Entergy

Entergy Operations, Inc.
17265 River Road
Killona, LA 70066
Tel 504 739 6650

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April 25, 2002

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Subject: Waterford 3 SES
Docket No. 50-382
License No. NPF-38
Annual Radioactive Effluent Release Report - 2001

Gentlemen:

Attached is the Annual Radioactive Effluent Release Report for the period January 1 through December 31, 2001. This report is being submitted pursuant to the requirements of Technical Specification Section 6.9.1.8.

If you have any questions, please contact Oscar Pipkins at (504) 739-6707. There are no commitments contained in this submittal.

Very truly yours,

R.D. Peters
Acting, Director
Nuclear Safety Assurance

RDP/OPP/cbh
Attachment

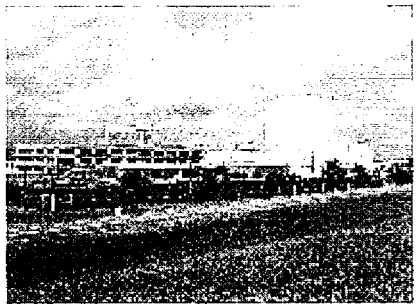
cc: E.W. Merschoff, NRC Region IV
N. Kalyanam, NRC-NRR
J. Smith
N.S. Reynolds
NRC Resident Inspectors Office

IE48

Entergy

Annual Radioactive Effluent Release Report

January 1, 2001 - December 31, 2001



Waterford 3 SES
Entergy Operations, Inc.

Docket Number 50-382 License Number NPF-38

Originator: Gregory L. Hood — Sr. Environmental Specialist, Waterford 3 SES — 4/24/02 (Date)

Reviewed By: John L. Hornsby — Chemistry Supervisor, Waterford 3 SES — 4-24-02 (Date)

Approved By: Glenn M. Pierce — Chemistry Superintendent, Waterford 3 SES — 4-24-02 (Date)

Table of Contents

Table of Contents

1.0 Introduction

This Annual Radioactive Effluent Release Report is submitted as required by Waterford 3's Technical Specification 6.9.1.8. It covers the period from January 1, 2001 through December 31, 2001. Information in this report is presented in the format outlined in Appendix B of Regulatory Guide 1.21 and in Section 5.8.1 of the Offsite Dose Calculation Manual (UNT-005-014).

The information contained in this report includes:

- A summary of the quantities of radioactive liquid and gaseous effluents and solid wastes released from the plant during the reporting period.
- A summary of the meteorological data collected during 2001.
- Assessment of radiation doses due to liquid and gaseous radioactive effluents released during 2001.
- A discussion of Unplanned/Abnormal releases that occurred during the reporting period.
- A submittal of changes to the Offsite Dose Calculation Manual and Process Control Program during this reporting period.
- A discussion of why required radioactive effluent monitoring instrumentation was not returned to service within the time specified.
- A discussion of any instances in which effluent samples were not collected within the required frequency.

2.0 Supplemental Information

2.1 Regulatory Limits

The limits applicable to the release of radioactive material in liquid and gaseous effluents are described in the following sections. These limits are addressed by reference in UNT-005-014, Offsite Dose Calculation Manual, and directly in the Technical Requirements Manual (TRM).

2.1.1 Fission and Activation Gases (Noble Gases)

The dose rate due to radioactive noble gases released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to less than or equal to:

- 500 mrem/yr to the total body; and,
- 3000 mrem/yr to the skin.

The air dose due to noble gases released in gaseous effluents from the site to areas at or beyond the site boundary shall be limited to the following:

- During any calendar quarter, Less than or equal to:
  - 5 mrad for gamma radiation; and,
  - 10 mrad for beta radiation.
- During any calendar year, Less than or equal to:
  - 10 mrad for gamma radiation; and,
  - 20 mrad for beta radiation.

2.1.2 Iodines, Particulates with Half Lives > Eight (8) Days, and Tritium

The dose rate due to Iodine-131 and 133, Tritium, and all radionuclides in particulate form with half lives greater than eight (8) days, released in gaseous effluents from the site to areas at and beyond the site boundary, shall be limited to less than or equal to:

- 1500 mrem/yr to any organ.

The dose to a member of the public from Iodine-131 and 133, Tritium, and all radionuclides in particulate form with half lives greater than eight (8) days in gaseous effluents released to areas at and beyond the site boundary shall be limited to the following:

- During any calendar quarter, Less than or equal to:
  - 7.5 mrem to any organ.
- During any calendar year, Less than or equal to:
  - 15 mrem to any organ.

2.1.3 Liquid Effluents

The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to ten times the concentrations specified in 10 CFR Part 20, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2.0E-4 µCi/ml (Total Activity).

The dose or dose commitment to a member of the public from radioactive materials in liquid effluents released to unrestricted areas shall be limited to the following:

During any calendar quarter, Less than or equal to:

- 1.5 mrem to the total body; and,
- 5 mrem to any organ, and

During any calendar year, Less than or equal to

- 3 mrem to the total body; and,
- 10 mrem to any organ.

2.1.4 Uranium Fuel Cycle Sources

The dose or dose commitment to any member of the public due to releases of radioactivity and radiation from uranium fuel cycle sources over 12 consecutive months shall be limited to less than or equal to:

- 25 mrem to the Total Body or any organ (except thyroid organ); and,
- 75 mrem to the Thyroid

2.2 Maximum Permissible Concentrations

2.2.1 Fission and Activation Gases, Iodines, and Particulates, With Half Lives > Eight (8) Days

For gaseous effluents, maximum permissible concentrations are not directly used in release rate calculations since the applicable limits are expressed in terms of dose rate at the site boundary.

2.2.2 Liquid Effluents

Ten times the effluent concentration (EC) values specified in 10 CFR Part 20, Appendix B, Table 2, Column 2 are used as the permissible concentrations of liquid radioactive effluents at the unrestricted area boundary. A value of 2.0E-4 µCi/ml is used as the concentration limit for dissolved and entrained noble gases in liquid effluents.

2.3 Average Energy (E-Bar)

This is not applicable to Waterford 3's effluent specifications. E-Bar's are not required to be calculated from effluent release data. The average energy (E-Bar) for the Reactor Coolant System (RCS) is supplied as additional information in the report further below.

2.4 Measurements and Approximations of Total Radioactivity

The quantification of radioactivity in liquid and gaseous effluents was accomplished by performing the sampling and radiological analysis of effluents in accordance with the requirements of Tables 4.11-1 and 4.11-2 of the Technical Requirements Manual (TRM).

2.4.1 Fission and Activation Gases (Noble Gases)

For continuous releases, a gas grab sample was analyzed monthly for noble gases. Each week a Gas Ratio (GR) was calculated according to the following equation:

$$GR = \frac{\text{Average Weekly Noble Gas Monitor Reading}}{\text{Monitor Reading During Noble Gas Sampling}}$$

The monthly sample analysis and weekly Gas Ratio were then used to determine noble gases discharged continuously for the previous week. For gas decay tank and containment purge batch releases, a gas grab sample was analyzed prior to release to determine noble gas concentrations in the batch. In all cases the total radioactivity in gaseous effluents was determined from measured concentrations of each radionuclide present and the total volume discharged.

2.4.2 Iodines, Particulates, and Tritium

Iodines and particulates discharged were sampled using a continuous sampler which contained a charcoal cartridge and a particulate filter. Each week the charcoal cartridge and particulate filter were analyzed for gamma emitters using gamma spectroscopy. The determined radionuclide concentrations and effluent volumes discharged were used to calculate the previous week's activity released. The particulate samples were composited and analyzed quarterly for Sr-89 and Sr-90 by a contract laboratory (Duke Engineering). Particulate gross alpha activity was measured weekly using alpha scintillation or gas-flow proportional counting techniques. The determined activities were used to estimate effluent concentrations in subsequent releases until the next scheduled analysis was performed.

Grab samples of continuous releases were analyzed at least monthly for tritium. Containment Purge batch releases are analyzed prior to release. The determined concentrations were used to estimate tritium activity in subsequent releases until the next scheduled analysis was performed.

2.4.3 Liquid Effluents

For continuous releases, samples were collected weekly and analyzed using gamma spectroscopy. The measured concentrations were used to determine radionuclide concentrations in the following week's releases. For batch releases, gamma analysis was performed on the sample prior to release.

For both continuous and batch releases, composite samples were analyzed quarterly by a contract laboratory (Duke Engineering) for Sr-89, Sr-90, and Fe-55. Samples were composited and analyzed monthly for tritium and gross alpha using liquid scintillation and gas flow proportional counting techniques, respectively. For radionuclides measured in the composite samples, the measured concentrations in the composite samples from the previous month or quarter were used to estimate released quantities of these isotopes in liquid effluents during the current month or quarter when the analysis results became available.

The total radioactivity in liquid effluent releases was determined from the measured and estimated concentrations of each radionuclide present and the total volume of the effluent discharged.

2.5 Batch Releases

A summary of information for gaseous and liquid batch releases is included in Table 1.

2.6 Unplanned/Abnormal Releases

2.6.1 Unplanned/Abnormal Gaseous Releases

There were no unplanned/abnormal gaseous releases during the reporting period.

2.6.2 Unplanned/Abnormal Liquid Releases

There were no unplanned/abnormal liquid releases during this reporting period.

3.0 Gaseous Effluents

The quantities of radioactive material released in gaseous effluents are summarized in Tables 1A, 1B, and 1C. Note that there were no elevated releases, since all Waterford 3 releases are considered to be at ground level. The estimated total error in % is based upon several statistical uncertainties due to sample counting, efficiency, volume, etc.

4.0 Liquid Effluents

The quantities of radioactive material released in liquid effluents are summarized in Tables 2A and 2B. The estimated total error in % is based upon several statistical uncertainties due to sample counting, efficiency, volume, etc.

5.0 Solid Wastes

The summary of radioactive solid wastes shipped offsite for disposal is listed in Table 3. For certain waste forms, Waterford 3 uses volume reduction services provided by a contractor. These waste forms are included in Table 3 and the volumes reported reflect the volume of waste shipped offsite, not final disposal volumes. Final disposal volumes for wastes compacted offsite are available upon request. The estimated total error in % is based upon several statistical uncertainties due to sample counting, efficiency, volume, etc.

6.0 Meteorological Data

In Table 4, the hourly meteorological data from January 1, 2001 through December 31, 2001, is presented in the form of a joint frequency distribution of wind speed, wind direction, and atmospheric stability (hourly data is also available upon request). The standard Pasquill classification scheme, as presented in Regulatory Guide 1.23, is used to determine stability class from differential temperature measurements. The Waterford-3 data recovery results by parameter are as follows:

Parameter Monitored	Annual Data Recovery Rate
Differential Temp.	100.00%
Wind Speed	100.00%
Wind Direction	100.00%
Overall*	100.00%

* - Simultaneous occurrence of valid data for all three parameters.

Dispersion and deposition values were determined from the 2001 data and used in the assessment of doses due to gaseous effluents released from site during the 2001 period.

7.0 Assessment of Doses

7.1 Dose Due to Gaseous Effluents

7.1.1 Air Doses at the Site Boundary

Air doses from gaseous effluents were evaluated at the closest offsite location that could be occupied continuously during the term of plant operation and that would result in the highest dose. This location was determined by examining the atmospheric dispersion parameters (χ/Q's) at the closest offsite locations that could be continuously occupied during plant operation in each of the meteorological sectors surrounding the plant. The location that would have the highest dose would be that location having the most restrictive (largest) χ/Q value.

Based on actual meteorological data collected during 2001, this location was determined to be in the ENE sector at a distance of 966 meters (0.6 miles) from the plant. Doses were assessed at this location in accordance with the methodology described in the Waterford 3 Offsite Dose Calculation Manual considering only beta and gamma exposures in air due to noble gas. The results of these assessments for the year 2001 are summarized as follows:

Beta air dose:	0.023 mrad
Gamma air dose:	0.008 mrad

The above Beta and Gamma air doses represent the following percentage of the Annual Dose limits:

0.12% of the Beta air dose limit (20 mrad).
0.08% of the Gamma air dose limit (10 mrad).

Dose calculation results are summarized by quarters in Table 5A. The doses were calculated in accordance with the methodology described in the Waterford 3 Offsite Dose Calculation Manual.

7.1.2 Maximum Organ Dose to the Critical Receptor

The maximum organ dose to a MEMBER OF THE PUBLIC from I-131, I-133, tritium, and all radionuclides in particulate form with half-lives greater than eight (8) days in gaseous effluents released to areas at and beyond the site boundary was determined for 2001.

An assessment of the maximum organ dose was performed for the critical receptor. The critical receptor was assumed to be located at the nearest residence to the plant having the most restrictive atmospheric dispersion (χ/Q) and deposition (D/Q) parameters. Furthermore, it was assumed that the receptor living at this residence consumed food products that were either raised or produced at this residence.

Using land use census and meteorological data for 2001, the residence with the highest χ/Q and D/Q values was determined to be in the ENE sector at a distance of 1448 meters (0.9miles) from the plant. The dose calculation was performed in accordance with the methodology described in the Waterford 3 Offsite Dose Calculation Manual considering the inhalation, ground plane exposure, and ingestion pathways. The maximum organ dose to the critical receptor was determined to be:

0.080 mrem to the child liver.

This represents 0.53% of the Annual Organ Dose limit (15 mrem).

Dose calculation results are summarized by quarters in Table 5A. The doses were calculated in accordance with the methodology described in the Waterford 3 Offsite Dose Calculation Manual.

7.2 Doses Due to Liquid Effluents

The annual doses to the maximum exposed individual resulting from exposure to liquid effluents released during 2001 from Waterford 3 were:

0.003 mrem to the Total Body.
0.006 mrem to the maximum exposed organ (Bone).

The above doses represent the following percentage of the Annual Dose limits:

0.10% of the Total Body Dose Limit (3 mrem), and
0.06% of the Organ Dose Limit (10 mrem).

Dose calculation results are summarized by quarter in Table 5B. The doses were calculated in accordance with the methodology described in the Waterford 3 Offsite Dose Calculation Manual.

