.03 (Spring 2001) run on  8/01/2005  at 17:43:26
#######################################################################

#######################################################################
                      Plant Description
#######################################################################

Number of Nuclides =  14

Inventory Power =   2.7540E+03 MWth
Plant Power Level =   2.7540E+03 MWth

Number of compartments    =   3

Compartment information

Compartment number  1  (Source term fraction =   1.0000E+00
)
Name: Waste Gas Decay Tank
Compartment volume =   6.0825E+02 (Cubic feet)
Compartment type is Normal
Pathways into and out of compartment  1
   Exit Pathway Number    1: Waste Gas Decay Tank to Environment

Compartment number  2
Name: Environment
Compartment type is Environment
Pathways into and out of compartment  2
   Inlet Pathway Number   1: Waste Gas Decay Tank to Environment
   Inlet Pathway Number   3: Control Room to Environment
   Exit Pathway Number    2: Environment to Control Room

Compartment number  3
Name: Control Room
Compartment volume =   2.8919E+05 (Cubic feet)
Compartment type is Control Room
Pathways into and out of compartment  3
   Inlet Pathway Number   2: Environment to Control Room
   Exit Pathway Number    3: Control Room to Environment

Total number of pathways =   3
```

```
#######################################################################
   RADTRAD Version 3.03 (Spring 2001) run on  8/01/2005  at 17:43:26
#######################################################################

#######################################################################
                    Scenario Description
#######################################################################
```

Radioactive Decay is enabled
Calculation of Daughters is enabled

Release Fractions and Timings

	GAP	EARLY IN-VESSEL	LATE RELEASE	RELEASE MASS
	0.016666 hr	0.0000 hrs	0.0000 hrs	(gm)
NOBLES	1.0000E+00	0.0000E+00	0.0000E+00	2.083E+01
IODINE	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
CESIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
TELLURIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
STRONTIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
BARIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
RUTHENIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
CERIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
LANTHANUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00

Inventory Power = 1. MWt

Nuclide Name	Group	Specific Inventory (Ci/MWt)	half life (s)	Whole Body DCF (Sv-m3/Bq-s)	Inhaled Thyroid (Sv/Bq)	Inhaled Effective (Sv/Bq)
Kr-85	1	7.997E+03	3.383E+08	1.190E-16	0.000E+00	0.000E+00
Kr-85m	1	4.198E+02	1.613E+04	7.480E-15	0.000E+00	0.000E+00
Kr-87	1	2.424E+02	4.578E+03	4.120E-14	0.000E+00	0.000E+00
Kr-88	1	7.547E+02	1.022E+04	1.020E-13	0.000E+00	0.000E+00
Xe-133	1	8.257E+04	4.532E+05	1.560E-15	0.000E+00	0.000E+00
Xe-135	1	1.973E+03	3.272E+04	1.190E-14	0.000E+00	0.000E+00
Xe-133m	1	1.176E+03	1.892E+05	1.370E-15	0.000E+00	0.000E+00
Xe-135m	1	2.581E+02	9.180E+02	2.040E-14	0.000E+00	0.000E+00
Xe-138	1	1.362E+02	8.460E+02	5.770E-14	0.000E+00	0.000E+00

Nuclide	Daughter	Fraction	Daughter	Fraction	Daughter	Fraction
Kr-85m	Kr-85	0.21	none	0.00	none	0.00
Kr-87	Rb-87	1.00	none	0.00	none	0.00
Kr-88	Rb-88	1.00	none	0.00	none	0.00
I-133	Xe-133m	0.03	Xe-133	0.97	none	0.00
I-135	Xe-135m	0.15	Xe-135	0.85	none	0.00
Xe-135	Cs-135	1.00	none	0.00	none	0.00
Xe-133m	Xe-133	1.00	none	0.00	none	0.00
Xe-135m	Xe-135	1.00	none	0.00	none	0.00

Iodine fractions
Aerosol = 9.5000E-01
Elemental = 4.8500E-02
Organic = 1.5000E-03

COMPARTMENT DATA

Compartment number 1: Waste Gas Decay Tank

Compartment number 2: Environment

Compartment number 3: Control Room

PATHWAY DATA

Pathway number 1: Waste Gas Decay Tank to Environment

Piping: Removal Data

Time (hr)	Flow Rate (cfm)	DF Aerosol	DF Elemental	DF Organic

0.0000E+00	6.0800E+02	1.0000E+00	1.0000E+00	1.0000E+00

Pathway number 2: Environment to Control Room

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%) Aerosol	Elemental	Organic
0.0000E+00	3.5000E+03	0.0000E+00	0.0000E+00	0.0000E+00

Pathway number 3: Control Room to Environment

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%) Aerosol	Elemental	Organic
0.0000E+00	3.5000E+03	0.0000E+00	0.0000E+00	0.0000E+00

LOCATION DATA

Location Site Boundary is in compartment 2

Location X/Q Data

Time (hr)	X/Q (s * m^-3)
0.0000E+00	1.4400E-04
2.0000E+00	0.0000E+00

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	0.0000E+00

Location Low Population Zone is in compartment 2

Location X/Q Data

Time (hr)	X/Q (s * m^-3)
0.0000E+00	3.3900E-05
2.0000E+00	2.2000E-06
2.4000E+01	5.4000E-07
7.2000E+02	0.0000E+00

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	0.0000E+00

Location Control Room is in compartment 3

Location X/Q Data

Time (hr)	X/Q (s * m^-3)
0.0000E+00	1.6800E-03
2.0000E+00	1.3400E-03
8.0000E+00	5.1400E-04
2.4000E+01	3.8400E-04
9.6000E+01	3.1200E-04
7.2000E+02	0.0000E+00

Location Breathing Rate Data

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

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	0.0000E+00

```
#######################################################################
   RADTRAD Version 3.03 (Spring 2001) run on  8/01/2005  at 17:43:26
#######################################################################


     ####   #    #  #####  #####   #    #  #####
    #    #  #    #    #    #    #  #    #    #
    #    #  #    #    #    #    #  #    #    #
    #    #  #    #    #    #####   #    #    #
    #    #  #    #    #    #       #    #    #
    #    #  #    #    #    #       #    #    #
     ####    ####     #    #        ####     #