7.3 40 CFR Part 190 Dose Evaluation

In accordance with Technical Requirements Manual (TRM), Specification 3/4.11.4, Total Dose, dose evaluations to demonstrate compliance with Surveillance Requirements 4.11.4.1 and 4.11.4.2 of the Technical Requirements Manual (TRM), dealing with dose from the uranium fuel cycle, need to be performed only if quarterly doses exceed 3 mrem to the total body (liquid releases), 10 mrem to any organ (liquid releases), 10 mrad gamma air dose, 20 mrad beta air dose, or 15 mrem to any organ from radioiodines and particulates.

At no time during 2001 were any of these limits exceeded; therefore, the evaluation was not required.

7.4 Doses to Public Inside the Site Boundary

The Member of the Public inside the site boundary expected to have the maximum exposure due to gaseous effluents would be an employee at the Waterford 1 and 2 fossil fuel plants, located in the NW sector at a distance of approximately 670 meters (0.42 miles) from the plant.

The doses for such an individual were determined by scaling the full-time occupancy doses due to airborne effluents by the occupancy time due to a normal working year. Based on an assumed occupancy of 25% (40 hour work week) and the fact that all employees are adults, the calculated doses were determined to be less than:

5.83E-03 mrem to the maximum exposed organ (Thyroid)

6.98E-03 mrem to the Total body

2.86E-03 mrem to the skin

Additionally, residential quarters for members of the Louisiana National Guard are located within the site boundary in the S sector at a distance of approximately 500 meters (0.31 miles) from the plant. These personnel have been stationed at the facility since October 29, 2001, following the terrorist attacks that occurred in New York and Washington, D.C. on September 11, 2001. These personnel are considered to be occupationally exposed during the performance of their duties.

The doses for an off-duty Louisiana National Guard individual were determined by scaling the full-time occupancy doses due to airborne effluents by the off-duty time during a typical duty schedule. Based on an assumed occupancy of 50% (12 hour shifts) and the fact that all employees are adults, the calculated annual doses were determined to be less than:

3.71E-02 mrem to the maximum exposed organ (Gi-LLI)

4.44E-02 mrem to the Total body

1.82E-02 mrem to the skin

Doses were calculated according to the methodology described in the Waterford 3 Offsite Dose Calculation Manual considering only the inhalation and ground plane exposure pathways.

8.0 Related Information

8.1 Changes to the Process Control Program

Changes were made to the Process Control Program (PCP). Procedure RW-001-210 was deleted and replaced with procedure RW-105, during the reporting period. Procedure RW-105 is an Entergy corporate level implementation of the PCP for all Entergy Nuclear South sites. The procedure implements radioactive waste processing requirements and includes elements necessary for the PCP. The changes were administrative in nature and no detailed technical evaluation was required. A complete copy of RW-105 is included in this report as an attachment.

8.2 Changes to the Offsite Dose Calculation Manual

Changes were made to the Waterford 3 Offsite Dose Calculation Manual (ODCM), procedure UNT-005-014, and applicable sections of the Technical Requirements Manual (TRM) during the reporting period. The changes are discussed below. A complete copy of UNT-005-014 and applicable sections of the Technical Requirements Manual (TRM) are included in this report as attachments.

Revision of TRM table 4.11-1, Radioactive Liquid Waste Sampling and Analysis Program:

1.) add additional footnote for the Turbine Building Industrial Waste Sump for both batch and continuous mode releases to clearly specify the normal sampling location.

2.) change footnote specifying discharge/treatment destination when contents of the Regenerative Waste Tank or the Filter Flush Tank are found to contain radioactivity.

Revision of TRM table 3.12-1, Radiological Environmental Monitoring Program:

3.) change requirement for the number of required sample locations for drinking water,

4.) change requirement for the number of required sample locations, and the sampling and analysis frequency for shoreline sediment,

5.) change requirements for sampling and analysis frequency for milk samples,

6.) change requirement for sampling and analysis frequency for broad leaf vegetation samples,

Revision of UNT-005-014, Offsite Dose Calculation Manual, Attachments 7.11, 7.14, 7.14, 7.16, 7.17, 7.18:

7.) Delete ground water sampling location GWK-1,

8.) Add surface water sampling location SWK-1,

9.) Delete broad leaf vegetation sampling location BLK-15,

10.) Add fish sampling location FH-3,

11.) Add shoreline sediment sampling location SHWQ-6,

12.) Remove milk sampling location MKQ-1,

13.) Revise/change the current TLD locations: R-1, H-6, G-9, N-1, and Q-5. Revise the current air sampling location APG-1. Revise current surface and drinking water sample location DWG-2 and SWG-2.

14.) Revise attachment 7.13, Radiological Environmental Monitoring Program, to reflect the addition or removal of sample points and changes to sampling/collection frequencies as stated above,

15.) Revise attachment 7.14, Radiological Environmental Monitoring Program Sample Location Table to reflect the addition or removal of sample points and changes to sampling and analysis frequencies as stated above and to provide bearing, distance, latitude/longitude coordinates in order to provide more accurate locations.

16.) Revise attachments 7.16 (REMP Sampling Locations Within Two Miles of Waterford-3), 7.17 (REMP Sampling Locations Within Ten Miles of Waterford-3), and 7.18 (REMP Sampling Locations Within Fifty Miles of Waterford-3). These attachments contain maps displaying the location of REMP sample points.

17.) Revise attachment 7.11, (LIQUID WASTE MANAGEMENT SYSTEM EFFLUENT SOURCES AND RELEASE PATHWAYS AND POINTS).

8.3 Unavailability of REMP Milk Samples

Due to the unavailability of three milk sampling locations within five kilometers of the plant, Broad Leaf sampling is performed in accordance with Technical Requirements Manual (TRM) Table 3.12-1. Milk is collected, when available, from the control location and one identified sampling location as indicated in UNT-005-014, Offsite Dose Calculation Manual, Attachment 7.13.

8.4 Report of Required Effluent Instrument Inoperability

Technical Requirements Manual (TRM) Specifications 3.3.3.10 and 3.3.3.11 require reporting in the Annual Radioactive Effluent Release Report of why designated inoperable effluent monitoring instrumentation was not restored to operability within the time specified in the Action Statement.

During the reporting period, there were no cases where instrumentation was not restored to operability within the time specified.

8.5 Activity Released Via Secondary Pathways

The following secondary release paths were continuously monitored for radioactivity:

- The Hot Machine Shop Exhaust (AH-35),
- Decontamination Shop Exhaust (AH-34),
- The RAB H&V Equipment Room Ventilation system Exhaust (E-41A and E-41B); and,
- The Switchgear/Cable Vault Area Ventilation System (AH-25).

Continuous sampling for these areas is maintained in order to demonstrate the operability of installed treatment systems and to verify integrity of barriers separating primary and secondary ventilation systems. Sampling for these areas was limited to continuous particulate and iodine sampling and monthly noble gas grab sampling. The activity released via these secondary pathways resulted from routine operations and remained below significant levels.

8.6 Missed Effluent Samples

All effluent samples were collected within the frequency requirements specified in the ODCM/TRM during this reporting period.

8.7 Major Changes to Radioactive Waste Systems

During the reporting period, no major changes were made to any Radioactive Waste Systems. All major changes to Radioactive Waste Systems are included in Waterford 3's FSAR updates.

8.8 Biennial Land Use Census

A land use census was last performed in 2000. The land use census performed in 2000 did not identify the need for any changes to locations used for effluent dose calculations or radiological environmental sampling.

8.9 Gaseous Storage Tank Total Radioactivity Limit

Technical Specification 3/4.11.2.6 specifies that the quantity of radioactivity contained in each gas storage tank be maintained less than or equal to 8.5E+04 Curies noble gas (considered as Xe-133 equivalent). At no time during the reporting period was this value exceeded.

8.10 Unprotected Outside Tank Total Radioactivity Limit

Technical Specification 3/4.11.1.4 specifies that the quantity of radioactive material contained in each unprotected outdoor tank be maintained less than or equal to 7.85E-04 Curies (excluding tritium and dissolved and entrained noble gases). During this reporting period, there were no instances in which this limit was exceeded.

9.0 Additional Information

9.1 Reactor Coolant System Average Energy (E-Bar)

The most recent Reactor Coolant System E-Bar calculation was 0.2373 MeV/Disintegration from a sample obtained on December 3, 2001. Reactor Coolant System E-Bar is supplied for information only and is not used for effluent dose calculations.

10.0 Tables

11.0 Attachments

Table 1
Batch Release Summary

Batch Release Summary information for 2001 Report Period.

Report Category	: Batch Release Summary	
Release Point	: All	
Type of Release	: Batch Liquid and Gaseous	
Period Start Time	: 01-jan-2001 00:00:00	
Period End Time	: 31-dec-2001 23:59:59	
Liquid Releases		
Number of Releases	: 97	
Total Time for All Releases	: 27930.7	Minutes
Maximum Time for a Release	: 361.0	Minutes
Average Time for a Release	: 287.9	Minutes
Minimum Time for a Release	: 209.0	Minutes
Average Stream Flow	: 830698.4	GPM
Gaseous Releases		
Number of Releases	: 2	
Total Time for All Releases	: 328.0	Minutes
Maximum Time for a Release	: 180.0	Minutes
Average Time for a Release	: 164.0	Minutes
Minimum Time for a Release	: 148.0	Minutes

Batch Release Summary information for 2001 by Quarter.

Report Category	: Batch Release Summary				
Release Point	: All				
Type of Release	: Batch Liquid and Gaseous				
Period Start Time	: 01-jan-2001 00:00:00				
Period End Time	: 31-dec-2001 23:59:59				
Liquid Releases					
	Qtr 1	Qtr 2	Qtr 3	Qtr 4	
Number of Releases	: 20	18	31	28	
Total Time for All Releases	: 5519.8	5292.0	9011.0	8108.0	Minutes
Maximum Time for a Release	: 324.0	326.0	361.0	356.0	Minutes
Average Time for a Release	: 276.0	294.0	290.7	289.6	Minutes
Minimum Time for a Release	: 209.0	269.0	251.0	243.0	Minutes
Average Stream Flow	: 750043.5	750043.3	1000043.6	750043.4	GPM
Gaseous Releases					
	Qtr 1	Qtr 2	Qtr 3	Qtr 4	
Number of Releases	: 1	0	1	0	
Total Time for All Releases	: 180.0	0.0	148.0	0.0	Minutes
Maximum Time for a Release	: 180.0	0.0	148.0	0.0	Minutes
Average Time for a Release	: 180.0	n/a	148.0	n/a	Minutes
Minimum Time for a Release	: 180.0	n/a	148.0	n/a	Minutes

Table 1A
Annual Summation of All Releases by Quarter
All Airborne Effluents

Report Category : Summation of All Releases
Type of Activity : All Airborne Effluents
Period Start Time : 01-jan-2001 00:00:00
Period End Time : 31-dec-2001 23:59:59

Type of Effluent	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Est.Total Error %
A. Fission and Activation Gases						
1. Total Release	Curies	1.60e-01	0.00e+00	7.43e+00	3.36e+01	1.50e+01
2. Average Release Rate for Period	uCi/sec	2.06e-02	0.00e+00	9.35e-01	4.22e+00	
3. Percent of Applicable Limit	%	n/a	n/a	n/a	n/a	
B. Radioiodines						
1. Total Iodine-131	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.50e+01
2. Average Release Rate for Period	uCi/sec	0.00e+00	0.00e+00	0.00e+00	0.00e+00	
3. Percent of Applicable Limit	%	n/a	n/a	n/a	n/a	
C. Particulates						
1. Particulates (Half-lives > 8 Days)	Curies	5.06e-07	2.34e-07	0.00e+00	0.00e+00	1.50e+01
2. Average Release Rate for Period	uCi/sec	6.51e-08	2.97e-08	0.00e+00	0.00e+00	
3. Percent of Applicable Limit	%	n/a	n/a	n/a	n/a	
1. Gross Alpha Radioactivity	Curies	7.08e-07	4.86e-07	4.08e-07	2.77e-07	1.50e+01
D. Tritium						
1. Total Release	Curies	2.90e+01	2.03e+01	1.80e+01	2.57e+01	1.50e+01
2. Average Release Rate for Period	uCi/sec	3.73e+00	2.58e+00	2.27e+00	3.23e+00	
3. Percent of Applicable Limit	%	n/a	n/a	n/a	n/a	

Table 1B
Annual Airborne Continuous Elevated and Ground Level Releases
Totals for Each Nuclide Released

Report Category : Airborne Continuous Elevated and Ground Level Releases.
: Totals for Each Nuclide Released.
Type of Activity : Fission Gases, Iodines, and Particulates
Period Start Time : 01-jan-2001 00:00:00
Period End Time : 31-dec-2001 23:59:59

		Elevated Releases				Ground Releases			
Nuclide	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
Fission and Activation Gases									
Xe-133	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	5.21e+00	3.29e+01
Xe-135	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	6.44e-01
Total for Period	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	5.21e+00	3.36e+01
Radioiodines									
None									
Particulates									
H-3	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.89e+01	2.03e+01	1.79e+01	2.57e+01
Ru-103	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.39e-07	0.00e+00	0.00e+00	0.00e+00
Cs-137	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.67e-07	2.34e-07	0.00e+00	0.00e+00
Gralpha	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	7.08e-07	4.86e-07	4.08e-07	2.77e-07
Total for Period	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.89e+01	2.03e+01	1.79e+01	2.57e+01

Table 1C
Annual Airborne Batch Elevated and Ground Level Releases
Totals for Each Nuclide Released

Report Category : Airborne Batch Elevated and Ground Level Releases.
: Totals for Each Nuclide Released.
Type of Activity : Fission Gases, Iodines, and Particulates
Period Start Time : 01-jan-2001 00:00:00
Period End Time : 31-dec-2001 23:59:59

		Elevated Releases				Ground Releases			
Nuclide	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
Fission and Activation Gases									
Ar-41	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	3.60e-02	0.00e+00	3.37e-02	0.00e+00
Kr-85	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.86e+00	0.00e+00
Xe-133	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.22e-01	0.00e+00	3.25e-01	0.00e+00
Xe-135	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.93e-03	0.00e+00	0.00e+00	0.00e+00
Total for Period	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.60e-01	0.00e+00	2.22e+00	0.00e+00
Radioiodines									
None									
Particulates									
H-3	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.13e-01	0.00e+00	1.36e-01	0.00e+00
Total for Period	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.13e-01	0.00e+00	1.36e-01	0.00e+00