#######################################################################
           Dose, Detailed model and Detailed Inventory Output
#######################################################################
```

Site Boundary Doses:

Time (h) = 0.0167	Whole Body	Thyroid	TEDE
Delta dose (rem)	5.0557E-02	0.0000E+00	5.0557E-02
Accumulated dose (rem)	5.0557E-02	0.0000E+00	5.0557E-02

Low Population Zone Doses:

Time (h) = 0.0167	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.1902E-02	0.0000E+00	1.1902E-02
Accumulated dose (rem)	1.1902E-02	0.0000E+00	1.1902E-02

Control Room Doses:

Time (h) = 0.0167	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.9952E-04	0.0000E+00	1.9952E-04
Accumulated dose (rem)	1.9952E-04	0.0000E+00	1.9952E-04

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 0.0167	Ci	kg	Atoms	Decay
Kr-85	5.0560E+03	1.2887E-02	9.1303E+22	1.0533E+16
Kr-85m	2.6473E+02	3.2168E-08	2.2791E+17	5.5218E+14
Kr-87	1.5187E+02	5.3615E-09	3.7113E+16	3.1774E+14
Kr-88	4.7521E+02	3.7898E-08	2.5935E+17	9.9191E+14
Xe-133	5.2199E+04	2.7887E-04	1.2627E+21	1.0875E+17
Xe-135	1.2461E+03	4.8795E-07	2.1766E+18	2.5971E+15
Xe-133m	7.4335E+02	1.6582E-06	7.5082E+18	1.5488E+15
Xe-135m	1.5626E+02	1.7165E-09	7.6570E+15	3.3255E+14
Xe-138	8.1980E+01	8.4837E-10	3.7022E+15	1.7479E+14

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 0.0167	Atmosphere	Sump	
Noble gases (atoms)	9.2576E+22	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	
Dose Effective (Ci/cc)	I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 0.0167	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	5.4859E+22
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 Integral Nuclide Release:

Time (h) = 0.0167	Ci	kg	Atoms	Bq
Kr-85	2.9410E+03	7.4961E-03	5.3109E+22	1.0882E+14
Kr-85m	1.5399E+02	1.8712E-08	1.3257E+17	5.6976E+12
Kr-87	8.8343E+01	3.1189E-09	2.1589E+16	3.2687E+12
Kr-88	2.7643E+02	2.2045E-08	1.5086E+17	1.0228E+13
Xe-133	3.0363E+04	1.6221E-04	7.3449E+20	1.1234E+15
Xe-135	7.2482E+02	2.8383E-07	1.2661E+18	2.6818E+13
Xe-133m	4.3239E+02	9.6454E-07	4.3674E+18	1.5999E+13
Xe-135m	9.0905E+01	9.9860E-10	4.4546E+15	3.3635E+12
Xe-138	4.7700E+01	4.9362E-10	2.1541E+15	1.7649E+12

Environment Transport Group Inventory:

Time (h) = 0.0167	Total Release	Release Rate/s
Noble gases (atoms)	5.3849E+22	8.9752E+20
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

Dose Effective (Ci) I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)	0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 0.0167	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	5.4859E+22
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 to Control Room Transport Group Inventory:

Time (h) = 0.0167	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	1.4943E+20
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 to Environment Transport Group Inventory:

Time (h) = 0.0167	Pathway Filtered	Transported
Noble gases (atoms)	6.1310E+17	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 Compartment Nuclide Inventory:

Time (h) = 0.0167	Ci	kg	Atoms	Decay
Kr-85	8.1260E+00	2.0712E-05	1.4674E+20	1.6841E+13
Kr-85m	4.2547E-01	5.1701E-11	3.6629E+14	8.8284E+11
Kr-87	2.4408E-01	8.6170E-12	5.9647E+13	5.0800E+11
Kr-88	7.6376E-01	6.0910E-11	4.1683E+14	1.5859E+12
Xe-133	8.3894E+01	4.4820E-07	2.0294E+18	1.7388E+14
Xe-135	2.0027E+00	7.8422E-10	3.4983E+15	4.1523E+12
Xe-133m	1.1947E+00	2.6651E-09	1.2067E+16	2.4762E+12
Xe-135m	2.5111E-01	2.7584E-12	1.2305E+13	5.3157E+11
Xe-138	1.3176E-01	1.3635E-12	5.9501E+12	2.7943E+11

Control Room Transport Group Inventory:

Time (h) = 0.0167	Atmosphere	Sump
Noble gases (atoms)	1.4879E+20	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

Dose Effective (Ci/cc) I-131 (Thyroid)	0.0000E+00

Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)	0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 0.0167	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	1.4943E+20
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 to Environment Transport Group Inventory:

Time (h) = 0.0167	Pathway Filtered	Transported
Noble gases (atoms)	6.1310E+17	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

Site Boundary Doses:

Time (h) = 2.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	8.6579E-02	0.0000E+00	8.6579E-02
Accumulated dose (rem)	1.3714E-01	0.0000E+00	1.3714E-01

Low Population Zone Doses:

Time (h) = 2.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	2.0382E-02	0.0000E+00	2.0382E-02
Accumulated dose (rem)	3.2284E-02	0.0000E+00	3.2284E-02

Control Room Doses:

Time (h) = 2.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	6.3924E-02	0.0000E+00	6.3924E-02
Accumulated dose (rem)	6.4123E-02	0.0000E+00	6.4123E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 2.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 2.0000	Atmosphere	Sump
Noble gases (atoms)	2.0258E-29	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

Dose Effective (Ci/cc) I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)	0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 2.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3386E+23
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 Integral Nuclide Release:

Time (h) = 2.0000	Ci	kg	Atoms	Bq
Kr-85	7.9970E+03	2.0383E-02	1.4441E+23	2.9589E+14
Kr-85m	4.1465E+02	5.0385E-08	3.5697E+17	1.5342E+13
Kr-87	2.3214E+02	8.1953E-09	5.6728E+16	8.5891E+12
Kr-88	7.4016E+02	5.9027E-08	4.0394E+17	2.7386E+13
Xe-133	8.2534E+04	4.4093E-04	1.9965E+21	3.0538E+15
Xe-135	1.9625E+03	7.6847E-07	3.4280E+18	7.2611E+13
Xe-133m	1.1748E+03	2.6206E-06	1.1866E+19	4.3466E+13

Xe-135m	2.0990E+02	2.3058E-09	1.0286E+16	7.7663E+12
Xe-138	1.0870E+02	1.1249E-09	4.9088E+15	4.0219E+12

Environment Transport Group Inventory:

Time (h) = 2.0000	Total Release	Release Rate/s	
Noble gases (atoms)	1.4642E+23	2.0337E+19	
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	
Dose Effective (Ci) I-131 (Thyroid)			0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)			0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 2.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3386E+23
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 to Control Room Transport Group Inventory:

Time (h) = 2.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0634E+20
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 to Environment Transport Group Inventory:

Time (h) = 2.0000	Pathway Filtered	Transported
Noble gases (atoms)	3.1887E+20	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 Compartment Nuclide Inventory:

Time (h) = 2.0000	Ci	kg	Atoms	Decay
Kr-85	5.2890E+00	1.3481E-05	9.5510E+19	3.0302E+15
Kr-85m	2.0375E-01	2.4759E-11	1.7541E+14	1.4160E+14
Kr-87	5.3894E-02	1.9027E-12	1.3170E+13	6.2787E+13
Kr-88	3.0636E-01	2.4432E-11	1.6720E+14	2.3876E+14
Xe-133	5.4021E+01	2.8860E-07	1.3068E+18	3.1156E+16
Xe-135	1.1246E+00	4.4038E-10	1.9645E+15	7.0717E+14
Xe-133m	7.5754E-01	1.6899E-09	7.6515E+15	4.4109E+14
Xe-135m	7.4481E-04	8.1818E-15	3.6498E+10	2.6177E+13
Xe-138	2.4699E-04	2.5559E-15	1.1154E+10	1.2891E+13

Control Room Transport Group Inventory:

Time (h) = 2.0000	Atmosphere	Sump	
Noble gases (atoms)	9.6827E+19	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	
Dose Effective (Ci/cc) I-131 (Thyroid)			0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)			0.0000E+00
Total I (Ci)			0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 2.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0634E+20
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 to Environment Transport Group Inventory:

Time (h) = 2.0000	Pathway Filtered	Transported
Noble gases (atoms)	3.1887E+20	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

Site Boundary Doses:

Time (h) = 8.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	1.3714E-01	0.0000E+00	1.3714E-01

Low Population Zone Doses:

Time (h) = 8.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	2.2879E-55	0.0000E+00	2.2879E-55
Accumulated dose (rem)	3.2284E-02	0.0000E+00	3.2284E-02

Control Room Doses:

Time (h) = 8.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.6409E-02	0.0000E+00	1.6409E-02
Accumulated dose (rem)	8.0532E-02	0.0000E+00	8.0532E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 8.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 8.0000	Atmosphere	Sump	
Noble gases (atoms)	1.0583-185	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	
Dose Effective (Ci/cc)	I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 8.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3386E+23
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 Integral Nuclide Release:

Time (h) = 8.0000	Ci	kg	Atoms	Bq
Kr-85	7.9970E+03	2.0383E-02	1.4441E+23	2.9589E+14
Kr-85m	4.1465E+02	5.0385E-08	3.5697E+17	1.5342E+13
Kr-87	2.3214E+02	8.1953E-09	5.6728E+16	8.5891E+12
Kr-88	7.4016E+02	5.9027E-08	4.0394E+17	2.7386E+13
Xe-133	8.2534E+04	4.4093E-04	1.9965E+21	3.0538E+15
Xe-135	1.9625E+03	7.6847E-07	3.4280E+18	7.2611E+13
Xe-133m	1.1748E+03	2.6206E-06	1.1866E+19	4.3466E+13
Xe-135m	2.0990E+02	2.3058E-09	1.0286E+16	7.7663E+12
Xe-138	1.0870E+02	1.1249E-09	4.9088E+15	4.0219E+12

Environment Transport Group Inventory:

Time (h) = 8.0000	Total Release	Release Rate/s
Noble gases (atoms)	1.4642E+23	5.0842E+18
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
Dose Effective (Ci) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 8.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3386E+23
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 to Control Room Transport Group Inventory:

Time (h) = 8.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0634E+20
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 to Environment Transport Group Inventory:

Time (h) = 8.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1445E+20	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 Compartment Nuclide Inventory:

Time (h) = 8.0000	Ci	kg	Atoms	Decay
Kr-85	6.7785E-02	1.7277E-07	1.2241E+18	3.9535E+15
Kr-85m	1.0321E-03	1.2541E-13	8.8854E+11	1.7115E+14
Kr-87	2.6242E-05	9.2644E-16	6.4128E+09	6.8227E+13
Kr-88	9.0789E-04	7.2404E-14	4.9549E+11	2.7919E+14
Xe-133	6.7017E-01	3.5803E-09	1.6211E+16	4.0521E+16
Xe-135	9.1220E-03	3.5720E-12	1.5934E+13	8.8569E+14
Xe-133m	8.9706E-03	2.0011E-11	9.0608E+13	5.7111E+14

Control Room Transport Group Inventory:

Time (h) = 8.0000	Atmosphere	Sump
Noble gases (atoms)	1.2404E+18	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
Dose Effective (Ci/cc) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 8.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0634E+20
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 to Environment Transport Group Inventory:

Time (h) = 8.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1445E+20	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

Site Boundary Doses:

Time (h) = 24.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	1.3714E-01	0.0000E+00	1.3714E-01

Low Population Zone Doses:

Time (h) = 24.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	8.8607-212	0.0000E+00	8.8607-212
Accumulated dose (rem)	3.2284E-02	0.0000E+00	3.2284E-02

Control Room Doses:

Time (h) = 24.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.6551E-04	0.0000E+00	1.6551E-04
Accumulated dose (rem)	8.0698E-02	0.0000E+00	8.0698E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 24.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 24.0000	Atmosphere	Sump
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
Dose Effective (Ci/cc) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 24.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3386E+23
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 Integral Nuclide Release:

Time (h) = 24.0000	Ci	kg	Atoms	Bq
Kr-85	7.9970E+03	2.0383E-02	1.4441E+23	2.9589E+14
Kr-85m	4.1465E+02	5.0385E-08	3.5697E+17	1.5342E+13
Kr-87	2.3214E+02	8.1953E-09	5.6728E+16	8.5891E+12
Kr-88	7.4016E+02	5.9027E-08	4.0394E+17	2.7386E+13
Xe-133	8.2534E+04	4.4093E-04	1.9965E+21	3.0538E+15
Xe-135	1.9625E+03	7.6847E-07	3.4280E+18	7.2611E+13
Xe-133m	1.1748E+03	2.6206E-06	1.1866E+19	4.3466E+13
Xe-135m	2.0990E+02	2.3058E-09	1.0286E+16	7.7663E+12
Xe-138	1.0870E+02	1.1249E-09	4.9088E+15	4.0219E+12

Environment Transport Group Inventory:

Time (h) = 24.0000	Total Release	Release Rate/s
Noble gases (atoms)	1.4642E+23	1.6947E+18
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
Dose Effective (Ci) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 24.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3386E+23
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 to Control Room Transport Group Inventory:

Time (h) = 24.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0634E+20
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 to Environment Transport Group Inventory:

Time (h) = 24.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1569E+20	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 Compartment Nuclide Inventory:

Time (h) = 24.0000	Ci	kg	Atoms	Decay
Kr-85	6.0977E-07	1.5542E-12	1.1011E+13	3.9654E+15
Kr-85m	7.8108E-10	9.4912E-20	6.7244E+05	1.7130E+14
Kr-88	1.6450E-10	1.3119E-20	8.9778E+04	2.7931E+14
Xe-133	5.5270E-06	2.9527E-14	1.3370E+11	4.0637E+16
Xe-135	2.4227E-08	9.4870E-18	4.2320E+07	8.8714E+14
Xe-133m	6.5353E-08	1.4578E-16	6.6010E+08	5.7265E+14

Control Room Transport Group Inventory:

Time (h) = 24.0000	Atmosphere	Sump
Noble gases (atoms)	1.1146E+13	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
Dose Effective (Ci/cc) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 24.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0634E+20
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 to Environment Transport Group Inventory:

Time (h) = 24.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1569E+20	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

Site Boundary Doses:

Time (h) = 96.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	1.3714E-01	0.0000E+00	1.3714E-01

Low Population Zone Doses:

Time (h) = 96.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	3.2284E-02	0.0000E+00	3.2284E-02

Control Room Doses:

Time (h) = 96.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	7.5697E-10	0.0000E+00	7.5697E-10
Accumulated dose (rem)	8.0698E-02	0.0000E+00	8.0698E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 96.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 96.0000	Atmosphere	Sump	
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	
Dose Effective (Ci/cc) I-131 (Thyroid)			0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)			0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 96.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3386E+23
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 Integral Nuclide Release:

Time (h) = 96.0000	Ci	kg	Atoms	Bq
Kr-85	7.9970E+03	2.0383E-02	1.4441E+23	2.9589E+14
Kr-85m	4.1465E+02	5.0385E-08	3.5697E+17	1.5342E+13
Kr-87	2.3214E+02	8.1953E-09	5.6728E+16	8.5891E+12
Kr-88	7.4016E+02	5.9027E-08	4.0394E+17	2.7386E+13
Xe-133	8.2534E+04	4.4093E-04	1.9965E+21	3.0538E+15
Xe-135	1.9625E+03	7.6847E-07	3.4280E+18	7.2611E+13
Xe-133m	1.1748E+03	2.6206E-06	1.1866E+19	4.3466E+13
Xe-135m	2.0990E+02	2.3058E-09	1.0286E+16	7.7663E+12
Xe-138	1.0870E+02	1.1249E-09	4.9088E+15	4.0219E+12

Environment Transport Group Inventory:

Time (h) = 96.0000	Total Release	Release Rate/s	
Noble gases (atoms)	1.4642E+23	4.2368E+17	
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	
Dose Effective (Ci) I-131 (Thyroid)			0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)			0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 96.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3386E+23
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 to Control Room Transport Group Inventory:

Time (h) = 96.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0634E+20
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 to Environment Transport Group Inventory:

Pathway

Time (h) = 96.0000	Filtered	Transported
Noble gases (atoms)	4.1569E+20	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 Compartment Nuclide Inventory:

Time (h) = 96.0000	Ci	kg	Atoms	Decay

Control Room Transport Group Inventory:

Time (h) = 96.0000	Atmosphere	Sump	
Noble gases (atoms)	2.1804E-10	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	
Dose Effective (Ci/cc)	I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)			0.0000E+00

Environment to Control Room Transport Group Inventory:

	Pathway	
Time (h) = 96.0000	Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0634E+20
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 to Environment Transport Group Inventory:

	Pathway	
Time (h) = 96.0000	Filtered	Transported
Noble gases (atoms)	4.1569E+20	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

Site Boundary Doses:

Time (h) = 720.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	1.3714E-01	0.0000E+00	1.3714E-01

Low Population Zone Doses:

Time (h) = 720.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	3.2284E-02	0.0000E+00	3.2284E-02

Control Room Doses:

Time (h) = 720.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	6.4795E-33	0.0000E+00	6.4795E-33
Accumulated dose (rem)	8.0698E-02	0.0000E+00	8.0698E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 720.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 720.0000	Atmosphere	Sump	
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	
Dose Effective (Ci/cc)	I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 720.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3386E+23
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 Integral Nuclide Release:

Time (h) = 720.0000	Ci	kg	Atoms	Bq
Kr-85	7.9970E+03	2.0383E-02	1.4441E+23	2.9589E+14
Kr-85m	4.1465E+02	5.0385E-08	3.5697E+17	1.5342E+13
Kr-87	2.3214E+02	8.1953E-09	5.6728E+16	8.5891E+12
Kr-88	7.4016E+02	5.9027E-08	4.0394E+17	2.7386E+13
Xe-133	8.2534E+04	4.4093E-04	1.9965E+21	3.0538E+15
Xe-135	1.9625E+03	7.6847E-07	3.4280E+18	7.2611E+13
Xe-133m	1.1748E+03	2.6206E-06	1.1866E+19	4.3466E+13
Xe-135m	2.0990E+02	2.3058E-09	1.0286E+16	7.7663E+12
Xe-138	1.0870E+02	1.1249E-09	4.9088E+15	4.0219E+12

Environment Transport Group Inventory:

Time (h) = 720.0000	Total Release	Release Rate/s
Noble gases (atoms)	1.4642E+23	5.6491E+16
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

Dose Effective (Ci) I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)	0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 720.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3386E+23
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 to Control Room Transport Group Inventory:

Time (h) = 720.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0634E+20
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 to Environment Transport Group Inventory:

Time (h) = 720.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1569E+20	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 Compartment Nuclide Inventory:

Time (h) = 720.0000	Ci	kg	Atoms	Decay

Control Room Transport Group Inventory:

Time (h) = 720.0000	Atmosphere	Sump
Noble gases (atoms)	3.4852-207	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

Dose Effective (Ci/cc) I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)	0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 720.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0634E+20
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 to Environment Transport Group Inventory:

Time (h) = 720.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1569E+20	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

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##
I-131 Summary
##

Time (hr)	Waste Gas Decay Tank I-131 (Curies)	Environment I-131 (Curies)	Control Room I-131 (Curies)
0.000	0.0000E+00	0.0000E+00	0.0000E+00
0.017	0.0000E+00	0.0000E+00	0.0000E+00
0.417	0.0000E+00	0.0000E+00	0.0000E+00
0.717	0.0000E+00	0.0000E+00	0.0000E+00
1.017	0.0000E+00	0.0000E+00	0.0000E+00
1.317	0.0000E+00	0.0000E+00	0.0000E+00
1.617	0.0000E+00	0.0000E+00	0.0000E+00
1.917	0.0000E+00	0.0000E+00	0.0000E+00
2.000	0.0000E+00	0.0000E+00	0.0000E+00
2.300	0.0000E+00	0.0000E+00	0.0000E+00
2.600	0.0000E+00	0.0000E+00	0.0000E+00
2.900	0.0000E+00	0.0000E+00	0.0000E+00
3.200	0.0000E+00	0.0000E+00	0.0000E+00
3.500	0.0000E+00	0.0000E+00	0.0000E+00
3.800	0.0000E+00	0.0000E+00	0.0000E+00
4.100	0.0000E+00	0.0000E+00	0.0000E+00
4.400	0.0000E+00	0.0000E+00	0.0000E+00
4.700	0.0000E+00	0.0000E+00	0.0000E+00
5.000	0.0000E+00	0.0000E+00	0.0000E+00
5.300	0.0000E+00	0.0000E+00	0.0000E+00
5.600	0.0000E+00	0.0000E+00	0.0000E+00
5.900	0.0000E+00	0.0000E+00	0.0000E+00
6.200	0.0000E+00	0.0000E+00	0.0000E+00
6.500	0.0000E+00	0.0000E+00	0.0000E+00
6.800	0.0000E+00	0.0000E+00	0.0000E+00
7.100	0.0000E+00	0.0000E+00	0.0000E+00
7.400	0.0000E+00	0.0000E+00	0.0000E+00
7.700	0.0000E+00	0.0000E+00	0.0000E+00
8.000	0.0000E+00	0.0000E+00	0.0000E+00
8.300	0.0000E+00	0.0000E+00	0.0000E+00
8.600	0.0000E+00	0.0000E+00	0.0000E+00
8.900	0.0000E+00	0.0000E+00	0.0000E+00
9.200	0.0000E+00	0.0000E+00	0.0000E+00
9.500	0.0000E+00	0.0000E+00	0.0000E+00
9.800	0.0000E+00	0.0000E+00	0.0000E+00
10.100	0.0000E+00	0.0000E+00	0.0000E+00
10.400	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
##

	Site Boundary		Low Population Zone		Control Room	
Time (hr)	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)
0.000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.017	0.0000E+00	5.0557E-02	0.0000E+00	1.1902E-02	0.0000E+00	1.9952E-04
0.417	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	2.1508E-02
0.717	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	3.4388E-02
1.017	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	4.4369E-02
1.317	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	5.2147E-02
1.617	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	5.8228E-02
1.917	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	6.2993E-02
2.000	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	6.4123E-02
2.300	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	6.7620E-02
2.600	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	7.0370E-02
2.900	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	7.2534E-02
3.200	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	7.4239E-02
3.500	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	7.5584E-02
3.800	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	7.6645E-02
4.100	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	7.7485E-02
4.400	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	7.8148E-02
4.700	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	7.8674E-02
5.000	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	7.9090E-02
5.300	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	7.9419E-02
5.600	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	7.9681E-02
5.900	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	7.9889E-02
6.200	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0054E-02
6.500	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0185E-02
6.800	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0289E-02
7.100	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0372E-02
7.400	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0438E-02
7.700	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0491E-02
8.000	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0532E-02
8.300	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0566E-02
8.600	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0592E-02
8.900	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0614E-02
9.200	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0630E-02
9.500	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0644E-02
9.800	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0655E-02
10.100	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0663E-02
10.400	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0670E-02
24.000	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0698E-02
96.000	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0698E-02
720.000	0.0000E+00	1.3714E-01	0.0000E+00	3.2284E-02	0.0000E+00	8.0698E-02

```
#######################################################################
                        Worst Two-Hour Doses
#######################################################################
```

ATTACHMENT F – RADTRAD OUTPUT FILE WASTEGAS4.O0 – 4-HOUR GAS TRANSFER DECAY TIME CREDIT

```
#######################################################################
   RADTRAD Version 3.03 (Spring 2001) run on  8/01/2005  at 17:46:26
#######################################################################

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

Plant file           = D:\RADTRAD\Defaults\WasteGas4.psf
Inventory file       = d:\radtrad\defaults\wastegas.nif
Release file         = d:\radtrad\defaults\wastegas0.rft
Dose Conversion file = d:\radtrad\defaults\wastegas14.inp



    #####    ####   #####    #  #     #  #####   #    #  #####
    #    #  #       #        #  ##    #  #    #  #    #    #
    #    #  #       #        #  # #   #  #    #  #    #    #
    #####    ####   ####     #  #  #  #  #####   #    #    #
    #            #  #        #  #   # #  #       #    #    #
    #            #  #        #  #    ##  #       #    #    #
    #        ####   #        #  #     #  #        ####     #


Radtrad 3.03 4/15/2001

Nuclide Inventory File:
d:\radtrad\defaults\wastegas.nif
Plant Power Level:
 2.7540E+03
Compartments:
  3
Compartment 1:
Waste Gas Decay Tank
  3
 6.0825E+02
  0
  0
  0
  0
  0
Compartment 2:
Environment
  2
 0.0000E+00
  0
  0
  0
  0
  0
Compartment 3:
Control Room
  1
 2.8919E+05
  0
  0
  0
  0
  0
Pathways:
  3
Pathway 1:
Waste Gas Decay Tank to Environment
  1
  2
  1
Pathway 2:
```

```
Environment to Control Room
  2
  3
  2
Pathway 3:
Control Room to Environment
  3
  2
  2
End of Plant Model File
Scenario Description Name:

Plant Model Filename:

Source Term:
  1
  1   1.0000E+00
d:\radtrad\defaults\wastegas14.inp
d:\radtrad\defaults\wastegas0.rft
  4.0000E+00
  1
  9.5000E-01   4.8500E-02   1.5000E-03   1.0000E+00
Overlying Pool:
  0
  0.0000E+00
  0
  0
  0
  0
Compartments:
  3
Compartment 1:
  1
  1
  0
  0
  0
  0
  0
  0
  0
Compartment 2:
  1
  1
  0
  0
  0
  0
  0
  0
  0
Compartment 3:
  1
  1
  0
  0
  0
  0
  0
  0
  0
Pathways:
  3
Pathway 1:
  0
  0
  1
  1
  4.0000E+00   1.0000E+00   6.0800E+02
  1
  1
```

```
  4.0000E+00   1.0000E+00   6.0800E+02
  1
  1
  4.0000E+00   1.0000E+00   6.0800E+02
  0
  0
  0
  0
  0
  0
  0
Pathway 2:
  0
  0
  0
  0
  0
  1
  1
  4.0000E+00   3.5000E+03   0.0000E+00   0.0000E+00   0.0000E+00
  0
  0
  0
  0
  0
  0
Pathway 3:
  0
  0
  0
  0
  0
  1
  1
  4.0000E+00   3.5000E+03   0.0000E+00   0.0000E+00   0.0000E+00
  0
  0
  0
  0
  0
  0
Dose Locations:
  3
Location 1:
Site Boundary
  2
  1
  2
  4.0000E+00   1.4400E-04
  6.0000E+00   0.0000E+00
  1
  4
  4.0000E+00   3.5000E-04
  1.2000E+01   1.8000E-04
  2.8000E+01   2.3000E-04
  7.2400E+02   0.0000E+00
  0
Location 2:
Low Population Zone
  2
  1
  4
  4.0000E+00   3.3900E-05
  6.0000E+00   2.2000E-06
  2.8000E+01   5.4000E-07
  7.2400E+02   0.0000E+00
  1
  4
  4.0000E+00   3.5000E-04
  1.2000E+01   1.8000E-04
  2.8000E+01   2.3000E-04
```

```
  7.2400E+02   0.0000E+00
  0
Location 3:
Control Room
  3
  0
  1
  2
  4.0000E+00   3.5000E-04
  7.2400E+02   0.0000E+00
  1
  4
  4.0000E+00   1.0000E+00
  2.8000E+01   6.0000E-01
  1.0000E+02   4.0000E-01
  7.2400E+02   0.0000E+00
Effective Volume Location:
  1
  6
  4.0000E+00   1.6800E-03
  6.0000E+00   1.3400E-03
  1.2000E+01   5.1400E-04
  2.8000E+01   3.8400E-04
  1.0000E+02   3.1200E-04
  7.2400E+02   0.0000E+00
Simulation Parameters:
  0
Output Filename:
D:\RADTRAD\Defaults\WasteGas4.o0
  1
  1
  1
  0
  0
End of Scenario File
```

```
#######################################################################
  RADTRAD Version 3.03 (Spring 2001) run on  8/01/2005  at 17:46:26
#######################################################################

#######################################################################
                    Plant Description
#######################################################################

Number of Nuclides =  14

Inventory Power =   2.7540E+03 MWth
Plant Power Level =   2.7540E+03 MWth

Number of compartments    =   3

Compartment information

Compartment number  1  (Source term fraction =   1.0000E+00
)
Name: Waste Gas Decay Tank
Compartment volume =   6.0825E+02 (Cubic feet)
Compartment type is Normal
Pathways into and out of compartment  1
   Exit Pathway Number    1: Waste Gas Decay Tank to Environment

Compartment number  2
Name: Environment
Compartment type is Environment
Pathways into and out of compartment  2
   Inlet Pathway Number   1: Waste Gas Decay Tank to Environment
   Inlet Pathway Number   3: Control Room to Environment
   Exit Pathway Number    2: Environment to Control Room

Compartment number  3
Name: Control Room
Compartment volume =   2.8919E+05 (Cubic feet)
Compartment type is Control Room
Pathways into and out of compartment  3
   Inlet Pathway Number   2: Environment to Control Room
   Exit Pathway Number    3: Control Room to Environment

Total number of pathways =   3
```

```
#######################################################################
   RADTRAD Version 3.03 (Spring 2001) run on  8/01/2005  at 17:46:26
#######################################################################