Table 2A
Annual Summation of All Releases by Quarter
All Liquid Effluents

Report Category : Summation of All Releases
Type of Activity : All Liquid Effluents
Period Start Time : 01-jan-2001 00:00:00
Period End Time : 31-dec-2001 23:59:59

Type of Effluent	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Est.Total Error %
A. Fission and Activation Products						
1. Total Release (Not Including Tritium, Gases, and Alpha	Curies	9.31e-02	4.01e-02	3.62e-02	2.42e-02	1.50e+01
2. Average Diluted Concentration During Period	uCi/sec	2.53e-10	1.07e-10	7.16e-11	6.28e-11	
3. Percent of Applicable Limit	%	n/a	n/a	n/a	n/a	
B. Tritium						
1. Total Release	Curies	2.45e+01	2.80e+01	1.01e+02	1.86e+02	1.50e+01
2. Average Diluted Concentration During Period	uCi/sec	6.65e-08	7.47e-08	2.00e-07	4.82e-07	
3. Percent of Applicable Limit	%	n/a	n/a	n/a	n/a	
C. Dissolved and Entrained Gases						
1. Total Release	Curies	6.16e-03	1.32e-04	1.57e-03	2.33e-02	1.50e+01
2. Average Diluted Concentration During Period	uCi/sec	1.67e-11	3.50e-13	3.11e-12	6.05e-11	
3. Percent of Applicable Limit	%	n/a	n/a	n/a	n/a	
D. Gross Alpha Radioactivity						
1. Total Release	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.50e+01
E. Waste Volume Released (Pre-Dilution)	Liters	7.98e+06	1.02e+07	8.24e+06	6.30e+06	1.50e+01
F. Volume of Dilution Water Used	Liters	3.68e+11	3.76e+11	5.05e+11	3.85e+11	1.50e+01

Table 2B
Annual Liquid Continuous and Batch Releases
Totals for Each Nuclide Released

Report Catagory : Liquid Continuous and Batch Releases.
: Totals for Each Nuclide Released.
Type of Activity : All Radionuclides
Period Start Time : 01-jan-2001 00:00:00
Period End Time : 31-dec-2001 23:59:59

		Continuous Releases				Batch Releases			
Nuclide	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
All Nuclides									
H-3	Curies	3.95e-02	9.53e-02	8.37e-02	6.70e-02	2.44e+01	2.79e+01	1.01e+02	1.86e+02
Na-24	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	7.46e-06
Cr-51	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.90e-02	1.44e-04	0.00e+00	0.00e+00
Mn-54	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.49e-03	4.19e-04	2.85e-04	7.97e-04
Fe-55	Curies	0.00e+00	0.00e+00	0.00e+00	9.37e-04	5.00e-03	2.16e-02	2.67e-02	8.41e-03
Fe-59	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.19e-03	9.74e-06	0.00e+00	0.00e+00
Co-57	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.62e-04	3.40e-06	2.23e-06	2.30e-05
Co-58	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.97e-02	1.55e-03	6.34e-04	8.18e-04
Co-60	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.05e-02	1.62e-03	1.22e-03	4.20e-03
Ni-56	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	4.21e-05	0.00e+00	0.00e+00	0.00e+00
Kr-85	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.18e-02
Kr-85m	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	3.81e-06	0.00e+00	0.00e+00
Zr-95	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.00e-02	8.76e-04	2.47e-04	2.70e-04
Nb-95	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.74e-02	1.59e-03	4.73e-04	6.12e-04
Tc-99m	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.09e-06
Ag-110m	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.70e-03	1.03e-02	3.92e-03	5.52e-03
Sn-113	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.40e-03	1.70e-04	3.48e-05	8.78e-05
Sb-124	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	5.83e-05	0.00e+00	0.00e+00	0.00e+00
Sb-125	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.81e-03	1.75e-03	2.55e-03	2.34e-03
I-131	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	4.47e-06
Xe-133	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	6.16e-03	1.28e-04	1.56e-03	1.51e-03
Xe-135	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	3.48e-06	4.33e-06
Cs-134	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	9.18e-05	1.45e-05	2.90e-05	6.74e-05
Cs-137	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	7.83e-05	2.44e-05	3.71e-05	8.38e-05
La-140	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.04e-05	3.62e-05	8.85e-06	0.00e+00
Ce-144	Curies	0.00e+00	0.00e+00	0.00e+00	0.00e+00	4.61e-04	0.00e+00	0.00e+00	0.00e+00
Total for Period	Curies	3.95e-02	9.53e-02	8.37e-02	6.79e-02	2.45e+01	2.80e+01	1.01e+02	1.86e+02

Table 3
Solid Waste Shipped Offsite for Burial or Disposal

SUMMARY BY MAJOR WASTE TYPES

Waste Stream : Resins, Filters, and Evap Bottoms

10CFR61	Volume			% Error
Waste Class	Ft^3	M^3	Curies Shipped	(Ci)
A	0.00E+00	0.00E+00	0.00E+00	+/- 25%
B	1.20E+02	3.41E+00	3.35E+02♦	+/- 25%
C	0.00E+00	0.00E+00	0.00E+00	+/- 25%
All	1.20E+02	3.41E+00	3.35E+02	+/- 25%

Waste Stream : Dry Active Waste

10CFR61	Volume			% Error
Waste Class	Ft^3	M^3	Curies Shipped	(Ci)
A	1.41E+04	3.99E+02	7.23E-01 ♣	+/- 25%
B	0.00E+00	0.00E+00	0.00E+00	+/- 25%
C	0.00E+00	0.00E+00	0.00E+00	+/- 25%
All	1.41E+04	3.99E+02	7.23E-01	+/- 25%

Waste Stream : Irradiated Components

10CFR61	Volume			% Error
Waste Class	Ft^3	M^3	Curies Shipped	(Ci)
A	0.00E+00	0.00E+00	0.00E+00	+/- 25%
B	0.00E+00	0.00E+00	0.00E+00	+/- 25%
C	0.00E+00	0.00E+00	0.00E+00	+/- 25%
All	0.00E+00	0.00E+00	0.00E+00	+/- 25%

♣ Activity determined by estimations

♦ Activity determined by measurements

Table 3
Solid Waste Shipped Offsite for Burial or Disposal

Waste Stream : Other Waste (Steam Generator Cleaning Waste)

10CFR61	Volume			% Error
Waste Class	Ft^3	M^3	Curies Shipped	(Ci)
A	2.18E+03	6.17E+01	3.37E-04 ♦	+/- 25%
B	0.00E+00	0.00E+00	0.00E+00	+/- 25%
C	0.00E+00	0.00E+00	0.00E+00	+/- 25%
All	2.18E+03	6.17E+01	3.37E-04	+/- 25%

Waste Stream : Sum of All 4 Categories

10CFR61	Volume			% Error
Waste Class	Ft^3	M^3	Curies Shipped	(Ci)
A	1.63E+04	4.60E+02	7.24E-01	+/- 25%
B	1.20E+02	3.41E+00	3.35E+02	+/- 25%
C	0.00E+00	0.00E+00	0.00E+00	+/- 25%
All	1.64E+04	4.64E+02	3.36E+02	+/- 25%

♣ Activity determined by estimations

♦ Activity determined by measurements

Table 3
Solid Waste Shipped Offsite for Burial or Disposal

Estimate of major nuclide composition (by waste type)

Waste Stream : Resins, Filters, and Evap Bottoms

Nuclide Name	Percent Abundance	Curies
H-3	0.120%	4.03E-01
C-14	0.015%	5.18E-02
Mn-54	3.994%	1.34E+01
Fe-55	3.755%	1.26E+01
Co-57	0.230%	7.70E-01
Co-58	34.759%	1.16E+02
Co-60	3.059%	1.03E+01
Ni-63	12.492%	4.19E+01
Sr-90	0.168%	5.64E-01
Ag-110m	0.075%	2.51E-01
Sb-125	0.315%	1.05E+00
Cs-134	19.227%	6.44E+01
Cs-137	20.678%	6.93E+01
Ce-144	1.092%	3.66E+00
Pu-238	0.000%	1.53E-03
Pu-239	0.000%	5.80E-04
Pu-241	0.017%	5.74E-02
Am-241	0.000%	5.72E-04
Cm-242	0.001%	2.90E-03
Cm-243	0.001%	2.06E-03

Table 3
Solid Waste Shipped Offsite for Burial or Disposal

Estimate of major nuclide composition (by waste type)

Waste Stream : Dry Active Waste

Nuclide Name	Percent Abundance	Curies
H-3	6.945%	5.02E-02
Mn-54	2.767%	2.00E-02
Fe-55	32.602%	2.36E-01
Co-58	6.645%	4.81E-02
Co-60	8.254%	5.97E-02
Ni-63	23.311%	1.69E-01
Sb-125	2.030%	1.47E-02
Cs-134	7.762%	5.61E-02
Cs-137	9.682%	7.00E-02

Table 3
Solid Waste Shipped Offsite for Burial or Disposal

Estimate of major nuclide composition (by waste type)

Waste Stream : Irradiated Components

N/A - None Shipped in 2001.

Table 3
Solid Waste Shipped Offsite for Burial or Disposal

Estimate of major nuclide composition (by waste type)

Waste Stream : Other Waste (Steam Generator Cleaning Waste)

Nuclide Name	Percent Abundance	Curies
H-3	4.846%	1.63E-05
Mn-54	2.503%	8.43E-06
Fe-55	36.325%	1.22E-04
Fe-59	0.534%	1.80E-06
Co-58	8.828%	2.97E-05
Co-60	8.743%	2.94E-05
Ni-63	23.426%	7.89E-05
Zn-65	0.472%	1.59E-06
Nb-95	0.052%	1.73E-07
Sb-125	1.541%	5.19E-06
Cs-134	6.066%	2.04E-05
Cs-137	6.664%	2.24E-05

Table 3
Solid Waste Shipped Offsite for Burial or Disposal

Estimate of major nuclide composition (by waste type)

Waste Stream : Sum of All 4 Categories

Nuclide Name	Percent Abundance	Curies
H-3	0.135%	4.53E-01
C-14	0.015%	5.18E-02
Mn-54	3.991%	1.34E+01
Fe-55	3.817%	1.28E+01
Fe-59	0.000%	1.80E-06
Co-57	0.229%	7.70E-01
Co-58	34.699%	1.17E+02
Co-60	3.070%	1.03E+01
Ni-63	12.515%	4.20E+01
Zn-65	0.000%	1.59E-06
Sr-90	0.168%	5.64E-01
Nb-95	0.000%	1.73E-07
Ag-110m	0.075%	2.51E-01
Sb-125	0.318%	1.07E+00
Cs-134	19.203%	6.45E+01
Cs-137	20.655%	6.94E+01
Ce-144	1.090%	3.66E+00
Pu-238	0.000%	1.53E-03
Pu-239	0.000%	5.80E-04
Pu-241	0.017%	5.74E-02
Am-241	0.000%	5.72E-04
Cm-242	0.001%	2.90E-03
Cm-243	0.001%	2.06E-03

Table 3
Solid Waste Shipped Offsite for Burial or Disposal

Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
6	Hittman Transport Services (Truck)	Duratek - Bear Creek, Oak Ridge, TN
1	Suttles Truck Leasing LLC (Truck)	ATG, Richland, WA
1	Hittman Transport Services (Truck)	Barnwell Waste Management Facility, Barnwell, SC
1	Hittman Transport Services (Truck)	Duratek, Oak Ridge, TN

Irradiated Fuel Shipments (Disposition)

Number of Shipments	Mode of Transportation	Destination
None	N/A	N/A

Table 4
Joint Frequency Distribution of Meteorological Data

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS 01/01/2001 00:00:00 TO 12/31/2001 23:59:59 PASQUILL CLASS A

Wind Speed (M/S) at 10-m Level

Wind Direction	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.	10.1-13	13.1-18.0	>18.0	Total
N	0	0	0	0	0	2	16	12	3	0	0	0	33
NNE	0	0	0	0	0	6	21	7	0	0	0	0	34
NE	0	0	0	0	1	24	112	39	0	0	0	0	176
ENE	0	0	0	0	0	1	10	6	2	0	0	0	19
E	0	0	0	0	0	0	2	6	0	0	0	0	8
ESE	0	0	0	0	0	0	6	8	0	0	0	0	14
SE	0	0	0	0	0	1	9	10	1	0	0	0	21
SSE	0	0	0	0	0	0	23	17	1	0	0	0	41
S	0	0	0	1	0	1	12	8	0	0	0	0	22
SSW	0	0	0	0	0	2	14	2	0	0	0	0	18
SW	0	0	0	0	2	2	17	10	0	0	0	0	31
WSW	0	0	0	1	0	2	2	2	0	0	0	0	7
W	0	0	0	0	0	1	5	2	0	0	0	0	8
WNW	0	0	0	0	0	1	12	3	0	0	0	0	16
NW	0	0	0	0	0	0	6	2	0	0	0	0	8
NNW	0	0	0	0	0	3	15	11	2	0	0	0	31
Total	0	0	0	2	3	46	282	145	9	0	0	0	487

Number of calms for A Stability: 0

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS 01/01/2001 00:00:00 TO 12/31/2001 23:59:59 PASQUILL CLASS B

Wind Speed (M/S) at 10-m Level

Wind Direction	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.	10.1-13	13.1-18.0	>18.0	Total
N	0	0	0	0	0	15	8	6	0	0	0	0	29
NNE	0	0	0	0	0	6	12	3	0	0	0	0	21
NE	0	0	0	0	0	23	83	14	1	0	0	0	121
ENE	0	0	0	0	1	4	12	5	0	0	0	0	22
E	0	0	0	0	2	1	1	5	0	0	0	0	9
ESE	0	0	0	0	0	0	11	5	0	0	0	0	16
SE	0	0	0	0	0	3	10	9	0	0	0	0	22
SSE	0	0	0	1	0	3	24	11	0	0	0	0	39
S	0	0	0	0	0	2	16	12	0	0	0	0	30
SSW	0	0	0	0	1	2	6	4	0	1	0	0	14
SW	0	0	0	0	0	2	10	4	0	0	0	0	16
WSW	0	0	0	0	2	0	1	1	0	0	0	0	4
W	0	0	0	0	0	0	1	0	0	0	0	0	1
WNW	0	0	0	0	0	2	6	0	0	0	0	0	8
NW	0	0	0	0	0	1	7	1	0	0	0	0	9
NNW	0	0	0	0	2	8	8	1	1	0	0	0	20
Total	0	0	0	1	8	72	216	81	2	1	0	0	381

Number of calms for B Stability: 0

Table 4
Joint Frequency Distribution of Meteorological Data

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS 01/01/2001 00:00:00 TO 12/31/2001 23:59:59 PASQUILL CLASS C

Wind Speed (M/S) at 10-m Level

Wind Direction	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.	10.1-13	13.1-18.0	>18.0	Total
N	0	0	0	0	2	16	9	4	1	0	0	0	32
NNE	0	0	0	0	4	12	16	2	0	0	0	0	34
NE	0	0	0	0	0	40	66	11	1	0	0	0	118
ENE	0	0	0	0	1	9	10	4	2	0	0	0	26
E	0	0	0	0	1	1	1	2	0	0	0	0	5
ESE	0	0	0	0	0	1	5	4	0	0	0	0	10
SE	0	0	0	0	1	3	18	10	0	0	0	0	32
SSE	0	0	0	0	0	2	19	15	1	0	0	0	37
S	0	0	0	0	1	7	14	11	1	0	0	0	34
SSW	0	0	0	1	2	4	15	6	1	2	0	0	31
SW	0	0	0	1	2	7	8	1	0	0	0	0	19
WSW	0	0	0	1	1	4	2	0	0	0	0	0	8
W	0	0	0	0	1	2	3	1	0	0	0	0	7
WNW	0	0	0	0	1	7	3	1	0	0	0	0	12
NW	0	0	0	0	0	1	9	2	0	0	0	0	12
NNW	0	0	0	0	1	10	14	3	0	0	0	0	28
Total	0	0	0	3	18	126	212	77	7	2	0	0	445

Number of calms for C Stability: 0

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS 01/01/2001 00:00:00 TO 12/31/2001 23:59:59 PASQUILL CLASS D

Wind Speed (M/S) at 10-m Level

Wind Direction	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.	10.1-13	13.1-18.0	>18.0	Total
N	0	0	2	4	14	58	78	56	6	0	0	0	218
NNE	0	0	2	8	24	57	101	33	1	0	0	0	226
NE	0	0	1	6	16	119	202	44	8	0	0	0	396
ENE	0	0	0	2	8	28	73	27	5	0	0	0	143
E	0	0	0	0	2	9	34	17	5	0	0	0	67
ESE	0	1	0	3	5	9	60	43	1	0	0	0	122
SE	0	0	0	0	3	22	78	60	7	1	0	0	171
SSE	0	0	0	2	10	43	152	55	7	0	0	0	269
S	0	0	2	6	13	36	82	65	14	2	0	0	220
SSW	0	1	6	5	14	29	42	21	5	1	0	0	124
SW	0	0	0	8	9	38	40	11	1	1	0	0	108
WSW	0	2	2	15	26	47	18	3	0	0	0	0	113
W	0	3	0	8	18	32	30	2	1	0	0	0	94
WNW	0	0	2	8	10	24	30	1	0	0	0	0	75
NW	0	0	1	6	3	27	26	9	0	0	0	0	72
NNW	0	1	1	1	13	42	59	30	5	2	0	0	154
Total	0	8	19	82	188	620	1105	477	66	7	0	0	2572

Number of calms for D Stability: 0

Table 4
Joint Frequency Distribution of Meteorological Data

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS 01/01/2001 00:00:00 TO 12/31/2001 23:59:59 PASQUILL CLASS E

Wind Speed (M/S) at 10-m Level

Wind Direction	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.	10.1-13	13.1-18.0	>18.0	Total
N	0	0	5	14	32	75	97	15	1	0	0	0	239
NNE	1	1	5	22	27	77	99	13	0	0	0	0	245
NE	0	1	2	8	24	113	118	9	1	0	0	0	276
ENE	0	1	3	5	20	78	71	12	1	0	0	0	191
E	0	1	0	2	7	38	40	6	0	0	0	0	94
ESE	0	1	2	8	13	11	82	15	0	0	0	0	132
SE	1	0	5	6	25	72	82	12	0	0	0	0	203
SSE	1	1	2	17	52	140	92	10	1	0	0	0	316
S	0	5	4	35	55	70	51	5	0	0	0	0	225
SSW	0	4	11	25	41	55	30	8	1	0	0	0	175
SW	0	3	9	30	22	35	13	5	0	0	0	0	117
WSW	0	1	14	38	43	28	6	3	0	0	0	0	133
W	0	9	9	24	20	19	3	0	0	0	0	0	84
WNW	0	1	4	27	19	13	4	0	0	0	0	0	68
NW	0	0	2	12	18	35	14	0	0	0	0	0	81
NNW	1	3	1	12	19	49	34	6	0	0	0	0	125
Total	4	32	78	285	437	908	836	119	5	0	0	0	2704

Number of calms for E Stability: 0

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS 01/01/2001 00:00:00 TO 12/31/2001 23:59:59 PASQUILL CLASS F

Wind Speed (M/S) at 10-m Level

Wind Direction	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.	10.1-13	13.1-18.0	>18.0	Total
N	1	4	3	21	25	30	12	0	0	0	0	0	96
NNE	0	4	8	13	18	26	1	0	0	0	0	0	70
NE	1	0	6	12	24	40	5	0	0	0	0	0	88
ENE	0	1	3	9	6	19	6	0	0	0	0	0	44
E	1	1	1	6	2	5	0	0	0	0	0	0	16
ESE	0	1	8	3	1	0	0	0	0	0	0	0	13
SE	0	3	6	12	12	15	3	0	0	0	0	0	51
SSE	3	5	8	30	60	29	1	0	0	0	0	0	136
S	4	10	15	72	51	9	0	0	0	0	0	0	161
SSW	6	9	29	68	34	13	0	0	0	0	0	0	159
SW	7	12	22	48	10	5	2	0	0	0	0	0	106
WSW	1	18	18	44	11	2	0	0	0	0	0	0	94
W	0	10	16	30	4	3	0	0	0	0	0	0	63
WNW	0	9	7	19	15	7	0	0	0	0	0	0	57
NW	0	2	5	8	3	7	0	0	0	0	0	0	25
NNW	1	2	8	11	18	11	0	0	0	0	0	0	51
Total	25	91	163	406	294	221	30	0	0	0	0	0	1230

Number of calms for F Stability: 1

Table 4
Joint Frequency Distribution of Meteorological Data

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS 01/01/2001 00:00:00 TO 12/31/2001 23:59:59 PASQUILL CLASS G

Wind Speed (M/S) at 10-m Level

Wind Direction	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.	10.1-13	13.1-18.0	>18.0	Total
N	8	11	15	16	4	1	0	0	0	0	0	0	55
NNE	2	5	4	7	2	1	0	0	0	0	0	0	21
NE	4	4	7	8	3	5	1	0	0	0	0	0	32
ENE	1	1	3	5	0	2	1	0	0	0	0	0	13
E	1	2	2	0	1	1	0	0	0	0	0	0	7
ESE	0	2	2	1	0	0	0	0	0	0	0	0	5
SE	3	3	4	3	0	0	0	0	0	0	0	0	13
SSE	2	2	6	13	15	8	0	0	0	0	0	0	46
S	2	11	17	34	17	2	0	0	0	0	0	0	83
SSW	1	13	16	41	19	5	0	0	0	0	0	0	95
SW	7	19	35	30	5	0	0	0	0	0	0	0	96
WSW	16	34	25	22	2	1	0	0	0	0	0	0	100
W	20	46	29	23	3	0	0	0	0	0	0	0	121
WNW	15	36	22	21	1	1	0	0	0	0	0	0	96
NW	16	14	19	16	3	3	1	0	0	0	0	0	72
NNW	2	23	21	23	7	4	1	0	0	0	0	0	81
Total	100	226	227	263	82	34	4	0	0	0	0	0	936

Number of calms for G Stability: 4

Total valid hours for all stablities = 8760
Total invalid hours for all stablities = 0

Table 5A
Doses Due to Gaseous Radioactive Effluents

Doses due to Noble Gases (mRad or mrem)

Age Group : **All**

Organ	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year Total
Total-body	1.8132e-04	0.0000e+00	9.9145e-04	5.5008e-03	6.6736e-03
Skin	2.8274e-04	0.0000e+00	3.4548e-03	1.2892e-02	1.6629e-02
Air Beta	1.2743e-04	0.0000e+00	4.8476e-03	1.8337e-02	2.3312e-02
Air Gamma	1.9349e-04	0.0000e+00	1.1660e-03	6.5219e-03	7.8814e-03

Doses due to Radioiodines/Particulates/Tritium (mrem)

Age Group : **Adult**

Organ	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year Total
Bone	3.6135e-06	3.2680e-06	7.6811e-07	6.6673e-07	8.3164e-06
Liver	1.5939e-02	1.1175e-02	9.9143e-03	1.4117e-02	5.1146e-02
Total-body	1.5939e-02	1.1176e-02	9.9157e-03	1.4118e-02	5.1149e-02
Thyroid	1.5937e-02	1.1173e-02	9.9143e-03	1.4117e-02	5.1142e-02
Kidney	1.5938e-02	1.1174e-02	9.9143e-03	1.4117e-02	5.1143e-02
Lung	1.5937e-02	1.1174e-02	9.9143e-03	1.4117e-02	5.1142e-02
Gi-lli	1.5938e-02	1.1175e-02	9.9158e-03	1.4119e-02	5.1147e-02
Skin	2.1387e-06	1.9979e-06	8.8939e-07	7.7200e-07	5.7979e-06

Age Group : **Teen**

Organ	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year Total
Bone	4.8685e-06	4.3640e-06	7.6811e-07	6.6673e-07	1.0667e-05
Liver	1.8045e-02	1.2652e-02	1.1223e-02	1.5981e-02	5.7902e-02
Total-body	1.8044e-02	1.2652e-02	1.1226e-02	1.5983e-02	5.7905e-02
Thyroid	1.8041e-02	1.2649e-02	1.1223e-02	1.5981e-02	5.7895e-02
Kidney	1.8043e-02	1.2650e-02	1.1223e-02	1.5981e-02	5.7897e-02
Lung	1.8042e-02	1.2649e-02	1.1223e-02	1.5981e-02	5.7896e-02
Gi-lli	1.8041e-02	1.2649e-02	1.1223e-02	1.5981e-02	5.7895e-02
Skin	2.1387e-06	1.9979e-06	8.8939e-07	7.7200e-07	5.7979e-06

Age Group : **Child**

Organ	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year Total
Bone	9.0347e-06	8.0024e-06	7.6811e-07	6.6673e-07	1.8472e-05
Liver	2.4975e-02	1.7511e-02	1.5533e-02	2.2118e-02	8.0137e-02
Total-body	2.4973e-02	1.7509e-02	1.5538e-02	2.2122e-02	8.0141e-02
Thyroid	2.4968e-02	1.7505e-02	1.5533e-02	2.2118e-02	8.0125e-02
Kidney	2.4971e-02	1.7507e-02	1.5533e-02	2.2118e-02	8.0129e-02
Lung	2.4969e-02	1.7506e-02	1.5533e-02	2.2118e-02	8.0126e-02
Gi-lli	2.4969e-02	1.7505e-02	1.5533e-02	2.2118e-02	8.0125e-02
Skin	2.1387e-06	1.9979e-06	8.8939e-07	7.7200e-07	5.7979e-06

Age Group : **Infant**

Organ	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year Total
Bone	8.4142e-06	7.4620e-06	7.6811e-07	6.6673e-07	1.7311e-05
Liver	1.1290e-02	7.9172e-03	7.0188e-03	9.9942e-03	3.6221e-02
Total-body	1.1288e-02	7.9163e-03	7.0260e-03	1.0000e-02	3.6231e-02
Thyroid	1.1283e-02	7.9104e-03	7.0188e-03	9.9942e-03	3.6206e-02
Kidney	1.1285e-02	7.9122e-03	7.0188e-03	9.9942e-03	3.6210e-02
Lung	1.1284e-02	7.9112e-03	7.0188e-03	9.9942e-03	3.6208e-02
Gi-lli	1.1283e-02	7.9105e-03	7.0188e-03	9.9942e-03	3.6206e-02
Skin	2.1387e-06	1.9979e-06	8.8939e-07	7.7200e-07	5.7979e-06

Table 5B
Doses Due to Liquid Radioactive Effluents

Age Group : **Adult**

Organ	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year Total
Bone	3.6300e-04	1.6367e-04	1.7787e-04	5.7723e-03	6.4769e-03
Liver	8.1032e-04	3.4352e-04	4.0683e-04	4.5815e-03	6.1421e-03
Total-body	6.1739e-04	2.5765e-04	3.1743e-04	1.5370e-03	2.7295e-03
Thyroid	6.8030e-05	1.3646e-04	1.7057e-04	2.4185e-04	6.1691e-04
Kidney	2.9223e-04	1.8471e-04	2.3040e-04	4.2413e-04	1.1315e-03
Lung	1.4851e-04	1.8362e-04	2.1982e-04	2.4063e-03	2.9582e-03
Gi-lli	2.4505e-03	4.3413e-04	2.9112e-04	2.6740e-03	5.8498e-03

ATTACHMENT 11.1

Copy of

Offsite Dose Calculation Manual (ODCM)
UNT-005-014, Revision 7, Change 0

REQUEST/APPROVAL PAGE

SAFETY RELATED

Required Review Level (check one)
☒ PORC
☐ QUALIFIED REVIEWER

PROCEDURE NUMBER: UNT-005-014 REVISION: 7 CHANGE: 0 DEVIATION: NA

TITLE: Offsite Dose Calculation Manual

EFFECTIVE DATE/MILESTONE: 3-18-02
(N/A If Same as Approval Date)

PROCEDURE OWNER: Chemistry Superintendent
(Position Title)

PREPARER (Print Name / Initial): Nicole Lawless / NLL DATE: 11/29/01

ACTION:

☐ New Procedure
☐ Deletion
☒ Revision
☐ Change EC? ☐ NA
(Applicable W2.109 Step Numbers)

☐ Deviation Expiration Date/Milestone: NA
☐ Temporary Procedure Applicable Conditions: NA

DESCRIPTION AND JUSTIFICATION OF CHANGE:

1.) W2.110 changes throughout procedure.
2.) Incorporated all previous changes.
3.) Modified all sample locations in Sample Location Table (pgs 204-215) for clarity. Changed directions to GPS coordinates and bearings. Changed distances to sample locations using the global positioning system (GPS).
4.) All of the following changes are due to the REMP standardization.(pgs 201-215)
   a) Added sample point SHWQ-6 to Shoreline Sediment due to requirement change. and changed sample frequency
   b) Changed milk sampling to from Monthly to Quarterly due to requirement change. from semi-annual to annual.
   c) Broad Leaf changed from Monthly to Quarterly due to requirement change.
5.) Added sample point FH-3 because fish can be affected by releases via 40 Arpent Canal.
6.) Broad Leaf BLK-15 sample removed due to not a valid control location sample point
7.) Changed ground water sample to NONE due to changing classification from ground water to surface water.
8.) Changed sample point GWK-1 to SWK-1 because not a ground water sample point, actually surface water sample point.
9.) Removed MKQ-1 because no longer providing milk samples.