#######################################################################
                        Scenario Description
#######################################################################
```

Time between shutdown and first release = 4.0000E+00 (Hours)

Radioactive Decay is enabled
Calculation of Daughters is enabled

Release Fractions and Timings

	GAP	EARLY IN-VESSEL	LATE RELEASE	RELEASE MASS
	0.016666 hr	0.0000 hrs	0.0000 hrs	(gm)
NOBLES	1.0000E+00	0.0000E+00	0.0000E+00	2.083E+01
IODINE	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
CESIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
TELLURIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
STRONTIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
BARIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
RUTHENIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
CERIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
LANTHANUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00

Inventory Power = 1. MWt

Nuclide Name	Group	Specific Inventory (Ci/MWt)	half life (s)	Whole Body DCF (Sv-m3/Bq-s)	Inhaled Thyroid (Sv/Bq)	Inhaled Effective (Sv/Bq)
Kr-85	1	7.997E+03	3.383E+08	1.190E-16	0.000E+00	0.000E+00
Kr-85m	1	4.198E+02	1.613E+04	7.480E-15	0.000E+00	0.000E+00
Kr-87	1	2.424E+02	4.578E+03	4.120E-14	0.000E+00	0.000E+00
Kr-88	1	7.547E+02	1.022E+04	1.020E-13	0.000E+00	0.000E+00
Xe-133	1	8.257E+04	4.532E+05	1.560E-15	0.000E+00	0.000E+00
Xe-135	1	1.973E+03	3.272E+04	1.190E-14	0.000E+00	0.000E+00
Xe-133m	1	1.176E+03	1.892E+05	1.370E-15	0.000E+00	0.000E+00
Xe-135m	1	2.581E+02	9.180E+02	2.040E-14	0.000E+00	0.000E+00
Xe-138	1	1.362E+02	8.460E+02	5.770E-14	0.000E+00	0.000E+00

Nuclide	Daughter	Fraction	Daughter	Fraction	Daughter	Fraction
Kr-85m	Kr-85	0.21	none	0.00	none	0.00
Kr-87	Rb-87	1.00	none	0.00	none	0.00
Kr-88	Rb-88	1.00	none	0.00	none	0.00
I-133	Xe-133m	0.03	Xe-133	0.97	none	0.00
I-135	Xe-135m	0.15	Xe-135	0.85	none	0.00
Xe-135	Cs-135	1.00	none	0.00	none	0.00
Xe-133m	Xe-133	1.00	none	0.00	none	0.00
Xe-135m	Xe-135	1.00	none	0.00	none	0.00

Iodine fractions
Aerosol = 9.5000E-01
Elemental = 4.8500E-02
Organic = 1.5000E-03

COMPARTMENT DATA

Compartment number 1: Waste Gas Decay Tank

Compartment number 2: Environment

Compartment number 3: Control Room

PATHWAY DATA

Pathway number 1: Waste Gas Decay Tank to Environment

Piping: Removal Data

Time (hr)	Flow Rate (cfm)	DF Aerosol	DF Elemental	DF Organic
4.0000E+00	6.0800E+02	1.0000E+00	1.0000E+00	1.0000E+00

Pathway number 2: Environment to Control Room

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%) Aerosol	Elemental	Organic
4.0000E+00	3.5000E+03	0.0000E+00	0.0000E+00	0.0000E+00

Pathway number 3: Control Room to Environment

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%) Aerosol	Elemental	Organic
4.0000E+00	3.5000E+03	0.0000E+00	0.0000E+00	0.0000E+00

LOCATION DATA

Location Site Boundary is in compartment 2

Location X/Q Data

Time (hr)	X/Q (s * m^-3)
4.0000E+00	1.4400E-04
6.0000E+00	0.0000E+00

Location Breathing Rate Data

Time (hr)	Breathing Rate (m^3 * sec^-1)
4.0000E+00	3.5000E-04
1.2000E+01	1.8000E-04
2.8000E+01	2.3000E-04
7.2400E+02	0.0000E+00

Location Low Population Zone is in compartment 2

Location X/Q Data

Time (hr)	X/Q (s * m^-3)
4.0000E+00	3.3900E-05
6.0000E+00	2.2000E-06
2.8000E+01	5.4000E-07
7.2400E+02	0.0000E+00

Location Breathing Rate Data

Time (hr)	Breathing Rate (m^3 * sec^-1)
4.0000E+00	3.5000E-04
1.2000E+01	1.8000E-04
2.8000E+01	2.3000E-04
7.2400E+02	0.0000E+00

Location Control Room is in compartment 3

Location X/Q Data

Time (hr)	X/Q (s * m^-3)
4.0000E+00	1.6800E-03
6.0000E+00	1.3400E-03
1.2000E+01	5.1400E-04
2.8000E+01	3.8400E-04
1.0000E+02	3.1200E-04
7.2400E+02	0.0000E+00

Location Breathing Rate Data

Time (hr)	Breathing Rate (m^3 * sec^-1)
4.0000E+00	3.5000E-04
7.2400E+02	0.0000E+00

Location Occupancy Factor Data

Time (hr)	Occupancy Factor
4.0000E+00	1.0000E+00
2.8000E+01	6.0000E-01
1.0000E+02	4.0000E-01
7.2400E+02	0.0000E+00

```
#######################################################################
   RADTRAD Version 3.03 (Spring 2001) run on  8/01/2005  at 17:46:26
#######################################################################
```

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