☒ Request/Approval Page Continuation Sheet(s) attached.

EC SUPERVISOR		APPROVAL:	NA	DATE:	NA
50.59 REVIEWER	Required? ☒	REVIEW:	[signature]	DATE:	2-27-02
☐ PROGRAMMATICALLY EXCLUDED		PORC Mtg. No.:	NA	DATE:	NA
50.54 REVIEWER	Required? ☐	REVIEW:	NA	DATE:	NA
TECHNICAL REVIEWER		REVIEW:	[signature]	DATE:	3-7-02

Change Notice (CN)? ☐

CHANGE NOTICE (CN) SUPERVISOR	APPROVAL:	NA	DATE: NA
CHANGE NOTICE (CN) ON-SHIFT SM/CRS	APPROVAL:	NA	DATE: NA
		2 Week Final Approval	DATE: NA

QUALIFIED REVIEWER	Required? ☐	REVIEW:	NA	DATE:	NA
GROUP/DEPT. HEAD	REVIEW ☒ or	APPROVAL ☐	[signature]	DATE:	3-7-02
GM, PLANT OPERATIONS	REVIEW ☐ or	APPROVAL ☒	[signature]	DATE:	3-14-02
VICE PRESIDENT, OPERATIONS		APPROVAL:	N/A	DATE:	N/A

REQUEST/APPROVAL PAGE CONTINUATION SHEET Page 1 of 1

PROCEDURE NUMBER: UNT-005-014 REVISION: 7 CHANGE: 0 DEVIATION: 0

TITLE: Offsite Dose Calculation Manual

DESCRIPTION AND JUSTIFICATION OF CHANGE: (continued)

7.) Updated maps to reflect changes in ODCM (pgs 217-219).
8.) Corrected TRM specification number 4.3.3.10 to 4.3.3.11. (pg 346)
9.) Removed Note # 6 on Attachment 7.13 page 202 due to deleting ground water sample.
10.) Updated all references of PORC to OSRC.
11.) Attachment 7.11 pg. 198, changed ACCW release path to match plant drawings.
12.) Changed H-6 to H-8 TLD locations on Attachment 7.14 pg 209 and moved TLD because H-6 was not in sector H according to the GPS.
13.) Changed G-9 to G-8 TLD location on Attachment 7.14 pg 210 and moved TLD because the distance to the plant was incorrectly estimated according to the GPS and in an incorrect sector according to the GPS.
14.) Changed DWG and SWG to DWF and SWF to correct sector location according to GPS. (pg 201)
15.) Changed APG-1 to APF-1 due to corrected sector location according to GPS. (pg 201)
16.) Added Note 4 on page 201 to DWF-2 and SWF-2 as well as DWE-5 and SWE-5 for correction.
17.) Added Note 5 to tritium on page 201 for correction.
18.) Removed T.S. 6.8.3 from page 8 because it no longer exists.
19.) Changed Reference W2.501 to LI-102 because W2.501 no longer exists.
20.) Deleted Note 8 on page 202 because Broad Leaf is required quarterly and is independent of getting milk samples.
21.) Added Reference 2.3 because it is referenced within the procedure.
22.) Added T.S. 6.13 to References because it is referenced in the procedure.
23.) Moved R-1 TLD into R sector according to GPS.

TABLE OF CONTENTS

LIST OF EFFECTIVE PAGES
1-346 Revision 7

1.0 PURPOSE

1.1 The Offsite Dose Calculation Manual (ODCM) is a supporting document of the Waterford 3 Technical Specifications. The ODCM provides:

(1) The Radiological Effluent Specifications and Radiological Environmental Monitoring Program required by Technical Specification 6.8.4;
(3) The detailed Radiological Environmental Monitoring Program (REMP);
(4) The description of the Radiological Environmental Monitoring Interlaboratory Comparison Program;
(5) The liquid and gaseous radwaste block flow diagram;
(6) The Radioactive Liquid and Gaseous Waste Sampling and Analysis Programs;
(7) The general methodology to be used to calculate dose to individuals due to releases of radioactive gaseous and liquid effluents from the Waterford 3 site;
(8) The general methodology to be used to calculate effluent monitor setpoints and allowable release rates to ensure compliance with the Radiological Effluent Controls, 10CFR20, and 10CFR50 criteria;
(9) The methodology to be used to ensure representative sampling of liquids; and
(10) The methodology to be used to comply with 40CFR190 criteria.

2.0 REFERENCES

2.1 LI-102, Corrective Action Process

2.2 UNT-006-010, Event Notification and Reporting

2.3 Waterford 3 FSAR Chapter 2

2.4 Waterford 3 Technical Requirements Manual (TRM)

2.5 Waterford 3 Technical Specifications (T.S.)

2.5.1 T.S. 3/4.11.1.4, Liquid Holdup Tanks

2.5.2 T.S. 3/4.11.2.6, Gas Storage Tanks

2.5.3 T.S. 5.1.3, Map Defining Unrestricted Areas for Radioactive Gaseous and Liquid Effluents

2.5.4 T.S. 6.9.1.7, Annual Radiological Environmental Operating Report

2.5.5 T.S. 6.9.1.8, Annual Radioactive Effluent Release Report

2.5.6 T.S. 6.9.2, Special Reports

2.5.7 T.S. 6.13, Process Control Program

2.5.8 T.S. 6.14, Offsite Dose Calculation Manual

2.6 Code of Federal Regulations: Title 10, Parts 20, 40, 50 and 100; Title 40, Part 190 and 302

2.7 HASL-300, HASL Procedures Manual; Currie, L.A., "Limits for Qualitative Detection and Quantitative Determination Application to Radiochemistry", Anal Chem. 40, 586-93, (1968)

2.8 International Atomic Energy Agency (IAEA) Safety Series No.57, Generic Models and Parameters for Assessing the Environmental Transfer of Radionuclides from Routine Releases, Exposures of Critical Groups

2.9 NUREG/CR-1276, Users Manual for LADTAP II – A computer program for calculating radiation exposure to man from routine release of nuclear reactor liquid effluents

2.10 NUREG/CR-4007, Currie, L.A., "Lower Limit of Detection; Definition and Elaboration of a Proposed Position for Radiological Effluent and Environmental Measurements", (September 1984)

2.11 NUREG-0172, Age Specific Radiation Dose Commitment Factors for a One Year Chronic Intake

2.12 NUREG-1301, Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors, Generic Letter 89-01, Supplement No. 1. (November 1990)

2.13 Radiological Health Handbook, U.S. Department of Health, Education and Welfare, January 1970

2.14 USNRC Generic Letter 89-01, Implementation of Programmatic Controls for Radiological Effluent Technical Specifications in the Administrative Controls Section of the Technical Specifications and the Relocation of Procedural Details of RETS to the Offsite Dose Calculation Manual or to the Process Control Program

2.15 USNRC NUREG 0133, Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants, October 1978

2.16 USNRC Regulatory Guide 1.21, Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants, Revision 1, June, 1974

2.17 USNRC Regulatory Guide 1.109, Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR Part 50, Appendix I, Revision 1, October, 1977

2.18 USNRC Regulatory Guide 1.111, Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Gaseous-Effluents from Light-Water-Cooled Reactors, July 1977

2.19 USNRC Regulatory Guide 1.113, Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I, April 1977

3.0 DEFINITIONS

- OFFSITE DOSE CALCULATION MANUAL (ODCM) shall be comprised of the radiological effluent technical specifications and methodology contained within this procedure and applicable sections of the Technical Requirements Manual (TRM) as listed on Attachment 7.23 of this procedure.

- UNRESTRICTED AREA (T.S. 1.36) shall be any area to which access is neither limited nor controlled by the licensee. The definition of UNRESTRICTED AREA used in implementing these Technical Specifications has been expanded over that in 10 CFR 20.1003. The UNRESTRICTED AREA boundary may coincide with the Exclusion (fenced) Area boundary, as defined in 10 CFR 100.3(a), but the UNRESTRICTED AREA does not include areas over water bodies. For calculations performed pursuant to 10 CFR 50.36a, the concept of UNRESTRICTED AREAS, established at or beyond the SITE BOUNDARY, is utilized in the Controls to keep levels of radioactive materials in liquid and gaseous effluents as low as is reasonably achievable, see Attachment 7.1.

- LIQUID RADWASTE TREATMENT SYSTEM shall be any system designed and installed to reduce radioactive material in effluents by passing liquid waste through filters and/or absorption or exchange media (e.g. Ion Exchanger Resin, Charcoal etc) and/or other reduction processes (e.g. reverse osmosis, etc) for the purpose of removing radioactive materials from the liquid system prior to the release to the environment.

- A MAJOR CHANGE to a radioactive waste system shall be any alteration or modification to the system that causes waste characteristics (e.g. chemical composition, pH, etc.), waste form or waste activity (e.g. equipment decontamination factor change) in liquid, gaseous, or solid effluents to change, thereby requiring a re-evaluation of the effluent source terms.

- LOWER LIMITS OF DETECTION (LLD) is defined, for purposes of these specifications, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

  It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement.

  For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66\ s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot e^{-\lambda \Delta t}}$$

  Where:
  LLD is the "a priori" lower limit of detection as defined above, as microcuries per unit mass or volume,

  S_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate, as counts per minute,

  E is the counting efficiency, as counts per disintegration,

  V is the sample size in units of mass or volume,
  2.22×10^6 is the number of disintegrations per minute per microcurie,

  Y is the fraction radiochemical yield, when applicable,

  λ is the radioactive decay constant for the particular radionuclide, and

Δt for plant effluents is the elapsed time between the midpoint of sample collection and the time of counting. For environmental samples it is the elapsed time between sample collection, or end of the sample collection period, and time of counting. Typical values of E, V, Y, and Δt should be used in the calculation.

- An UNPLANNED/ABNORMAL RELEASE is defined as any unplanned, uncontrolled or unmonitored release of radioactive material to the UNRESTRICTED AREA for liquids or to the SITE BOUNDARY for gases. This includes any unplanned, uncontrolled or unmonitored releases where the radiological consequences may be minimal but where the potential exists for more serious radiological consequences if allowed to recur. Incidents that are to be classified as UNPLANNED/ABNORMAL RELEASES do not include releases that fall within the guidelines of a Secondary Release Pathway. Secondary Release Pathways are usually known and have been previously evaluated or considered.

4.0 RESPONSIBILITIES

- General Manager, Plant Operations has lead responsibility for ensuring implementation of the Radiological Effluent Specifications and Radiological Environmental Monitoring Program.

- The Chemistry Superintendent is responsible for
  a) ensuring Radiological Effluent Specifications, the Radiological Effluent Monitoring Program and Radiological Environmental Monitoring Program (REMP) is performed as required according to procedures and methodologies established by this document.
  b) ensuring the Annual Effluent Release Report and the Annual Radiological Environmental Operating Report are performed and issued as required.
  c) ensuring the Land Use Census is performed as required.

5.0 PROCEDURE

5.1 SITE CHARACTERISTICS

Waterford 3 SES Site Characteristics is provided in Chapter 2 of Waterford 3 FSAR (Sections 2.1.1, 2.1.2 and 2.1.3).

A map of the SITE BOUNDARIES for establishing effluent release limits along with radioactive effluent release points are given in Attachment 7.1. The release point elevations for gaseous effluents are also provided in Attachment 7.1. The nearest distances to the boundary line are shown in Attachment 7.2 of this procedure.

5.2 SPECIFICATIONS AND SURVEILLANCE REQUIREMENTS

a. Compliance with the SPECIFICATIONS contained in this procedure and the TRM is required during the conditions specified therein; except that failure to meet the SPECIFICATIONS requires that the associated ACTION requirements shall be met.

b. Noncompliance with this procedure and the TRM shall exist when the requirements of the SPECIFICATION and/or associated ACTION requirements are not met within the specified time intervals. If the SPECIFICATION is restored prior to expiration of the specified time intervals, completion of the ACTION requirements is not required.

c. Surveillance Requirements shall be applicable during all conditions specified for individual systems unless otherwise stated in an individual Surveillance Requirement.

d. Each Surveillance Requirement shall be performed within the specified time interval with a maximum allowable extension not to exceed 25% of the surveillance interval.

e. Failure to perform a Surveillance Requirement within the specified time interval shall constitute a failure to meet the OPERABILITY requirements for a Specific System for Operation. Exceptions to these requirements are stated in the individual specifications. Surveillance Requirements do not have to be performed on inoperable equipment.

f. Failure to comply with the compensatory ACTION requirements or failure to complete the surveillance requirements within the specified time shall be documented and evaluated in accordance with LI-102 the Corrective Action Process, Condition Report and UNT-006-010, Event Notification and Reporting procedures.

5.3 LIQUID EFFLUENTS

5.3.1 Liquid Effluent Dose Calculation

NOTE

The Offsite Dose Calculation Manual (ODCM) follows the general models suggested by NUREG 0133 and Regulatory Guide 1.109. However, alternate calculation methods from those presented may be used provided the overall methodology is acceptable and consistent with regulation or provided the alternate methodology is conservative. In addition, the most up-to-date dose conversion factors and bioaccumulation factors may be substituted in lieu of Regulatory Guide 1.109 values.