```
#######################################################################
           Dose, Detailed model and Detailed Inventory Output
#######################################################################
```

Site Boundary Doses:

Time (h) = 4.0167	Whole Body	Thyroid	TEDE
Delta dose (rem)	3.5927E-02	0.0000E+00	3.5927E-02
Accumulated dose (rem)	3.5927E-02	0.0000E+00	3.5927E-02

Low Population Zone Doses:

Time (h) = 4.0167	Whole Body	Thyroid	TEDE
Delta dose (rem)	8.4579E-03	0.0000E+00	8.4579E-03
Accumulated dose (rem)	8.4579E-03	0.0000E+00	8.4579E-03

Control Room Doses:

Time (h) = 4.0167	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.4178E-04	0.0000E+00	1.4178E-04
Accumulated dose (rem)	1.4178E-04	0.0000E+00	1.4178E-04

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 4.0167	Ci	kg	Atoms	Decay
Kr-85	5.0559E+03	1.2887E-02	9.1300E+22	1.0533E+16
Kr-85m	1.4257E+02	1.7324E-08	1.2274E+17	2.9738E+14
Kr-87	1.7163E+01	6.0591E-10	4.1941E+15	3.5908E+13
Kr-88	1.7902E+02	1.4277E-08	9.7701E+16	3.7367E+14
Xe-133	5.1125E+04	2.7313E-04	1.2367E+21	1.0651E+17
Xe-135	1.0738E+03	4.2049E-07	1.8758E+18	2.2382E+15
Xe-133m	7.0848E+02	1.5804E-06	7.1561E+18	1.4761E+15
Xe-135m	7.9238E+01	8.7044E-10	3.8829E+15	1.6864E+14
Xe-138	6.1630E-04	6.3778E-15	2.7832E+10	1.3140E+09

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 4.0167	Atmosphere	Sump
Noble gases (atoms)	9.2546E+22	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

Dose Effective (Ci/cc) I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)	0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 4.0167	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	5.4842E+22
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 Integral Nuclide Release:

Time (h) = 4.0167	Ci	kg	Atoms	Bq
Kr-85	2.9409E+03	7.4959E-03	5.3107E+22	1.0881E+14
Kr-85m	8.2931E+01	1.0077E-08	7.1396E+16	3.0684E+12
Kr-87	9.9837E+00	3.5246E-10	2.4397E+15	3.6940E+11
Kr-88	1.0413E+02	8.3047E-09	5.6832E+16	3.8530E+12
Xe-133	2.9738E+04	1.5887E-04	7.1937E+20	1.1003E+15
Xe-135	6.2462E+02	2.4459E-07	1.0911E+18	2.3111E+13
Xe-133m	4.1211E+02	9.1930E-07	4.1625E+18	1.5248E+13
Xe-135m	4.6096E+01	5.0637E-10	2.2588E+15	1.7056E+12
Xe-138	3.5859E-04	3.7109E-15	1.6194E+10	1.3268E+07

Environment Transport Group Inventory:

Time (h) = 4.0167	Total Release	Release Rate/s
Noble gases (atoms)	5.3832E+22	8.9724E+20
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

Dose Effective (Ci) I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)	0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 4.0167	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	5.4842E+22
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 to Control Room Transport Group Inventory:

Time (h) = 4.0167	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	1.4939E+20
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 to Environment Transport Group Inventory:

Time (h) = 4.0167	Pathway Filtered	Transported
Noble gases (atoms)	6.1290E+17	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 Compartment Nuclide Inventory:

Time (h) = 4.0167	Ci	kg	Atoms	Decay
Kr-85	8.1258E+00	2.0711E-05	1.4674E+20	1.6840E+13
Kr-85m	2.2914E-01	2.7843E-11	1.9727E+14	4.7545E+11
Kr-87	2.7584E-02	9.7381E-13	6.7407E+12	5.7409E+10
Kr-88	2.8772E-01	2.2946E-11	1.5703E+14	5.9742E+11
Xe-133	8.2168E+01	4.3897E-07	1.9876E+18	1.7030E+14
Xe-135	1.7258E+00	6.7581E-10	3.0147E+15	3.5785E+12
Xe-133m	1.1387E+00	2.5401E-09	1.1501E+16	2.3601E+12
Xe-135m	1.2733E-01	1.3988E-12	6.2396E+12	2.6955E+11
Xe-138	9.9052E-07	1.0250E-17	4.4731E+07	2.1006E+06

Control Room Transport Group Inventory:

Time (h) = 4.0167	Atmosphere	Sump
Noble gases (atoms)	1.4874E+20	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

Dose Effective (Ci/cc) I-131 (Thyroid)	0.0000E+00

Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)	0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 4.0167	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	1.4939E+20
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 to Environment Transport Group Inventory:

Time (h) = 4.0167	Pathway Filtered	Transported
Noble gases (atoms)	6.1290E+17	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

Site Boundary Doses:

Time (h) = 6.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	6.1674E-02	0.0000E+00	6.1674E-02
Accumulated dose (rem)	9.7601E-02	0.0000E+00	9.7601E-02

Low Population Zone Doses:

Time (h) = 6.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.4519E-02	0.0000E+00	1.4519E-02
Accumulated dose (rem)	2.2977E-02	0.0000E+00	2.2977E-02

Control Room Doses:

Time (h) = 6.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	4.8340E-02	0.0000E+00	4.8340E-02
Accumulated dose (rem)	4.8482E-02	0.0000E+00	4.8482E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 6.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 6.0000	Atmosphere	Sump
Noble gases (atoms)	2.0252E-29	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

Dose Effective (Ci/cc) I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)	0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 6.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3375E+23
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 Integral Nuclide Release:

Time (h) = 6.0000	Ci	kg	Atoms	Bq
Kr-85	7.9968E+03	2.0383E-02	1.4441E+23	2.9588E+14
Kr-85m	2.2331E+02	2.7135E-08	1.9225E+17	8.2623E+12
Kr-87	2.6234E+01	9.2615E-10	6.4108E+15	9.7065E+11
Kr-88	2.7883E+02	2.2237E-08	1.5217E+17	1.0317E+13
Xe-133	8.0836E+04	4.3186E-04	1.9554E+21	2.9909E+15
Xe-135	1.6908E+03	6.6209E-07	2.9535E+18	6.2560E+13
Xe-133m	1.1197E+03	2.4976E-06	1.1309E+19	4.1427E+13

Xe-135m	1.0644E+02	1.1692E-09	5.2158E+15	3.9383E+12
Xe-138	8.1718E-04	8.4565E-15	3.6903E+10	3.0236E+07

Environment Transport Group Inventory:

Time (h) = 6.0000	Total Release	Release Rate/s	
Noble gases (atoms)	1.4638E+23	2.0330E+19	
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	
Dose Effective (Ci) I-131 (Thyroid)			0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)			0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 6.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3375E+23
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 to Control Room Transport Group Inventory:

Time (h) = 6.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0621E+20
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 to Environment Transport Group Inventory:

Time (h) = 6.0000	Pathway Filtered	Transported
Noble gases (atoms)	3.1877E+20	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 Compartment Nuclide Inventory:

Time (h) = 6.0000	Ci	kg	Atoms	Decay
Kr-85	5.2888E+00	1.3480E-05	9.5507E+19	3.0301E+15
Kr-85m	1.0973E-01	1.3334E-11	9.4468E+13	7.6257E+13
Kr-87	6.0906E-03	2.1502E-13	1.4884E+12	7.0956E+12
Kr-88	1.1541E-01	9.2040E-12	6.2986E+13	8.9946E+13
Xe-133	5.2909E+01	2.8266E-07	1.2799E+18	3.0515E+16
Xe-135	9.6771E-01	3.7894E-10	1.6904E+15	6.0881E+14
Xe-133m	7.2201E-01	1.6106E-09	7.2926E+15	4.2040E+14
Xe-135m	3.7769E-04	4.1490E-15	1.8508E+10	1.3274E+13
Xe-138	1.8568E-09	1.9215E-20	8.3850E+04	9.6910E+07

Control Room Transport Group Inventory:

Time (h) = 6.0000	Atmosphere	Sump	
Noble gases (atoms)	9.6796E+19	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	
Dose Effective (Ci/cc) I-131 (Thyroid)			0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)			0.0000E+00
Total I (Ci)			0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 6.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0621E+20
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 to Environment Transport Group Inventory:

Time (h) = 6.0000	Pathway Filtered	Transported
Noble gases (atoms)	3.1877E+20	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

Site Boundary Doses:

Time (h) = 12.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	9.7601E-02	0.0000E+00	9.7601E-02

Low Population Zone Doses:

Time (h) = 12.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.8482E-55	0.0000E+00	1.8482E-55
Accumulated dose (rem)	2.2977E-02	0.0000E+00	2.2977E-02

Control Room Doses:

Time (h) = 12.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.3746E-02	0.0000E+00	1.3746E-02
Accumulated dose (rem)	6.2227E-02	0.0000E+00	6.2227E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 12.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 12.0000	Atmosphere	Sump
Noble gases (atoms)	1.0580-185	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
Dose Effective (Ci/cc)	I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)		0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 12.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3375E+23
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 Integral Nuclide Release:

Time (h) = 12.0000	Ci	kg	Atoms	Bq
Kr-85	7.9968E+03	2.0383E-02	1.4441E+23	2.9588E+14
Kr-85m	2.2331E+02	2.7135E-08	1.9225E+17	8.2623E+12
Kr-87	2.6234E+01	9.2615E-10	6.4108E+15	9.7065E+11
Kr-88	2.7883E+02	2.2237E-08	1.5217E+17	1.0317E+13
Xe-133	8.0836E+04	4.3186E-04	1.9554E+21	2.9909E+15
Xe-135	1.6908E+03	6.6209E-07	2.9535E+18	6.2560E+13
Xe-133m	1.1197E+03	2.4976E-06	1.1309E+19	4.1427E+13
Xe-135m	1.0644E+02	1.1692E-09	5.2158E+15	3.9383E+12
Xe-138	8.1718E-04	8.4565E-15	3.6903E+10	3.0236E+07

Environment Transport Group Inventory:

Time (h) = 12.0000	Total Release	Release Rate/s
Noble gases (atoms)	1.4638E+23	5.0825E+18
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	
Dose Effective (Ci) I-131 (Thyroid)			0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)			0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 12.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3375E+23
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 to Control Room Transport Group Inventory:

Time (h) = 12.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0621E+20
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 to Environment Transport Group Inventory:

Time (h) = 12.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1432E+20	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 Compartment Nuclide Inventory:

Time (h) = 12.0000	Ci	kg	Atoms	Decay
Kr-85	6.7783E-02	1.7277E-07	1.2240E+18	3.9534E+15
Kr-85m	5.5583E-04	6.7541E-14	4.7852E+11	9.2172E+13
Kr-87	2.9656E-06	1.0470E-16	7.2471E+08	7.7104E+12
Kr-88	3.4202E-04	2.7276E-14	1.8666E+11	1.0517E+14
Xe-133	6.5637E-01	3.5066E-09	1.5878E+16	3.9687E+16
Xe-135	7.8493E-03	3.0737E-12	1.3711E+13	7.6242E+14
Xe-133m	8.5499E-03	1.9072E-11	8.6358E+13	5.4432E+14

Control Room Transport Group Inventory:

Time (h) = 12.0000	Atmosphere	Sump	
Noble gases (atoms)	1.2400E+18	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	
Dose Effective (Ci/cc) I-131 (Thyroid)			0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)			0.0000E+00
Total I (Ci)			0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 12.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0621E+20
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 to Environment Transport Group Inventory:

Time (h) = 12.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1432E+20	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

Site Boundary Doses:

Time (h) = 28.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	9.7601E-02	0.0000E+00	9.7601E-02

Low Population Zone Doses:

Time (h) = 28.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	8.1697-212	0.0000E+00	8.1697-212
Accumulated dose (rem)	2.2977E-02	0.0000E+00	2.2977E-02

Control Room Doses:

Time (h) = 28.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.5438E-04	0.0000E+00	1.5438E-04
Accumulated dose (rem)	6.2382E-02	0.0000E+00	6.2382E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 28.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 28.0000	Atmosphere	Sump
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
Dose Effective (Ci/cc) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 28.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3375E+23
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 Integral Nuclide Release:

Time (h) = 28.0000	Ci	kg	Atoms	Bq
Kr-85	7.9968E+03	2.0383E-02	1.4441E+23	2.9588E+14
Kr-85m	2.2331E+02	2.7135E-08	1.9225E+17	8.2623E+12
Kr-87	2.6234E+01	9.2615E-10	6.4108E+15	9.7065E+11
Kr-88	2.7883E+02	2.2237E-08	1.5217E+17	1.0317E+13
Xe-133	8.0836E+04	4.3186E-04	1.9554E+21	2.9909E+15
Xe-135	1.6908E+03	6.6209E-07	2.9535E+18	6.2560E+13
Xe-133m	1.1197E+03	2.4976E-06	1.1309E+19	4.1427E+13
Xe-135m	1.0644E+02	1.1692E-09	5.2158E+15	3.9383E+12
Xe-138	8.1718E-04	8.4565E-15	3.6903E+10	3.0236E+07

Environment Transport Group Inventory:

Time (h) = 28.0000	Total Release	Release Rate/s
Noble gases (atoms)	1.4638E+23	1.6942E+18
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
Dose Effective (Ci) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 28.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3375E+23
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 to Control Room Transport Group Inventory:

Time (h) = 28.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0621E+20
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 to Environment Transport Group Inventory:

Time (h) = 28.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1556E+20	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 Compartment Nuclide Inventory:

Time (h) = 28.0000	Ci	kg	Atoms	Decay
Kr-85	6.0975E-07	1.5542E-12	1.1011E+13	3.9653E+15
Kr-85m	4.2065E-10	5.1114E-20	3.6214E+05	9.2252E+13
Kr-88	6.1971E-11	4.9421E-21	3.3821E+04	1.0522E+14
Xe-133	5.4130E-06	2.8918E-14	1.3094E+11	3.9801E+16
Xe-135	2.0847E-08	8.1634E-18	3.6416E+07	7.6367E+14
Xe-133m	6.2288E-08	1.3895E-16	6.2914E+08	5.4579E+14

Control Room Transport Group Inventory:

Time (h) = 28.0000	Atmosphere	Sump	
Noble gases (atoms)	1.1143E+13	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	
Dose Effective (Ci/cc)	I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)			0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 28.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0621E+20
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 to Environment Transport Group Inventory:

Time (h) = 28.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1556E+20	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

Site Boundary Doses:

Time (h) = 100.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	9.7601E-02	0.0000E+00	9.7601E-02

Low Population Zone Doses:

Time (h) = 100.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	2.2977E-02	0.0000E+00	2.2977E-02

Control Room Doses:

Time (h) = 100.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	7.3771E-10	0.0000E+00	7.3771E-10
Accumulated dose (rem)	6.2382E-02	0.0000E+00	6.2382E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 100.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 100.0000	Atmosphere	Sump	
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	
Dose Effective (Ci/cc) I-131 (Thyroid)			0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)			0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 100.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3375E+23
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 Integral Nuclide Release:

Time (h) = 100.0000	Ci	kg	Atoms	Bq
Kr-85	7.9968E+03	2.0383E-02	1.4441E+23	2.9588E+14
Kr-85m	2.2331E+02	2.7135E-08	1.9225E+17	8.2623E+12
Kr-87	2.6234E+01	9.2615E-10	6.4108E+15	9.7065E+11
Kr-88	2.7883E+02	2.2237E-08	1.5217E+17	1.0317E+13
Xe-133	8.0836E+04	4.3186E-04	1.9554E+21	2.9909E+15
Xe-135	1.6908E+03	6.6209E-07	2.9535E+18	6.2560E+13
Xe-133m	1.1197E+03	2.4976E-06	1.1309E+19	4.1427E+13
Xe-135m	1.0644E+02	1.1692E-09	5.2158E+15	3.9383E+12
Xe-138	8.1718E-04	8.4565E-15	3.6903E+10	3.0236E+07

Environment Transport Group Inventory:

Time (h) = 100.0000	Total Release	Release Rate/s	
Noble gases (atoms)	1.4638E+23	4.2355E+17	
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	
Dose Effective (Ci) I-131 (Thyroid)			0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)			0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 100.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3375E+23
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 to Control Room Transport Group Inventory:

Time (h) = 100.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0621E+20
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 to Environment Transport Group Inventory:

Pathway

Time (h) = 100.0000	Filtered	Transported
Noble gases (atoms)	4.1556E+20	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 Compartment Nuclide Inventory:

Time (h) = 100.0000	Ci	kg	Atoms	Decay

Control Room Transport Group Inventory:

Time (h) = 100.0000	Atmosphere	Sump	
Noble gases (atoms)	2.1799E-10	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	
Dose Effective (Ci/cc)	I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)			0.0000E+00

Environment to Control Room Transport Group Inventory:

	Pathway	
Time (h) = 100.0000	Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0621E+20
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 to Environment Transport Group Inventory:

	Pathway	
Time (h) = 100.0000	Filtered	Transported
Noble gases (atoms)	4.1556E+20	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

Site Boundary Doses:

Time (h) = 724.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	9.7601E-02	0.0000E+00	9.7601E-02

Low Population Zone Doses:

Time (h) = 724.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	2.2977E-02	0.0000E+00	2.2977E-02

Control Room Doses:

Time (h) = 724.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	6.3458E-33	0.0000E+00	6.3458E-33
Accumulated dose (rem)	6.2382E-02	0.0000E+00	6.2382E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 724.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 724.0000	Atmosphere	Sump	
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	
Dose Effective (Ci/cc)	I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 724.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3375E+23
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 Integral Nuclide Release:

Time (h) = 724.0000	Ci	kg	Atoms	Bq
Kr-85	7.9968E+03	2.0383E-02	1.4441E+23	2.9588E+14
Kr-85m	2.2331E+02	2.7135E-08	1.9225E+17	8.2623E+12
Kr-87	2.6234E+01	9.2615E-10	6.4108E+15	9.7065E+11
Kr-88	2.7883E+02	2.2237E-08	1.5217E+17	1.0317E+13
Xe-133	8.0836E+04	4.3186E-04	1.9554E+21	2.9909E+15
Xe-135	1.6908E+03	6.6209E-07	2.9535E+18	6.2560E+13
Xe-133m	1.1197E+03	2.4976E-06	1.1309E+19	4.1427E+13
Xe-135m	1.0644E+02	1.1692E-09	5.2158E+15	3.9383E+12
Xe-138	8.1718E-04	8.4565E-15	3.6903E+10	3.0236E+07

Environment Transport Group Inventory:

Time (h) = 724.0000	Total Release	Release Rate/s
Noble gases (atoms)	1.4638E+23	5.6473E+16
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

Dose Effective (Ci) I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)	0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 724.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3375E+23
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 to Control Room Transport Group Inventory:

Time (h) = 724.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0621E+20
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 to Environment Transport Group Inventory:

Time (h) = 724.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1556E+20	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 Compartment Nuclide Inventory:

Time (h) = 724.0000	Ci	kg	Atoms	Decay

Control Room Transport Group Inventory:

Time (h) = 724.0000	Atmosphere	Sump
Noble gases (atoms)	3.4851-207	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

Dose Effective (Ci/cc) I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)	0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 724.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0621E+20
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 to Environment Transport Group Inventory:

Time (h) = 724.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1556E+20	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

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##
I-131 Summary
##

Time (hr)	Waste Gas Decay Tank I-131 (Curies)	Environment I-131 (Curies)	Control Room I-131 (Curies)
4.000	0.0000E+00	0.0000E+00	0.0000E+00
4.017	0.0000E+00	0.0000E+00	0.0000E+00
4.417	0.0000E+00	0.0000E+00	0.0000E+00
4.717	0.0000E+00	0.0000E+00	0.0000E+00
5.017	0.0000E+00	0.0000E+00	0.0000E+00
5.317	0.0000E+00	0.0000E+00	0.0000E+00
5.617	0.0000E+00	0.0000E+00	0.0000E+00
5.917	0.0000E+00	0.0000E+00	0.0000E+00
6.000	0.0000E+00	0.0000E+00	0.0000E+00
6.300	0.0000E+00	0.0000E+00	0.0000E+00
6.600	0.0000E+00	0.0000E+00	0.0000E+00
6.900	0.0000E+00	0.0000E+00	0.0000E+00
7.200	0.0000E+00	0.0000E+00	0.0000E+00
7.500	0.0000E+00	0.0000E+00	0.0000E+00
7.800	0.0000E+00	0.0000E+00	0.0000E+00
8.100	0.0000E+00	0.0000E+00	0.0000E+00
8.400	0.0000E+00	0.0000E+00	0.0000E+00
8.700	0.0000E+00	0.0000E+00	0.0000E+00
9.000	0.0000E+00	0.0000E+00	0.0000E+00
9.300	0.0000E+00	0.0000E+00	0.0000E+00
9.600	0.0000E+00	0.0000E+00	0.0000E+00
9.900	0.0000E+00	0.0000E+00	0.0000E+00
10.200	0.0000E+00	0.0000E+00	0.0000E+00
10.500	0.0000E+00	0.0000E+00	0.0000E+00
10.800	0.0000E+00	0.0000E+00	0.0000E+00
11.100	0.0000E+00	0.0000E+00	0.0000E+00
11.400	0.0000E+00	0.0000E+00	0.0000E+00
11.700	0.0000E+00	0.0000E+00	0.0000E+00
12.000	0.0000E+00	0.0000E+00	0.0000E+00
12.300	0.0000E+00	0.0000E+00	0.0000E+00
12.600	0.0000E+00	0.0000E+00	0.0000E+00
12.900	0.0000E+00	0.0000E+00	0.0000E+00
13.200	0.0000E+00	0.0000E+00	0.0000E+00
13.500	0.0000E+00	0.0000E+00	0.0000E+00
13.800	0.0000E+00	0.0000E+00	0.0000E+00
14.100	0.0000E+00	0.0000E+00	0.0000E+00
14.400	0.0000E+00	0.0000E+00	0.0000E+00
28.000	0.0000E+00	0.0000E+00	0.0000E+00
100.000	0.0000E+00	0.0000E+00	0.0000E+00
724.000	0.0000E+00	0.0000E+00	0.0000E+00

##
Cumulative Dose Summary
##

Time (hr)	Site Boundary Thyroid (rem)	Site Boundary TEDE (rem)	Low Population Zone Thyroid (rem)	Low Population Zone TEDE (rem)	Control Room Thyroid (rem)	Control Room TEDE (rem)
4.000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
4.017	0.0000E+00	3.5927E-02	0.0000E+00	8.4579E-03	0.0000E+00	1.4178E-04
4.417	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	1.5617E-02
4.717	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	2.5282E-02
5.017	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	3.2921E-02
5.317	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	3.8970E-02
5.617	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	4.3766E-02
5.917	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	4.7572E-02
6.000	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	4.8482E-02
6.300	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	5.1317E-02
6.600	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	5.3570E-02
6.900	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	5.5361E-02
7.200	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	5.6786E-02
7.500	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	5.7920E-02
7.800	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	5.8823E-02
8.100	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	5.9542E-02
8.400	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.0116E-02
8.700	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.0573E-02
9.000	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.0937E-02
9.300	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.1228E-02
9.600	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.1460E-02
9.900	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.1645E-02
10.200	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.1793E-02
10.500	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.1911E-02
10.800	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2005E-02
11.100	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2081E-02
11.400	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2141E-02
11.700	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2189E-02
12.000	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2227E-02
12.300	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2258E-02
12.600	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2283E-02
12.900	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2303E-02
13.200	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2318E-02
13.500	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2331E-02
13.800	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2341E-02
14.100	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2349E-02
14.400	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2356E-02
28.000	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2382E-02
100.000	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2382E-02
724.000	0.0000E+00	9.7601E-02	0.0000E+00	2.2977E-02	0.0000E+00	6.2382E-02

```
#####################################################################
                        Worst Two-Hour Doses
#####################################################################
```

ATTACHMENT G – RADTRAD OUTPUT FILE WASTEGAS8.O0 – 8-HOUR GAS TRANSFER DECAY TIME CREDIT

```
#######################################################################
   RADTRAD Version 3.03 (Spring 2001) run on  8/01/2005  at 17:47:03
#######################################################################

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

Plant file           = D:\RADTRAD\Defaults\WasteGas8.psf
Inventory file       = d:\radtrad\defaults\wastegas.nif
Release file         = d:\radtrad\defaults\wastegas0.rft
Dose Conversion file = d:\radtrad\defaults\wastegas14.inp



    #####    ####   #####    #  #     #  #####   #    #  #####
    #    #  #       #        #  ##    #  #    #  #    #    #
    #    #  #       #        #  # #   #  #    #  #    #    #
    #####    ####   ####     #  #  #  #  #####   #    #    #
    #            #  #        #  #   # #  #       #    #    #
    #            #  #        #  #    ##  #       #    #    #
    #        ####   #        #  #     #  #        ####     #


Radtrad 3.03 4/15/2001

Nuclide Inventory File:
d:\radtrad\defaults\wastegas.nif
Plant Power Level:
 2.7540E+03
Compartments:
  3
Compartment 1:
Waste Gas Decay Tank
  3
 6.0825E+02
  0
  0
  0
  0
  0
Compartment 2:
Environment
  2
 0.0000E+00
  0
  0
  0
  0
  0
Compartment 3:
Control Room
  1
 2.8919E+05
  0
  0
  0
  0
  0
Pathways:
  3
Pathway 1:
Waste Gas Decay Tank to Environment
  1
  2
  1
Pathway 2:
```

```
Environment to Control Room
  2
  3
  2
Pathway 3:
Control Room to Environment
  3
  2
  2
End of Plant Model File
Scenario Description Name:

Plant Model Filename:

Source Term:
  1
  1   1.0000E+00
d:\radtrad\defaults\wastegas14.inp
d:\radtrad\defaults\wastegas0.rft
  8.0000E+00
  1
  9.5000E-01   4.8500E-02   1.5000E-03   1.0000E+00
Overlying Pool:
  0
  0.0000E+00
  0
  0
  0
  0
Compartments:
  3
Compartment 1:
  1
  1
  0
  0
  0
  0
  0
  0
  0
Compartment 2:
  1
  1
  0
  0
  0
  0
  0
  0
  0
Compartment 3:
  1
  1
  0
  0
  0
  0
  0
  0
  0
Pathways:
  3
Pathway 1:
  0
  0
  1
  1
  8.0000E+00   1.0000E+00   6.0800E+02
  1
  1
```

```
  8.0000E+00   1.0000E+00   6.0800E+02
  1
  1
  8.0000E+00   1.0000E+00   6.0800E+02
  0
  0
  0
  0
  0
  0
  0
Pathway 2:
  0
  0
  0
  0
  0
  1
  1
  8.0000E+00   3.5000E+03   0.0000E+00   0.0000E+00   0.0000E+00
  0
  0
  0
  0
  0
  0
Pathway 3:
  0
  0
  0
  0
  0
  1
  1
  8.0000E+00   3.5000E+03   0.0000E+00   0.0000E+00   0.0000E+00
  0
  0
  0
  0
  0
  0
Dose Locations:
  3
Location 1:
Site Boundary
  2
  1
  2
  8.0000E+00   1.4400E-04
  1.0000E+01   0.0000E+00
  1
  4
  8.0000E+00   3.5000E-04
  1.6000E+01   1.8000E-04
  3.2000E+01   2.3000E-04
  7.2800E+02   0.0000E+00
  0
Location 2:
Low Population Zone
  2
  1
  4
  8.0000E+00   3.3900E-05
  1.0000E+01   2.2000E-06
  3.2000E+01   5.4000E-07
  7.2800E+02   0.0000E+00
  1
  4
  8.0000E+00   3.5000E-04
  1.6000E+01   1.8000E-04
  3.2000E+01   2.3000E-04
```

```
  7.2800E+02   0.0000E+00
  0
Location 3:
Control Room
  3
  0
  1
  2
  8.0000E+00   3.5000E-04
  7.2800E+02   0.0000E+00
  1
  4
  8.0000E+00   1.0000E+00
  3.2000E+01   6.0000E-01
  1.0400E+02   4.0000E-01
  7.2800E+02   0.0000E+00
Effective Volume Location:
  1
  6
  8.0000E+00   1.6800E-03
  1.0000E+01   1.3400E-03
  1.6000E+01   5.1400E-04
  3.2000E+01   3.8400E-04
  1.0400E+02   3.1200E-04
  7.2800E+02   0.0000E+00
Simulation Parameters:
  0
Output Filename:
D:\RADTRAD\Defaults\WasteGas8.o0
  1
  1
  1
  0
  0
End of Scenario File
```

```
#######################################################################
   RADTRAD Version 3.03 (Spring 2001) run on  8/01/2005  at 17:47:03
#######################################################################

#######################################################################
                      Plant Description
#######################################################################

Number of Nuclides =  14

Inventory Power =   2.7540E+03 MWth
Plant Power Level =   2.7540E+03 MWth

Number of compartments    =   3

Compartment information

Compartment number  1  (Source term fraction =   1.0000E+00
)
Name: Waste Gas Decay Tank
Compartment volume =   6.0825E+02 (Cubic feet)
Compartment type is Normal
Pathways into and out of compartment  1
   Exit Pathway Number    1: Waste Gas Decay Tank to Environment

Compartment number  2
Name: Environment
Compartment type is Environment
Pathways into and out of compartment  2
   Inlet Pathway Number   1: Waste Gas Decay Tank to Environment
   Inlet Pathway Number   3: Control Room to Environment
   Exit Pathway Number    2: Environment to Control Room

Compartment number  3
Name: Control Room
Compartment volume =   2.8919E+05 (Cubic feet)
Compartment type is Control Room
Pathways into and out of compartment  3
   Inlet Pathway Number   2: Environment to Control Room
   Exit Pathway Number    3: Control Room to Environment

Total number of pathways =   3
```

```
#######################################################################
   RADTRAD Version 3.03 (Spring 2001) run on  8/01/2005  at 17:47:03
#######################################################################

#######################################################################
                      Scenario Description
#######################################################################
```

Time between shutdown and first release = 8.0000E+00 (Hours)

Radioactive Decay is enabled
Calculation of Daughters is enabled

Release Fractions and Timings

	GAP	EARLY IN-VESSEL	LATE RELEASE	RELEASE MASS
	0.016666 hr	0.0000 hrs	0.0000 hrs	(gm)
NOBLES	1.0000E+00	0.0000E+00	0.0000E+00	2.083E+01
IODINE	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
CESIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
TELLURIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
STRONTIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
BARIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
RUTHENIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
CERIUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
LANTHANUM	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00

Inventory Power = 1. MWt

Nuclide Name	Group	Specific Inventory (Ci/MWt)	half life (s)	Whole Body DCF (Sv-m3/Bq-s)	Inhaled Thyroid (Sv/Bq)	Inhaled Effective (Sv/Bq)
Kr-85	1	7.997E+03	3.383E+08	1.190E-16	0.000E+00	0.000E+00
Kr-85m	1	4.198E+02	1.613E+04	7.480E-15	0.000E+00	0.000E+00
Kr-87	1	2.424E+02	4.578E+03	4.120E-14	0.000E+00	0.000E+00
Kr-88	1	7.547E+02	1.022E+04	1.020E-13	0.000E+00	0.000E+00
Xe-133	1	8.257E+04	4.532E+05	1.560E-15	0.000E+00	0.000E+00
Xe-135	1	1.973E+03	3.272E+04	1.190E-14	0.000E+00	0.000E+00
Xe-133m	1	1.176E+03	1.892E+05	1.370E-15	0.000E+00	0.000E+00
Xe-135m	1	2.581E+02	9.180E+02	2.040E-14	0.000E+00	0.000E+00
Xe-138	1	1.362E+02	8.460E+02	5.770E-14	0.000E+00	0.000E+00

Nuclide	Daughter	Fraction	Daughter	Fraction	Daughter	Fraction
Kr-85m	Kr-85	0.21	none	0.00	none	0.00
Kr-87	Rb-87	1.00	none	0.00	none	0.00
Kr-88	Rb-88	1.00	none	0.00	none	0.00
I-133	Xe-133m	0.03	Xe-133	0.97	none	0.00
I-135	Xe-135m	0.15	Xe-135	0.85	none	0.00
Xe-135	Cs-135	1.00	none	0.00	none	0.00
Xe-133m	Xe-133	1.00	none	0.00	none	0.00
Xe-135m	Xe-135	1.00	none	0.00	none	0.00

Iodine fractions
Aerosol = 9.5000E-01
Elemental = 4.8500E-02
Organic = 1.5000E-03

COMPARTMENT DATA

Compartment number 1: Waste Gas Decay Tank

Compartment number 2: Environment

Compartment number 3: Control Room

PATHWAY DATA

Pathway number 1: Waste Gas Decay Tank to Environment

Piping: Removal Data

Time (hr)	Flow Rate (cfm)	DF Aerosol	DF Elemental	DF Organic
8.0000E+00	6.0800E+02	1.0000E+00	1.0000E+00	1.0000E+00

Pathway number 2: Environment to Control Room

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%) Aerosol	Elemental	Organic
8.0000E+00	3.5000E+03	0.0000E+00	0.0000E+00	0.0000E+00

Pathway number 3: Control Room to Environment

Pathway Filter: Removal Data

Time (hr)	Flow Rate (cfm)	Filter Efficiencies (%) Aerosol	Elemental	Organic
8.0000E+00	3.5000E+03	0.0000E+00	0.0000E+00	0.0000E+00

LOCATION DATA

Location Site Boundary is in compartment 2

Location X/Q Data

Time (hr)	X/Q (s * m^-3)
8.0000E+00	1.4400E-04
1.0000E+01	0.0000E+00

Location Breathing Rate Data

Time (hr)	Breathing Rate (m^3 * sec^-1)
8.0000E+00	3.5000E-04
1.6000E+01	1.8000E-04
3.2000E+01	2.3000E-04
7.2800E+02	0.0000E+00

Location Low Population Zone is in compartment 2

Location X/Q Data

Time (hr)	X/Q (s * m^-3)
8.0000E+00	3.3900E-05
1.0000E+01	2.2000E-06
3.2000E+01	5.4000E-07
7.2800E+02	0.0000E+00

Location Breathing Rate Data

Time (hr)	Breathing Rate (m^3 * sec^-1)
8.0000E+00	3.5000E-04
1.6000E+01	1.8000E-04
3.2000E+01	2.3000E-04
7.2800E+02	0.0000E+00

Location Control Room is in compartment 3

Location X/Q Data

Time (hr)	X/Q (s * m^-3)
8.0000E+00	1.6800E-03
1.0000E+01	1.3400E-03
1.6000E+01	5.1400E-04
3.2000E+01	3.8400E-04
1.0400E+02	3.1200E-04
7.2800E+02	0.0000E+00

Location Breathing Rate Data

Time (hr)	Breathing Rate (m^3 * sec^-1)
8.0000E+00	3.5000E-04
7.2800E+02	0.0000E+00

Location Occupancy Factor Data

Time (hr)	Occupancy Factor
8.0000E+00	1.0000E+00
3.2000E+01	6.0000E-01
1.0400E+02	4.0000E-01
7.2800E+02	0.0000E+00