NOTE

Actual step-by-step dose calculations will be performed by in-plant procedures which are consistent with the methodology presented in this document.

5.3.1.1 The dose commitment to an individual from radioactive materials in liquid effluents released to unrestricted areas are calculated for the purpose of implementing Section 5.3.2 using the following expression:

$$D_{t\ell} = \Delta t_\ell \, F_\ell \sum_{i=1}^{n} A_{it} \, C_{il\ell} \qquad (1)$$

$$D_t = \sum_{\ell=1}^{m} D_{t\ell} \qquad (2)$$

5.3 LIQUID EFFLUENTS (cont'd)

$D_{t\ell}$ = the cumulative dose commitment to the total body or any organ (t) from the liquid effluents for each liquid release in mrem during time period (ℓ);

D_t = the cumulative dose commitment to the total body or any organ (t) from the liquid effluents for all (ℓ) time periods;

Δt_ℓ = the length of the ℓth time period over which the release is made, in hours;

$C_{i\ell}$ = the concentration of radionuclide (i) in undiluted liquid effluent during time period $\Delta t\ell$ from any liquid release, in µCi/ml;

A_{it} = the site-related liquid ingestion dose commitment factor to the total body or any organ (t) for each identified nuclide (i) in mrem-ml/hr- µCi (Attachment 7.3), and;

5.3 LIQUID EFFLUENTS (cont'd)

F_ℓ = the near field average dilution factor for $C_{i\ell}$ during any liquid effluent release. Defined as the ratio of the undiluted liquid waste flow during release to the average flow from the site discharge structure to site boundary receiving waters.

$$= \frac{\text{liquid radioactive waste flow}}{\text{discharge structure exit flow}}$$

The liquid radioactive waste flow is the maximum flow from the effluent release. The discharge structure exit flow is the flow during disposal from the discharge structure release point into the receiving water body. For radionuclides not determined in each batch or weekly composite, the dose contribution to the current calendar quarter cumulative summation may be approximated by using a ratio of concentrations based on the previous monthly or quarterly composite analyses.

5.3 LIQUID EFFLUENTS (cont'd)

5.3.1.2 Equation (1) above for calculating the dose contributions requires the use of a dose factor, A_{il}, for each nuclide (i) which embodies the dose factors and dilution factors for the points of pathway origin. The adult total body dose factor and the adult organ dose factor for each radionuclide will be used from Table E-11 of Regulatory Guide 1.109; thus the list contains critical organ dose factors for various organs. The dose factor is written:

$$A_{it} = K_o \left(\frac{U_w}{D_w} + U_f BF_i\right) DCF_{it} \qquad (3)$$

where:

A_{it} = Composite dose parameter for the total body or critical organ (t) of an adult for nuclide (i) for all appropriate pathways (mrem-ml/hr-μCi);

K_o = Unit conversion factor;

$$= 1.14e+5 = 10^6 \frac{pCi}{\mu Ci} \cdot 10^3 \frac{ml}{l} \div 8760 \frac{hr}{yr}$$

U_w = 730 l/yr adult water consumption (Reg. Guide 1.109, Table E-5);

5.3 LIQUID EFFLUENTS (cont'd)

D_w = Dilution factor from near field area to potable water intake;

= 220
for discharges from the circulating water discharge into the Mississippi River (based on the ratio of the average Mississippi River flow to the maximum discharge flow);

= 1
for discharges into the 40 Arpent Canal (based on the assumption that dilution from the near field area to a potable water intake is negligible);

U_f = 21 kg/yr, adult fish consumption (Reg. Guide 1.109, Table E-5);

BF_i = Bioaccumulation factor for nuclide (i) in fish (pCi/kg per pCi/l) from Attachment 7.22 and;

DCF_{it} = Ingestion Dose conversion factor for nuclide (*i*) and organ (t) for adults (mrem/pCi), from Attachment 7.21.

5.3 LIQUID EFFLUENTS (cont'd)

5.3.2 Liquid Effluent Monitor Setpoint Calculation Methodology

TRM specifications 3/4.11.1.1 and 3/4.3.3.10 require that the liquid effluent monitoring instrumentation alarm/trip setpoints be set so that the concentration of radioactive material released from the site is limited to 10 times the Effluent concentration values in 10CFR20, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2E-4 µCi/ml total activity. This section presents the method to be used for determining setpoints in accordance with TRM surveillance requirements 3/4.11.1.1 and 3/4.3.3.10.

5.3.2.1 The calculated setpoints for the liquid effluent monitors satisfy the following equation:

$$c = \frac{(SF)\,(RF)\,(F+f)\sum_{i=1}^{n} C_i}{(TEC)(f+F')} \qquad (4)$$

5.3 LIQUID EFFLUENTS (cont'd)

where;

c = the setpoint, in µCi/ml, of the liquid effluent monitor measuring the radioactivity concentration in the effluent line prior to complete dilution and subsequent release. This setpoint represents a value which, if exceeded would result in concentrations exceeding 10 times the Effluent concentration values of 10CFR20, Appendix B, Table 2. Column 2, to an UNRESTRICTED AREA;

SF = Safety Factor to ensure that the effluent limit is not exceeded. A value of 0.8 is normally used for SF;

RF = Release Fraction allocated to this release (to be used only in situations of simultaneous or concurrent release);

f = the undiluted liquid effluents flow as measured at the liquid effluent monitor location in gpm;

F = the dilution water flow as determined via pump curves or other appropriate measures that determine correct plant operating configuration in gpm;

NOTE

If F is large compared to f then F + f ~ F. If there is no additional dilution, F' = 0.

F' = additional dilution flow at the radiation monitor for liquid effluent radiation monitors that have additional dilution prior to actual withdrawal of the monitored fluid, in gpm.

= 1000 (maximum) for Steam Generator Blowdown or Auxiliary Component Cooling Water releases to the circulating water system.

= 0 for all other liquid release points.

5.3 LIQUID EFFLUENTS (cont'd)

C_i = the undiluted concentration in µCi/ml for all gamma emitting radionuclides (i). The value will be derived from radioanalysis of liquid effluent to be released. This value will be supplied for each liquid release;

$$TEC = \sum_{i=1}^{n} \frac{C_i}{10EC_i} + \sum_{j=1}^{m} \frac{C_j}{10EC_j}$$

Cj = the undiluted concentration, in µCi/ml, for all non-gamma emitting radionuclides (j). This value will be derived from radioanalysis of composite liquid effluents released. This value will be supplied for each liquid release based upon the most recent analysis results.

$\frac{C_i}{MPC_i}$ = the undiluted gamma MPC fraction for all gamma emitting radionuclides

$\frac{C_j}{MPC_j}$ = the undiluted non-gamma MPC fraction for all non-gamma emitting radionuclides

$10EC_i$ = 10 times the Effluent Concentration for the applicable gamma-emitting isotopes (i) from 10CFR20, Appendix B, Table 2, Column 2; and

$10EC_j$ = 10 times the Effluent Concentration for the applicable non-gamma emitting isotopes (j) from 10CFR20, Appendix B, Table 2, Column 2

5.3.2.2 The values of C_i and C_j will be measured for each release as appropriate and the parameters for f, F' and F will be supplied based on current plant operating configurations. The setpoint will be calculated in terms of µCi/ml and the liquid effluent monitor will be adjusted as necessary to ensure that liquid releases are secured prior to exceeding 10 times the Effluent concentration values specified in 10CFR20, Appendix B, Table 2, Column 2 to an UNRESTRICTED AREA.

5.3 LIQUID EFFLUENTS (cont'd)

5.3.3 Representative Liquid Sampling

Prior to grab sampling liquid waste tanks, methods should be used to guarantee representative sampling. Large volumes of liquid waste should be mixed in as short a time as possible and uniformly distributed prior to sampling. To determine the minimum mixing time for tanks from which releases are made, the following tests were performed prior to initial use for release purposes.

a. The tank was filled to a known volume.

b. A specific quantity of a selected chemical and/or sediments was added to the tank.

c. Recirculation was initiated through the normal path.

d. Periodic samples were taken until equilibrium was reached.

e. The time observed to completely mix the tank is used as a minimum recirculation time prior to effluent sampling. Records of the test will be maintained.

5.3.4 Dose Projection for Liquid Effluents

At least once every 31 days, the total dose from all liquid releases for the quarter-to-date will be divided by the number of days expired in the quarter and multiplied by 31.

5.4 GASEOUS EFFLUENTS

NOTE

The Offsite Dose Calculation Manual (ODCM) follows the general models suggested by NUREG 0133 and Regulatory Guide 1.109. However, alternate calculation methods from those presented may be used provided the overall methodology is acceptable and consistent with regulation or provided the alternate methodology is conservative. In addition, the most up-to-date dose conversion factors and bioaccumulation factors may be substituted in lieu of Regulatory Guide 1.109 values.

NOTE

Actual step-by-step dose calculations will be performed by in-plant procedures which are consistent with the methodology presented in this document.

5.4.1 Calculational Methodology for Gaseous Effluent Dose Rate

This section presents the calculational methods used for calculating gaseous effluent doses in fulfillment of Specification

- The dose rate due to the radioactive materials released in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY shall be limited to the following values and expressions:

5.4 GASEOUS EFFLUENTS (cont'd)

Release rate limit for Noble Gases:

$$K\overline{(\chi/Q)}_v \sum_{i=1}^{n} K_i Q_{iv} \leq 500 \frac{mrem}{yr} \text{ total body} \quad (5)$$

$$\overline{(\chi/Q)}_v \sum_{i=1}^{n} (L_i + 1.1M_i)Q_{iv} \leq 3000 \frac{mrem}{yr} \text{ skin} \quad (6)$$

Release rate limit for Iodine-131, Iodine-133, Tritium and for all radionuclides in particulate form with half-lives greater than 8 days:

$$\overline{(\chi/Q)}_v \sum_{i=1}^{n} P_{it} Q_{iv} \leq 1500 \frac{mrem}{yr} \text{ any organ} \quad (7)$$

Where:

$\overline{(X/Q)}_v$ = 1.1E-5 sec/m³ in the ESE sector at 0.6 mile for all vent releases (v) (the highest calculated annual average dispersion factor at the SITE BOUNDARY based on historical data Attachment 7.2). The actual X/Q for the time of release may be determined and used under certain circumstances;

$\sum_{i=1}^{n}$ = summation for all identified radionuclides;

5.4 GASEOUS EFFLUENTS (cont'd)

K_i = the total body dose factor due to gamma emissions for each identified radionuclide (i) in units of mrem/yr per µCi/m³ (Attachment 7.4);

L_i = the skin dose factor due to beta emissions for each identified radionuclide (i) in units of mrad/yr per µCi/m³ (Attachment 7.4);

M_i = the air dose factor due to gamma emissions for each identified radionuclide (i) in units of mrad/yr per µCi/m³ (Attachment 7.4). The constant 1.1 converts air dose to skin dose;

P_{it} = the thyroid dose parameter for Iodine-131, Iodine-133, tritium, and radionuclides in particulate form with half-lives greater than 8 days (i) for the inhalation pathway only, in mrem/yr per µCi/m³ (Attachment 7.19). The dose factor is based on the most restrictive age group (child) and most restrictive organ at the SITE BOUNDARY; and

5.4 GASEOUS EFFLUENTS (cont'd)

NOTE
All radioiodines are assumed to be released in elemental form.

Q_{iv} = the average release rate of radionuclides (i) (either noble gas or Iodine-131, Iodine-133, tritium, and radionuclides in the particulate form with half-lives greater than 8 days, as appropriate) during the time of release from all vent releases (v). Value is averaged over one hour and is in units of μCi/sec.

5.4 GASEOUS EFFLUENTS (cont'd)

5.4.2 Calculational Methodology for Noble Gas Doses

The air dose due to noble gases released in gaseous effluents to areas at or beyond the SITE BOUNDARY will be determined by the following expressions:

a. During any calendar quarter,

for gamma radiation:

$$D_\gamma = (1.14e-4)(\overline{X/Q})_v \sum_{i=1}^{n} M_i \sum_{j=1}^{m} \Delta t_j \, Q_{ijv} \qquad (8)$$

for beta radiation:

$$D_\beta = (1.14e-4)(\overline{X/Q})_v \sum_{i=1}^{n} N_i \sum_{j=1}^{m} \Delta t_j \, Q_{ijv} \qquad (9)$$

b. During any calendar year,

for gamma radiation:

$$D_\gamma = (1.14e-4)(\overline{X/Q})_v \sum_{i=1}^{n} M_i \sum_{j=1}^{m} \Delta t_j \, Q_{ijv} \qquad (10)$$

for beta radiation:

$$D_\beta = (1.14e-4)(\overline{X/Q})_v \sum_{i=1}^{n} N_i \sum_{j=1}^{m} \Delta t_j \, Q_{ijv} \qquad (11)$$

5.4 GASEOUS EFFLUENTS (cont'd)

Where:

D_γ = the total gamma (γ) air dose from gaseous effluents for the total time period and not to exceed 5 mrad quarterly and 10 mrad yearly;

D_β = the total beta (β) air dose from gaseous effluents for the total time period and not to exceed 10 mrad quarterly and 20 mrad yearly;

1.14E-04 = a constant of (1 yr/8760 hr);

$\overline{(\chi/Q)}_v$ = 1.1E-5 sec/m^3 in the ESE sector at 0.6 mile for all vent releases (v). The actual X/Q for the time of release may be determined and used under certain circumstances;

5.4 GASEOUS EFFLUENTS (cont'd)

M_i and N_i = the gamma and beta air dose factors (respectively) for a uniform semi-infinite cloud of radionuclide (i) in mrad/yr per µCi/m³ (Attachment 7.4);

Δt_j = the length of the jth time period over which Q_{ijv} are accumulated for all gaseous releases in hours; and

Q_{ijv} = the average release rate of radionuclides (i) in gaseous effluent from all vent releases (v) in µCi/sec during the time period Δt_j.

5.4 GASEOUS EFFLUENTS (cont'd)

5.4.3 Calculational Methodology for Doses Due to Radioiodines, Tritium, and Radioactive Materials in Particulate Form

The dose to an individual from iodine-131, iodine-133, tritium, and radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released to areas at and beyond the SITE BOUNDARY will be determined by the following expressions:

During any calendar quarter:

$$D_{ita} = (1.14e-4)\Delta t \sum_{i=1}^{n} R_{ita} W_v Q_{iv} \qquad (12)$$

During any calendar year:

$$D_{ita} = (1.14e-4)\Delta t \sum_{i=1}^{n} R_{ita} W_v Q_{iv} \qquad (13)$$

5.4 GASEOUS EFFLUENTS (cont'd)

Where:

D_{ita} = the cumulative dose to an organ (t), age group (a), due to radionuclides (i) in gaseous effluents; not to exceed 7.5 mrem quarterly or 15 mrem yearly;

1.14E-4 = a constant of unit conversion

= 1 yr/8760 hr;

Δt = the time required for the release in hours for all releases per quarter or per year.

W_v = the dispersion parameter for estimating the dose to an individual at the controlling location for long term vent releases (v);

= $\overline{(\chi/Q)}_v$ for the inhalation pathway from vent releases (v) in sec/m³, from historical data, at the location of the critical receptor (Attachment 7.2);

= $\overline{(D/Q)}_v$ for the food and ground plane pathways from vent releases (v) in 1/m², from historical data at the location of the critical receptor (Attachment 7.2), with the exception of tritium, which shall use $W_v = \overline{(\chi/Q)}_v$;

5.4 GASEOUS EFFLUENTS (cont'd)

R_{ita} = the dose factor from each identified radionuclide (i), for each applicable organ (t), and age group (a), in mrem/yr per μCi/m³ for the inhalation pathway (Attachment 7.5) and in mrem/yr per uCi/m²-sec for the food and ground plane pathways (Attachments 7.6, 7.7, 7.8, 7.9, and 7.10). For sectors with real pathways within 5 miles of the plant, the values of R_i are used based on these real pathways. (R_i's were calculated using the methodology found in NUREG 0133 (pages 31-36.); and

Q_{iv} = the average release rate of radionuclides (i) in gaseous effluent from all vent releases (v) in μCi/sec.

5.4 GASEOUS EFFLUENTS (cont'd)

5.4.4 Gaseous Effluent Monitor Setpoint Calculational Methodology

5.4.4.1 The calculated high alarm/flow termination setpoint is the maximum value for that particular release. An administrative Safety Factor (SF) will be utilized in the setpoint calculation. To allow for simultaneous releases from common or different release points a Release Fraction (RF) may be used to allocate percentages of the total allowable release.

5.4.4.2 Since the noble gas dose rates are more limiting than the radioiodine dose rate, gaseous setpoints will be based on noble gas dose rates (less than or equal to 500 mrem/yr total body, and less than or equal to 3000 mrem/yr skin). Specifically, gaseous setpoints will be based on the most limiting of the following equations:

5.4 GASEOUS EFFLUENTS (cont'd)

a. Total body (Q_{tb}):

$$Q_{tb} = \frac{(500\,\frac{mrem}{yr})(RF)(SF)}{\overline{(\chi/Q)}_v \dfrac{\left[\sum_{i=1}^{n} K_i Q_{iv}\right]}{\left[\sum_{i=1}^{n} Q_{iv}\right]}} \qquad (14)$$

Where:

Q_{tb} = maximum release rate allowed to give a limiting total body dose rate of 500 mrem/yr in µCi/sec;

$\sum_{i=1}^{n}$ = summation of all nuclides considered;

K_i = the total body dose factor due to gamma emissions for each identified radionuclide (i) in units of mrem/yr per µCi/m³ (Attachment 7.4);

5.4 GASEOUS EFFLUENTS (cont'd)

Q_{iv} = average release rate of isotope (i) from the release point (v) in µCi/sec;

$\overline{(\chi/Q)}_v$ = 1.1E-5 sec/m³ (in the ESE sector at 0.6 mile). The sector with highest value of annual average atmospheric dispersion factor at the site boundary for the release point (v) in question;

RF = release fraction allotted to release point in consideration; and

SF = administrative safety factor to account for uncontrollable variables (sampling, monitoring errors, etc.). A value of 0.8 is normally used for SF.

5.4 GASEOUS EFFLUENTS (cont'd)

b. For Skin (Q skin):

$$Q_{skin} = \frac{(3000\ \frac{mrem}{yr})(RF)(SF)}{\overline{(\chi/Q)_v}\ \frac{\left[\sum_{i=1}^{n}(L_i + 1.1M_i)Q_{iv}\right]}{\left[\sum_{i=1}^{n}Q_{iv}\right]}} \quad (15)$$

Where:

all terms are as defined in Step (a) for Q_{tb}, except:

Q_{skin} = maximum release rate allowed to give a limiting skin dose of 3000 mrem/yr in µCi/sec;

L_i = skin dose factor due to beta emissions for each identified radionuclide (i) in units of mrem/yr per µCi/m³ (Attachment 7.4);

1.1 = conversion factor to convert from air to skin dose; and

M_i = air dose factor due to gamma emissions for identified noble gas isotope (i) in units of mrad/yr per µCi/m³ (Attachment 7.4).

5.4 GASEOUS EFFLUENTS (cont'd)

5.4.4.3 The monitor setpoint is calculated in the following manner:

$$SN = \frac{Q}{(F_{max})(472)} \qquad (16)$$

Where:

SN = maximum monitor setpoint in $\mu Ci/cm^3$;

Q = Minimum value of Q_{tb} or Q_{skin} ($\mu Ci/sec$).

F_{max} = maximum effluent flow rate (cfm); and

472 = Unit conversion, CFM to cm^3/sec

5.4 GASEOUS EFFLUENTS (cont'd)

5.4.5 Dose Projection due to Gaseous Effluents

5.4.5.1 At least once every 31 days the gamma air dose, beta air dose and the maximum organ dose for the month-to-quarter will be divided by the number of days into the quarter and multiplied by 31.

5.5 40 CFR190 DOSE EVALUATION

For the evaluation of doses to real individuals from liquid releases, the same calculational methods as employed in Section 5.3.4 will be used. However, more encompassing and realistic assumptions will be made concerning the dilution and ingestion of radionuclides by individuals who live and fish in the Waterford 3 area.

The results of the Radiological Environmental Monitoring Program will be used in determining the realistic dose based on actual measured radionuclide concentrations. For the evaluation of doses to real individuals from gaseous releases, the same calculational methods as employed in sections 5.4.6 and 5.4.7 will be used. The total body dose factor should be substituted for the gamma air dose factor (M_i) to determine the total body dose. Otherwise, the same calculational sequence applies. More realistic assumptions will be made concerning the actual location of real individuals, the meteorological conditions, and the consumption of food. Data obtained from the latest land use census should be used to determine locations for evaluating doses. The results of the Radiological Environmental Monitoring Program will be included in determining more realistic doses based on actual measured radionuclide concentrations.

Cumulative dose contributions from direct radiation, from the reactor unit, and from Radwaste Storage Tanks shall be determined utilizing the results of routine plant perimeter surveys, TLD data, or a combination of both when necessary.

5.6 LIQUID AND GASEOUS RADWASTE PROCESSES

The block flow diagrams of the radwaste systems are shown in Attachments 7.11 and 7.12. In order to obtain a more detailed description, see the appropriate sections of the FSAR.

5.7 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM REQUIREMENTS

5.7.1 Description of the Radiological Environmental Monitoring Program

The Radiological Environmental Monitoring Program (REMP) is expounded on in Attachment 7.13, and the Sample Location Table, Attachment 7.14. Attachment 7.15 explains the sector and zone designations for the sample locations. Attachments 7.16, 7.17 and 7.18 show the sample locations within the 2,10, and 50 mile radius of Waterford 3.

Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of automatic sampling equipment and other legitimate reasons. If specimens are unobtainable due to sampling equipment malfunction, every effort shall be made to complete corrective action prior to the end of the next sampling period. All deviations from the sampling schedule shall be documented in the Annual Radiological Environmental Operating Report. It is recognized that, at times, it may not be possible or practical to continue to obtain samples of the media of choice at the most desired location or time. In these instances, suitable alternative media and locations may be chosen for the particular pathway in question and appropriate substitutions made within 30 days in the Radiological Environmental Monitoring Programs.

5.7 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM REQUIREMENTS (Cont'd)

5.7.2 Description of the Interlaboratory Comparison Program

Quality assurance in radiological environmental sampling will be maintained through participation in a selected Radiological Laboratory Quality Assurance Program. The summary of results will be presented in tabular form and will include the type of analysis, the preparation (collection) date, the date the results are returned, the mean of the analyses (usually triplicate), the standard deviation, the date the values are released for information, the known value, the three standard deviation limit, and a two standard deviation/three standard deviation warning/action flag. If the sample analysis indicates results outside the three standard deviation range, then the corrective actions taken to prevent a recurrence will be documented and submitted along with all results when the Annual Radiological Environmental Operating Report is submitted.

5.7 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM REQUIREMENTS (Cont'd)

5.7.3 Dispersion Parameters For Critical Locations

The dispersion parameters for the site boundary and where necessary, as identified by the Land Use Census, are listed in Attachment 7.2. This table will be subject to changes based on the Land Use Census and historical data.

5.8 ROUTINE EFFLUENT RELEASE REPORTS

5.8.1 Annual Radioactive Effluent Release Report

A routine Radioactive Effluent Release Report covering the operation of the unit during the previous Twelve months shall be submitted as specified in Waterford 3 SES, Technical Specification 6.9.1.8 prior to May 1 of each year. The radioactive effluent release report shall include:

5.8.1.1 A summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the units as outlined in Regulatory Guide 1.21, with data summarized on a quarterly basis following the format of Appendix B thereof.

5.8.1.2 An annual summary of hourly meteorological data collected over the previous year. This annual summary may be either in the form of an hour-by-hour listing of wind speed, wind direction, and atmospheric stability, and precipitation (if measured) on magnetic tape, or in the form of joint frequency distributions of wind speed, wind direction, and atmospheric stability.

5.8 ROUTINE EFFLUENT RELEASE REPORTS (cont'd)

In lieu of submission with the Radioactive Effluent Release Report, the summary of required meteorological data may be filed on site and shall be provided to the NRC upon request. This same report shall include an assessment of the radiation doses due to the radioactive liquid and gaseous effluents released from the unit or station during the previous calendar year. This same report shall also include an assessment of the radiation doses from radioactive liquid and gaseous effluents to MEMBERS OF THE PUBLIC due to their activities inside the SITE BOUNDARY (Attachment 7.1) during the reporting period. All assumptions used in making these assessments (i.e., specific activity, exposure time and location) shall be included in these reports. The meteorological conditions concurrent with the time of release of radioactive materials in gaseous effluents, as determined by sampling frequency and measurement, shall be used for determining the gaseous pathway doses. The assessment of radiation doses shall be performed in accordance with the methodology and parameters in this manual.

5.8 ROUTINE EFFLUENT RELEASE REPORTS (cont'd)

5.8.1.3 An assessment of radiation doses to the likely most exposed MEMBER OF THE PUBLIC from reactor releases and other nearby uranium fuel cycle sources, including doses from primary effluent pathways and direct radiation, for the previous calendar year to show conformance with 40CFR190, "Environmental Radiation Standards for Nuclear Power Operation". Acceptable methods for calculating the dose contribution from liquid and gaseous effluents are given in Regulatory Guide 1.109, Rev. 1, October 1977, and NUREG-0133.

5.8.1.4 The following information for each class of solid waste (as defined by 10CFR 61) shipped off site during the report period:

A. Container volume

B. Total curie quantity (specify whether determined by measurement or estimate),

C. Principal radionuclides (specify whether determined by measurement or estimate),

D. Source of waste and processing employed (e.g., dewatered spent resin, compacted dry waste, evaporator bottoms),

E. Type of container (e.g., LSA, Type A, Type B Large Quantity), and

F. Solidification agent or absorbent (e.g., cement, urea formaldehyde).

5.8 ROUTINE EFFLUENT RELEASE REPORTS (cont'd)

5.8.1.5 A list and description of unplanned releases from the site to UNRESTRICTED AREAS of radioactive materials in gaseous and liquid effluents made during the reporting period.

5.8.1.6 Any changes to the Process Control Program (PCP) or the Offsite Dose Calculation Manual (ODCM), pursuant to Technical Specification 6.13 and 6.14, as well as a listing of new locations for dose calculations and/or environmental monitoring identified by the land use census. It shall also include information of any MAJOR CHANGES to Radioactive Waste Systems if the information is not submitted as part of the annual FSAR update. Any changes made to the sections of the Waterford III TRM listed on Attachment 7.23 shall be included as part of submittal of the changes made to the ODCM.

5.8 ROUTINE EFFLUENT RELEASE REPORTS (cont'd)

A. The submittal providing information on ODCM changes shall contain:

1. Sufficiently detailed information to totally support the rationale for the change without benefit of additional or supplemental information. Information submitted should consist of a complete legible copy of the ODCM including the sections of the TRM listed on Attachment 7.23 together with appropriate analyses or evaluations justifying the change(s), if applicable.

2. A determination that the change did not reduce the accuracy or reliability of dose calculations or setpoint determinations.

3. Documentation of the fact that the change has been reviewed and found acceptable by the Onsite Safety Review Committee (OSRC).

5.8 ROUTINE EFFLUENT RELEASE REPORTS (cont'd)

B. The submittal providing information on PCP changes shall contain:

1. Information submitted should consist of a complete legible copy of the PCP, together with appropriate analyses or evaluations, justifying the changes(s), if applicable.

2. Documentation of the fact that the change has been reviewed and found acceptable by the OSRC.

NOTE

Radioactive Waste System change information may be submitted as part of the annual FSAR update in lieu of the Annual Radioactive Effluent Release Report.

C. The submittal providing information on licensee initiated MAJOR CHANGES to the radioactive waste systems (liquid, gaseous, and solid) shall contain:

1. A summary of the evaluation that led to the determination that the change could be made in accordance with 10CFR50.59

2. Sufficient detailed information to totally support the reason for the change without benefit of additional or supplemental information.

3. A detailed description of the equipment, components and processes involved and the interfaces with other plant systems.