```
#######################################################################
   RADTRAD Version 3.03 (Spring 2001) run on  8/01/2005  at 17:47:03
#######################################################################
```

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

```
#######################################################################
           Dose, Detailed model and Detailed Inventory Output
#######################################################################
```

Site Boundary Doses:

Time (h) = 8.0167	Whole Body	Thyroid	TEDE
Delta dose (rem)	3.0666E-02	0.0000E+00	3.0666E-02
Accumulated dose (rem)	3.0666E-02	0.0000E+00	3.0666E-02

Low Population Zone Doses:

Time (h) = 8.0167	Whole Body	Thyroid	TEDE
Delta dose (rem)	7.2193E-03	0.0000E+00	7.2193E-03
Accumulated dose (rem)	7.2193E-03	0.0000E+00	7.2193E-03

Control Room Doses:

Time (h) = 8.0167	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.2102E-04	0.0000E+00	1.2102E-04
Accumulated dose (rem)	1.2102E-04	0.0000E+00	1.2102E-04

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 8.0167	Ci	kg	Atoms	Decay
Kr-85	5.0557E+03	1.2886E-02	9.1297E+22	1.0533E+16
Kr-85m	7.6780E+01	9.3299E-09	6.6101E+16	1.6015E+14
Kr-87	1.9396E+00	6.8474E-11	4.7397E+14	4.0580E+12
Kr-88	6.7440E+01	5.3783E-09	3.6806E+16	1.4077E+14
Xe-133	5.0068E+04	2.6748E-04	1.2111E+21	1.0431E+17
Xe-135	8.9314E+02	3.4974E-07	1.5601E+18	1.8617E+15
Xe-133m	6.7499E+02	1.5057E-06	6.8178E+18	1.4064E+15
Xe-135m	5.2091E+01	5.7222E-10	2.5526E+15	1.1086E+14
Xe-138	4.6332E-09	4.7946E-20	2.0923E+05	9.8785E+03

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 8.0167	Atmosphere	Sump	
Noble gases (atoms)	9.2517E+22	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	
Dose Effective (Ci/cc)	I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 8.0167	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	5.4824E+22
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 Integral Nuclide Release:

Time (h) = 8.0167	Ci	kg	Atoms	Bq
Kr-85	2.9408E+03	7.4957E-03	5.3106E+22	1.0881E+14
Kr-85m	4.4662E+01	5.4271E-09	3.8450E+16	1.6525E+12
Kr-87	1.1283E+00	3.9832E-11	2.7571E+14	4.1745E+10
Kr-88	3.9229E+01	3.1285E-09	2.1410E+16	1.4515E+12
Xe-133	2.9123E+04	1.5559E-04	7.0449E+20	1.0776E+15
Xe-135	5.1952E+02	2.0344E-07	9.0750E+17	1.9222E+13
Xe-133m	3.9263E+02	8.7585E-07	3.9658E+18	1.4527E+13
Xe-135m	3.0304E+01	3.3289E-10	1.4850E+15	1.1212E+12
Xe-138	2.6958E-09	2.7897E-20	1.2174E+05	9.9744E+01

Environment Transport Group Inventory:

Time (h) = 8.0167	Total Release	Release Rate/s
Noble gases (atoms)	5.3815E+22	8.9696E+20
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

Dose Effective (Ci) I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)	0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 8.0167	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	5.4824E+22
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 to Control Room Transport Group Inventory:

Time (h) = 8.0167	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	1.4934E+20
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 to Environment Transport Group Inventory:

Time (h) = 8.0167	Pathway Filtered	Transported
Noble gases (atoms)	6.1271E+17	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 Compartment Nuclide Inventory:

Time (h) = 8.0167	Ci	kg	Atoms	Decay
Kr-85	8.1255E+00	2.0711E-05	1.4673E+20	1.6840E+13
Kr-85m	1.2340E-01	1.4995E-11	1.0624E+14	2.5605E+11
Kr-87	3.1172E-03	1.1005E-13	7.6177E+11	6.4878E+09
Kr-88	1.0839E-01	8.6440E-12	5.9154E+13	2.2506E+11
Xe-133	8.0469E+01	4.2990E-07	1.9465E+18	1.6678E+14
Xe-135	1.4354E+00	5.6210E-10	2.5074E+15	2.9765E+12
Xe-133m	1.0848E+00	2.4200E-09	1.0958E+16	2.2485E+12
Xe-135m	8.3709E-02	9.1955E-13	4.1019E+12	1.7720E+11

Control Room Transport Group Inventory:

Time (h) = 8.0167	Atmosphere	Sump
Noble gases (atoms)	1.4869E+20	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

Dose Effective (Ci/cc) I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)	0.0000E+00

Total I (Ci) 0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 8.0167	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	1.4934E+20
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 to Environment Transport Group Inventory:

Time (h) = 8.0167	Pathway Filtered	Transported
Noble gases (atoms)	6.1271E+17	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

Site Boundary Doses:

Time (h) = 10.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	5.2670E-02	0.0000E+00	5.2670E-02
Accumulated dose (rem)	8.3336E-02	0.0000E+00	8.3336E-02

Low Population Zone Doses:

Time (h) = 10.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.2399E-02	0.0000E+00	1.2399E-02
Accumulated dose (rem)	1.9619E-02	0.0000E+00	1.9619E-02

Control Room Doses:

Time (h) = 10.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	4.2052E-02	0.0000E+00	4.2052E-02
Accumulated dose (rem)	4.2173E-02	0.0000E+00	4.2173E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 10.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 10.0000	Atmosphere	Sump
Noble gases (atoms)	2.0245E-29	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

Dose Effective (Ci/cc)	I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)		0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 10.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3364E+23
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 Integral Nuclide Release:

Time (h) = 10.0000	Ci	kg	Atoms	Bq
Kr-85	7.9965E+03	2.0382E-02	1.4440E+23	2.9587E+14
Kr-85m	1.2026E+02	1.4613E-08	1.0353E+17	4.4497E+12
Kr-87	2.9647E+00	1.0466E-10	7.2449E+14	1.0969E+11
Kr-88	1.0504E+02	8.3769E-09	5.7326E+16	3.8865E+12
Xe-133	7.9164E+04	4.2293E-04	1.9150E+21	2.9291E+15
Xe-135	1.4062E+03	5.5065E-07	2.4564E+18	5.2030E+13
Xe-133m	1.0667E+03	2.3796E-06	1.0775E+19	3.9469E+13
Xe-135m	6.9973E+01	7.6866E-10	3.4289E+15	2.5890E+12

Xe-138	6.1433E-09	6.3574E-20	2.7743E+05	2.2730E+02

Environment Transport Group Inventory:

Time (h) = 10.0000	Total Release	Release Rate/s
Noble gases (atoms)	1.4633E+23	2.0324E+19
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
Dose Effective (Ci) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 10.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3364E+23
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 to Control Room Transport Group Inventory:

Time (h) = 10.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0608E+20
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 to Environment Transport Group Inventory:

Time (h) = 10.0000	Pathway Filtered	Transported
Noble gases (atoms)	3.1867E+20	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 Compartment Nuclide Inventory:

Time (h) = 10.0000	Ci	kg	Atoms	Decay
Kr-85	5.2887E+00	1.3480E-05	9.5504E+19	3.0300E+15
Kr-85m	5.9095E-02	7.1809E-12	5.0876E+13	4.1068E+13
Kr-87	6.8830E-04	2.4299E-14	1.6820E+11	8.0187E+11
Kr-88	4.3477E-02	3.4673E-12	2.3728E+13	3.3884E+13
Xe-133	5.1814E+01	2.7681E-07	1.2534E+18	2.9883E+16
Xe-135	8.0452E-01	3.1504E-10	1.4053E+15	5.0622E+14
Xe-133m	6.8788E-01	1.5345E-09	6.9479E+15	4.0052E+14
Xe-135m	2.4829E-04	2.7275E-15	1.2167E+10	8.7264E+12

Control Room Transport Group Inventory:

Time (h) = 10.0000	Atmosphere	Sump
Noble gases (atoms)	9.6766E+19	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
Dose Effective (Ci/cc) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 10.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0608E+20
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 to Environment Transport Group Inventory:

Time (h) = 10.0000	Pathway Filtered	Transported
Noble gases (atoms)	3.1867E+20	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

Site Boundary Doses:

Time (h) = 16.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	8.3336E-02	0.0000E+00	8.3336E-02

Low Population Zone Doses:

Time (h) = 16.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.6500E-55	0.0000E+00	1.6500E-55
Accumulated dose (rem)	1.9619E-02	0.0000E+00	1.9619E-02

Control Room Doses:

Time (h) = 16.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.2479E-02	0.0000E+00	1.2479E-02
Accumulated dose (rem)	5.4652E-02	0.0000E+00	5.4652E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 16.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 16.0000	Atmosphere	Sump	
Noble gases (atoms)	1.0577-185	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	
Dose Effective (Ci/cc)	I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 16.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3364E+23
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 Integral Nuclide Release:

Time (h) = 16.0000	Ci	kg	Atoms	Bq
Kr-85	7.9965E+03	2.0382E-02	1.4440E+23	2.9587E+14
Kr-85m	1.2026E+02	1.4613E-08	1.0353E+17	4.4497E+12
Kr-87	2.9647E+00	1.0466E-10	7.2449E+14	1.0969E+11
Kr-88	1.0504E+02	8.3769E-09	5.7326E+16	3.8865E+12
Xe-133	7.9164E+04	4.2293E-04	1.9150E+21	2.9291E+15
Xe-135	1.4062E+03	5.5065E-07	2.4564E+18	5.2030E+13
Xe-133m	1.0667E+03	2.3796E-06	1.0775E+19	3.9469E+13
Xe-135m	6.9973E+01	7.6866E-10	3.4289E+15	2.5890E+12
Xe-138	6.1433E-09	6.3574E-20	2.7743E+05	2.2730E+02

Environment Transport Group Inventory:

Time (h) = 16.0000	Total Release	Release Rate/s
Noble gases (atoms)	1.4633E+23	5.0810E+18
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
Dose Effective (Ci) I-131 (Thyroid)		0.0000E+00

Dose Effective (Ci) I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)	0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 16.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3364E+23
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 to Control Room Transport Group Inventory:

Time (h) = 16.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0608E+20
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 to Environment Transport Group Inventory:

Time (h) = 16.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1419E+20	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 Compartment Nuclide Inventory:

Time (h) = 16.0000	Ci	kg	Atoms	Decay
Kr-85	6.7781E-02	1.7276E-07	1.2240E+18	3.9533E+15
Kr-85m	2.9934E-04	3.6374E-14	2.5771E+11	4.9639E+13
Kr-87	3.3514E-07	1.1832E-17	8.1900E+07	8.7135E+11
Kr-88	1.2884E-04	1.0275E-14	7.0317E+10	3.9621E+13
Xe-133	6.4279E-01	3.4340E-09	1.5549E+16	3.8866E+16
Xe-135	6.5256E-03	2.5553E-12	1.1399E+13	6.3392E+14
Xe-133m	8.1457E-03	1.8171E-11	8.2276E+13	5.1859E+14

Control Room Transport Group Inventory:

Time (h) = 16.0000	Atmosphere	Sump
Noble gases (atoms)	1.2396E+18	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
Dose Effective (Ci/cc) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 16.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0608E+20
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 to Environment Transport Group Inventory:

Time (h) = 16.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1419E+20	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

Site Boundary Doses:

Time (h) = 32.0000	Whole Body	Thyroid	TEDE

Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	8.3336E-02	0.0000E+00	8.3336E-02

Low Population Zone Doses:

Time (h) = 32.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	7.7442-212	0.0000E+00	7.7442-212
Accumulated dose (rem)	1.9619E-02	0.0000E+00	1.9619E-02

Control Room Doses:

Time (h) = 32.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	1.4714E-04	0.0000E+00	1.4714E-04
Accumulated dose (rem)	5.4799E-02	0.0000E+00	5.4799E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 32.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 32.0000	Atmosphere	Sump
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
Dose Effective (Ci/cc) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 32.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3364E+23
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 Integral Nuclide Release:

Time (h) = 32.0000	Ci	kg	Atoms	Bq
Kr-85	7.9965E+03	2.0382E-02	1.4440E+23	2.9587E+14
Kr-85m	1.2026E+02	1.4613E-08	1.0353E+17	4.4497E+12
Kr-87	2.9647E+00	1.0466E-10	7.2449E+14	1.0969E+11
Kr-88	1.0504E+02	8.3769E-09	5.7326E+16	3.8865E+12
Xe-133	7.9164E+04	4.2293E-04	1.9150E+21	2.9291E+15
Xe-135	1.4062E+03	5.5065E-07	2.4564E+18	5.2030E+13
Xe-133m	1.0667E+03	2.3796E-06	1.0775E+19	3.9469E+13
Xe-135m	6.9973E+01	7.6866E-10	3.4289E+15	2.5890E+12
Xe-138	6.1433E-09	6.3574E-20	2.7743E+05	2.2730E+02

Environment Transport Group Inventory:

Time (h) = 32.0000	Total Release	Release Rate/s
Noble gases (atoms)	1.4633E+23	1.6937E+18
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
Dose Effective (Ci) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 32.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3364E+23
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 to Control Room Transport Group Inventory:

Time (h) = 32.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0608E+20
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 to Environment Transport Group Inventory:

Time (h) = 32.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1543E+20	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 Compartment Nuclide Inventory:

Time (h) = 32.0000	Ci	kg	Atoms	Decay
Kr-85	6.0973E-07	1.5541E-12	1.1011E+13	3.9652E+15
Kr-85m	2.2654E-10	2.7527E-20	1.9503E+05	4.9682E+13
Kr-88	2.3345E-11	1.8618E-21	1.2741E+04	3.9638E+13
Xe-133	5.3008E-06	2.8319E-14	1.2823E+11	3.8978E+16
Xe-135	1.7332E-08	6.7868E-18	3.0275E+07	6.3496E+14
Xe-133m	5.9343E-08	1.3238E-16	5.9940E+08	5.1999E+14

Control Room Transport Group Inventory:

Time (h) = 32.0000	Atmosphere	Sump
Noble gases (atoms)	1.1139E+13	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
Dose Effective (Ci/cc)	I-131 (Thyroid)	0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)	0.0000E+00
Total I (Ci)		0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 32.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0608E+20
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 to Environment Transport Group Inventory:

Time (h) = 32.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1543E+20	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

Site Boundary Doses:

Time (h) = 104.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	8.3336E-02	0.0000E+00	8.3336E-02

Low Population Zone Doses:

Time (h) = 104.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	1.9619E-02	0.0000E+00	1.9619E-02

Control Room Doses:

Time (h) = 104.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	7.1911E-10	0.0000E+00	7.1911E-10

Accumulated dose (rem) 5.4799E-02 0.0000E+00 5.4799E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 104.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 104.0000	Atmosphere	Sump	
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	
Dose Effective (Ci/cc) I-131 (Thyroid)			0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)			0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 104.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3364E+23
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 Integral Nuclide Release:

Time (h) = 104.0000	Ci	kg	Atoms	Bq
Kr-85	7.9965E+03	2.0382E-02	1.4440E+23	2.9587E+14
Kr-85m	1.2026E+02	1.4613E-08	1.0353E+17	4.4497E+12
Kr-87	2.9647E+00	1.0466E-10	7.2449E+14	1.0969E+11
Kr-88	1.0504E+02	8.3769E-09	5.7326E+16	3.8865E+12
Xe-133	7.9164E+04	4.2293E-04	1.9150E+21	2.9291E+15
Xe-135	1.4062E+03	5.5065E-07	2.4564E+18	5.2030E+13
Xe-133m	1.0667E+03	2.3796E-06	1.0775E+19	3.9469E+13
Xe-135m	6.9973E+01	7.6866E-10	3.4289E+15	2.5890E+12
Xe-138	6.1433E-09	6.3574E-20	2.7743E+05	2.2730E+02

Environment Transport Group Inventory:

Time (h) = 104.0000	Total Release	Release Rate/s	
Noble gases (atoms)	1.4633E+23	4.2341E+17	
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	
Dose Effective (Ci) I-131 (Thyroid)			0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)			0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 104.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3364E+23
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 to Control Room Transport Group Inventory:

Time (h) = 104.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0608E+20
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 to Environment Transport Group Inventory:

Time (h) = 104.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1543E+20	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 Compartment Nuclide Inventory:

Time (h) = 104.0000	Ci	kg	Atoms	Decay

Control Room Transport Group Inventory:

Time (h) = 104.0000	Atmosphere	Sump	
Noble gases (atoms)	2.1795E-10	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	
Dose Effective (Ci/cc)	I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)			0.0000E+00

Environment to Control Room Transport Group Inventory:

	Pathway	
Time (h) = 104.0000	Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0608E+20
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 to Environment Transport Group Inventory:

	Pathway	
Time (h) = 104.0000	Filtered	Transported
Noble gases (atoms)	4.1543E+20	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

Site Boundary Doses:

Time (h) = 728.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	8.3336E-02	0.0000E+00	8.3336E-02

Low Population Zone Doses:

Time (h) = 728.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	0.0000E+00	0.0000E+00	0.0000E+00
Accumulated dose (rem)	1.9619E-02	0.0000E+00	1.9619E-02

Control Room Doses:

Time (h) = 728.0000	Whole Body	Thyroid	TEDE
Delta dose (rem)	6.2142E-33	0.0000E+00	6.2142E-33
Accumulated dose (rem)	5.4799E-02	0.0000E+00	5.4799E-02

Waste Gas Decay Tank Compartment Nuclide Inventory:

Time (h) = 728.0000	Ci	kg	Atoms	Decay

Waste Gas Decay Tank Transport Group Inventory:

Time (h) = 728.0000	Atmosphere	Sump	
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	
Dose Effective (Ci/cc)	I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc)	I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)			0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 728.0000	Pipe Walls	Transported

Noble gases (atoms)	0.0000E+00	3.3364E+23
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 Integral Nuclide Release:

Time (h) = 728.0000	Ci	kg	Atoms	Bq
Kr-85	7.9965E+03	2.0382E-02	1.4440E+23	2.9587E+14
Kr-85m	1.2026E+02	1.4613E-08	1.0353E+17	4.4497E+12
Kr-87	2.9647E+00	1.0466E-10	7.2449E+14	1.0969E+11
Kr-88	1.0504E+02	8.3769E-09	5.7326E+16	3.8865E+12
Xe-133	7.9164E+04	4.2293E-04	1.9150E+21	2.9291E+15
Xe-135	1.4062E+03	5.5065E-07	2.4564E+18	5.2030E+13
Xe-133m	1.0667E+03	2.3796E-06	1.0775E+19	3.9469E+13
Xe-135m	6.9973E+01	7.6866E-10	3.4289E+15	2.5890E+12
Xe-138	6.1433E-09	6.3574E-20	2.7743E+05	2.2730E+02

Environment Transport Group Inventory:

Time (h) = 728.0000	Total Release	Release Rate/s
Noble gases (atoms)	1.4633E+23	5.6455E+16
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
Dose Effective (Ci) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Waste Gas Decay Tank to Environment Transport Group Inventory:

Time (h) = 728.0000	Pipe Walls	Transported
Noble gases (atoms)	0.0000E+00	3.3364E+23
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 to Control Room Transport Group Inventory:

Time (h) = 728.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0608E+20
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 to Environment Transport Group Inventory:

Time (h) = 728.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1543E+20	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 Compartment Nuclide Inventory:

Time (h) = 728.0000	Ci	kg	Atoms	Decay

Control Room Transport Group Inventory:

Time (h) = 728.0000	Atmosphere	Sump
Noble gases (atoms)	3.4849-207	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
Dose Effective (Ci/cc) I-131 (Thyroid)		0.0000E+00
Dose Effective (Ci/cc) I-131 (ICRP2 Thyroid)		0.0000E+00
Total I (Ci)		0.0000E+00

Environment to Control Room Transport Group Inventory:

Time (h) = 728.0000	Pathway Filtered	Transported
Noble gases (atoms)	0.0000E+00	4.0608E+20
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 to Environment Transport Group Inventory:

Time (h) = 728.0000	Pathway Filtered	Transported
Noble gases (atoms)	4.1543E+20	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

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I-131 Summary

Time (hr)	Waste Gas Decay Tank I-131 (Curies)	Environment I-131 (Curies)	Control Room I-131 (Curies)
8.000	0.0000E+00	0.0000E+00	0.0000E+00
8.017	0.0000E+00	0.0000E+00	0.0000E+00
8.417	0.0000E+00	0.0000E+00	0.0000E+00
8.717	0.0000E+00	0.0000E+00	0.0000E+00
9.017	0.0000E+00	0.0000E+00	0.0000E+00
9.317	0.0000E+00	0.0000E+00	0.0000E+00
9.617	0.0000E+00	0.0000E+00	0.0000E+00
9.917	0.0000E+00	0.0000E+00	0.0000E+00
10.000	0.0000E+00	0.0000E+00	0.0000E+00
10.300	0.0000E+00	0.0000E+00	0.0000E+00
10.600	0.0000E+00	0.0000E+00	0.0000E+00
10.900	0.0000E+00	0.0000E+00	0.0000E+00
11.200	0.0000E+00	0.0000E+00	0.0000E+00
11.500	0.0000E+00	0.0000E+00	0.0000E+00
11.800	0.0000E+00	0.0000E+00	0.0000E+00
12.100	0.0000E+00	0.0000E+00	0.0000E+00
12.400	0.0000E+00	0.0000E+00	0.0000E+00
12.700	0.0000E+00	0.0000E+00	0.0000E+00
13.000	0.0000E+00	0.0000E+00	0.0000E+00
13.300	0.0000E+00	0.0000E+00	0.0000E+00
13.600	0.0000E+00	0.0000E+00	0.0000E+00
13.900	0.0000E+00	0.0000E+00	0.0000E+00
14.200	0.0000E+00	0.0000E+00	0.0000E+00
14.500	0.0000E+00	0.0000E+00	0.0000E+00
14.800	0.0000E+00	0.0000E+00	0.0000E+00
15.100	0.0000E+00	0.0000E+00	0.0000E+00
15.400	0.0000E+00	0.0000E+00	0.0000E+00
15.700	0.0000E+00	0.0000E+00	0.0000E+00
16.000	0.0000E+00	0.0000E+00	0.0000E+00
16.300	0.0000E+00	0.0000E+00	0.0000E+00
16.600	0.0000E+00	0.0000E+00	0.0000E+00
16.900	0.0000E+00	0.0000E+00	0.0000E+00
17.200	0.0000E+00	0.0000E+00	0.0000E+00
17.500	0.0000E+00	0.0000E+00	0.0000E+00
17.800	0.0000E+00	0.0000E+00	0.0000E+00
18.100	0.0000E+00	0.0000E+00	0.0000E+00
18.400	0.0000E+00	0.0000E+00	0.0000E+00
32.000	0.0000E+00	0.0000E+00	0.0000E+00
104.000	0.0000E+00	0.0000E+00	0.0000E+00
728.000	0.0000E+00	0.0000E+00	0.0000E+00

Cumulative Dose Summary

Site Boundary	Low Population Zone	Control Room

Time (hr)	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)
8.000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
8.017	0.0000E+00	3.0666E-02	0.0000E+00	7.2193E-03	0.0000E+00	1.2102E-04
8.417	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	1.3400E-02
8.717	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	2.1770E-02
9.017	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	2.8434E-02
9.317	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	3.3745E-02
9.617	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	3.7981E-02
9.917	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	4.1362E-02
10.000	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	4.2173E-02
10.300	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	4.4708E-02
10.600	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	4.6732E-02
10.900	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	4.8349E-02
11.200	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	4.9641E-02
11.500	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.0674E-02
11.800	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.1499E-02
12.100	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.2159E-02
12.400	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.2686E-02
12.700	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.3108E-02
13.000	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.3446E-02
13.300	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.3716E-02
13.600	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.3932E-02
13.900	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4105E-02
14.200	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4243E-02
14.500	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4354E-02
14.800	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4442E-02
15.100	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4513E-02
15.400	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4570E-02
15.700	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4616E-02
16.000	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4652E-02
16.300	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4681E-02
16.600	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4705E-02
16.900	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4724E-02
17.200	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4739E-02
17.500	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4751E-02
17.800	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4760E-02
18.100	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4768E-02
18.400	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4774E-02
32.000	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4799E-02
104.000	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4799E-02
728.000	0.0000E+00	8.3336E-02	0.0000E+00	1.9619E-02	0.0000E+00	5.4799E-02

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#######################################################################
                        Worst Two-Hour Doses
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