4. An evaluation of the change which shows the predicted releases of radioactive materials in liquid and gaseous effluents and/or quantity of solid waste that differ from those previously predicted in the license application and amendments thereto.

5. An evaluation of the change which shows the expected maximum exposures a member of the Public in the unrestricted area and to the general population that differ from those previously estimated in the license application and amendments thereto.

5.8 ROUTINE EFFLUENT RELEASE REPORTS (cont'd)

6. A comparison of the predicted releases of radioactive materials, in liquid and gaseous effluents and in solid waste, to the actual releases for the period before the changes are to be made.

7. An estimate of the exposure to plant operating personnel as a result of the change.

8. Documentation of the fact that the change was reviewed and found acceptable by the OSRC.

9. Changes to Radioactive Waste Systems performed using the plant design change process will be reported as per design change procedures.

5.8.1.7 If applicable, a description of events which led to exceeding the following limiting condition for operation:

A. The dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to TRM specification 3/4.11.2.1.

B. The quantity of radioactive material contained in each unprotected tank shall be limited to Technical Specification 3/4.11.1.4.

5.8 ROUTINE EFFLUENT RELEASE REPORTS (cont'd)

5.8.1.8 If applicable, identify the cause of the unavailability of milk or fresh leafy vegetable samples at locations required by TRM specification Table 3.12-1. The new location(s) for obtaining replacement samples shall be identified. Revised figure(s) and table for the ODCM reflecting the new locations shall be included in the report.

5.8.1.9 Identify the new location(s), if a land use census identifies an environmental sampling location that yields a calculated dose or dose commitment greater than the values currently being calculated pursuant to TRM Specification 3/4.11.2.3.

5.8.1.10 Identify the new location(s), and include a revised figure(s) and table for the ODCM reflecting the new location(s) if a land use census identifies an environmental sampling location(s) that yields a calculated dose or dose commitment (via the same exposure pathway) 20% greater than at a location from which samples are currently being obtained pursuant to TRM Specification 3/4.12.1.

5.8 ROUTINE EFFLUENT RELEASE REPORTS (cont'd)

5.8.1.11 With less than the minimum number of radioactive liquid or gaseous effluent monitoring instrumentation channels operable for 30 days or longer, as required by TRM Specification Table 3.3-12 or 3.3-13, explain in the next Annual Radioactive Effluent Release Report, pursuant to Technical Specification 6.9.1.8, why this inoperability was not corrected within the time specified.

NOTE

The Shift Manager shall be immediately notified and a Condition Report promptly initiated whenever an effluent sample is late or missing in accordance with applicable Specifications.

5.8.1.12 Identify any missing or late analysis results for radioactive effluent samples collected during the reporting period.

5.9 SPECIAL EFFLUENT REPORTS

5.9.1 The Shift Manager shall be immediately notified and a Condition Report promptly initiated whenever any of the following specifications have been exceeded. A Special Report shall be prepared for submittal to the NRC within 30 day period, as per the ACTION requirement of the specification that has been exceeded.

- TRM Radioactive Liquid Effluent Dose Specification 3/4.11.1.2
- TRM Radioactive Liquid Waste Treatment System Specification 3/4.11.1.3
- TRM Radioactive Gaseous Effluent Dose, Noble Gas Specification 3/4.11.2.2
- TRM Radioactive Gaseous Effluent Dose, Iodine 131, I-133, Tritium, and Radionuclides in Particulate Form Specification 3/4.11.2.3
- TRM Radioactive Gaseous Waste Treatment System Specification 3/4.11.2.4
- TRM Radioactive Effluent Total Dose Specification 3/4.11.4

5.9 SPECIAL EFFLUENT REPORTS (cont'd)

5.9.2 Environmental Protection Agency Reportable Quantities

If any of TRM specifications 3/4.11.1.1, 3/4.11.1.2, 3/4.11.2.1, 3/4.11.2.2, 3/4.11.2.3 have been exceeded, an evaluation of the Radioactivity released verses EPA Reportable Quantities (RQ's) shall be performed as soon as practical.

The Shift Manager shall be immediately notified and a Condition Report promptly initiated whenever any radionuclide released over a 24 hour period is greater than or equal to the EPA RQ. Notification requirements shall be performed as per UNT-006-010, Event Evaluation and Reporting. Recipients of notification are: The National Response Center, the State Emergency Response Commission, and the Local Emergency Planning Committee. Methods for determination of reportability and the Reportable Quantities values for radionuclides are contained within 40CFR302.

5.9 SPECIAL EFFLUENT REPORTS (cont'd)

5.9.3 Unplanned/Abnormal Effluent Releases

5.9.3.1 A Condition Report should be initiated, in accordance with LI-102, for an UNPLANNED/ABNORMAL RELEASE to ensure that reporting requirements are determined. The Condition Report shall also serve to document causes and corrective actions. Major liquid spills or gaseous releases can occur through improper valve line-up, pipe breakage, or leakage. Each incident should be treated on a case-by-case basis.

The Condition Report shall include:

- a description of the event and equipment involved,
- cause(s) for the release,
- consequences of the release (if known or available)
- actions taken to prevent recurrence.

It is recognized that all elements that are to be included in the Condition Report (listed above) may not be known when the Condition Report is initiated. These items should be included while using the normal Condition Reporting process.

All Condition Reports for UNPLANNED/ABNORMAL RELEASES shall be reviewed by:

- OSRC
- SRC
- The Vice President - Operations

The OSRC shall review evaluations, recommendations, and the disposition of corrective action(s) to prevent recurrence as documented in the Condition Report. These reports will be forwarded to the Safety Review Committee and the Vice President - Operations for additional review.

5.9 SPECIAL EFFLUENT REPORTS (cont'd)

5.9.3.2 Prepare an effluent assessment report for each occurrence of an UNPLANNED/ABNORMAL RELEASE of radioactive materials. The purpose of this report is to document offsite impacts due to radioactive effluent releases. This report should include a description of the event, remedial actions, results of sampling and analysis (if applicable). The assessment should include evaluations of the following:

- concentrations of radioactive materials in unrestricted areas
- doses to the most likely exposed member of the public
- any environmental impacts due to radioactivity in the environment.

All assumptions and calculations used should be described and provided when necessary to support the conclusions. Doses should be calculated in accordance with the methods and parameters contained within the ODCM. Each occurrence of an UNPLANNED/ABNORMAL RELEASE should also be included in the Annual Effluent Release Report covering the period for which the event occurred as per step 5.8.1.5.

Each effluent assessment report shall be reviewed by:

- OSRC
- SRC
- The Vice President - Operations

5.10 SECONDARY RELEASE PATHS

5.10.1 This section addresses potential release pathways which should not contribute more than 10% of the annual doses evaluated in this manual. The ODCM methodology for calculation of doses will be applied to an applicable release path if a likely potential arises for contributing more than 10% of the annual doses evaluated in this manual.

5.10.2 Secondary Release Paths are expected to release trivial quantities of radionuclides. Some examples of Secondary Release Paths are listed below:

- Unmonitored Secondary System Steam Vents/Reliefs
- Decon Shop/Hot Machine Shop Exhaust
- Turbine Building Ventilation Exhaust
- Unmonitored Tank Atmospheric Vents
- Radioactive Waste Compactor Building
- Radioactive Waste Solidification Building
- Cooling Tower Atmospheric Entrainment

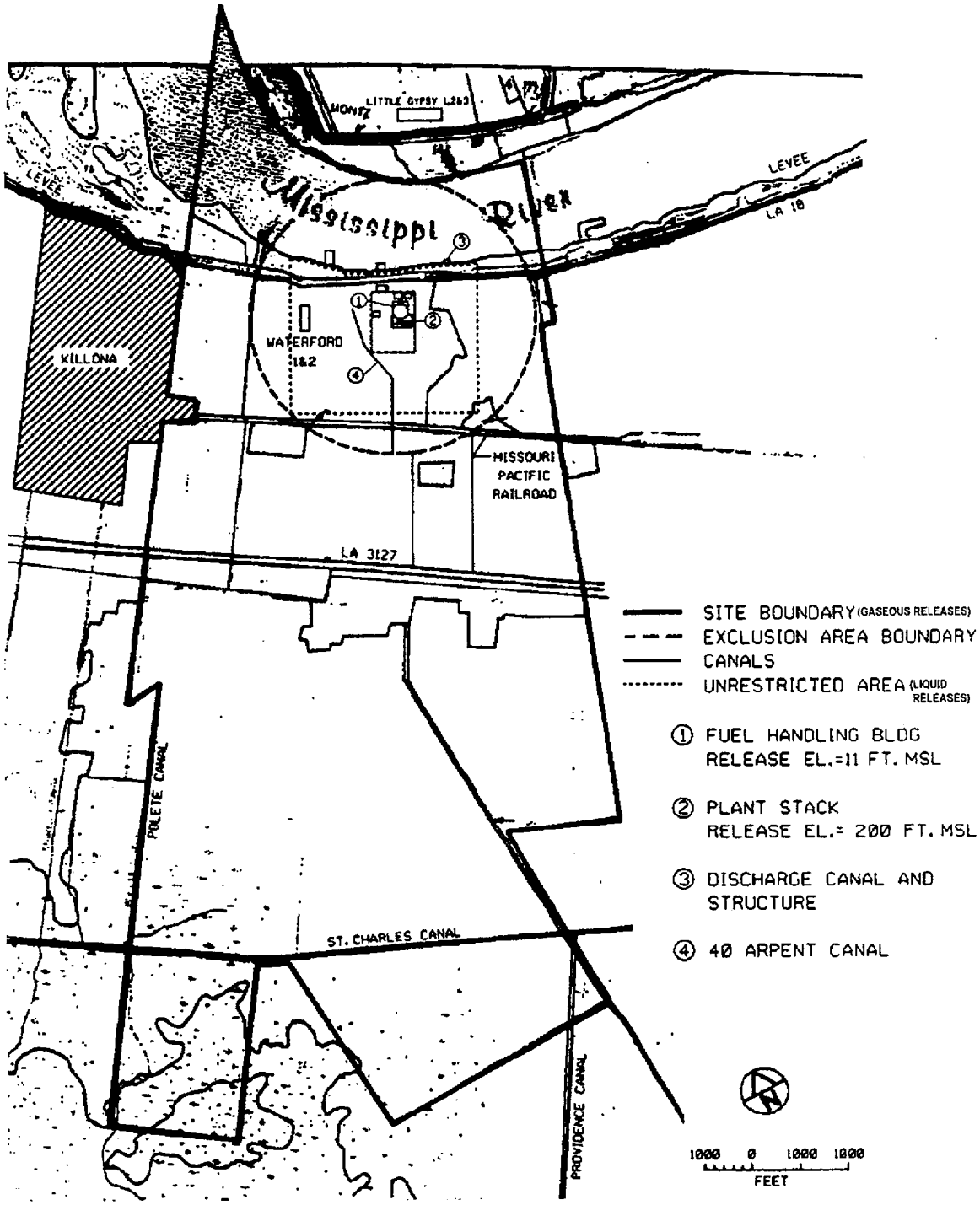
6.0 RECORDS

None

7.0 ATTACHMENTS

Refer to Table of Contents

BOUNDARIES FOR
RADIOACTIVE GASEOUS AND LIQUID EFFLUENTS



HISTORICAL AVERAGE DISPERSION AND DEPOSITION PARAMETERS FOR AREAS AT OR BEYOND THE UNRESTRICTED AREA BOUNDARY

ANNUAL AVERAGE ATMOSPHERIC DISPERSION AND DEPOSITION PARAMETERS
BASED ON HISTORICAL METEOROLOGICAL DATA AND CURRENT LAND USE CENSUS

Receptor Type or Location	Direction from Site	Sector Location	Distance from Site (miles)	Distance from Site (meters)	X/Q No Decay Undepleted (sec/m3)	D/Q (1/m2)
Site Boundary	N[a]	A	0.8	1287	1.0e-05	2.4e-08
	NNE[a]	B	0.6	966	1.6e-05	3.4e-08
	NE[a]	C	0.6	966	1.5e-05	2.8e-08
	ENE[a]	D	0.6	966	1.6e-05	2.5e-08
	E	E	0.8	1287	6.9e-06	1.3e-08
	ESE	F	0.6	966	1.1e-05	2.3e-08
	SE	G	0.6	966	1.1e-05	3.1e-08
	SSE	H	0.8	1287	6.3e-06	2.4e-08
	S	J	1.6	2575	8.9e-07	2.7e-09
	SSW	K	3.1	4989	3.0e-07	7.9e-10
	SW	L	3.4	5472	3.3e-07	9.1e-10
	WSW	M	1.5	2414	1.7e-06	4.9e-09
	W	N	1.0	1609	2.3e-06	7.3e-09
	WNW	P	0.8	1287	7.5e-06	2.7e-08
	NW	Q	0.8	1287	1.0e-05	3.2e-08
	NNW	R	0.9	1448	9.4e-06	2.4e-08
Residence	N	A	0.9	1448	7.8e-06	1.8e-08
	NNE	B	1.3	2092	3.0e-06	5.8e-09
	NE	C	0.9	1448	6.3e-06	1.2e-08
	ENE	D	0.9	1448	6.8e-06	1.1e-08
	E	E	2.2	3541	7.4e-07	1.0e-09
	ESE	F	3.1	4989	3.7e-07	4.8e-10
	SE	G	4.0	6437	2.3e-07	3.6e-10
	W	N	1.0	1609	2.3e-06	7.3e-09
	WNW	P	0.9	1448	5.6e-06	2.0e-08
	NW	Q	0.9	1448	7.7e-06	2.3e-08
	NNW	R	3.0	4828	7.7e-07	1.3e-09
Milk Cow	NW[b]	Q	0.9	1448	7.7e-06	2.3e-08
	NW	Q	4.9	7886	2.6e-07	4.1e-10
Vegetable Garden	N	A	1.0	1609	6.1e-06	1.4e-08
	NNE	B	1.3	2092	3.0e-06	5.8e-09
	NE	C	0.9	1448	6.3e-06	1.2e-08
	ENE	D	0.9	1448	6.8e-06	1.1e-08
	E	E	2.2	3541	7.4e-07	1.0e-09
	ESE	F	2.2	3541	7.0e-07	1.1e-09
	SE	G	2.3	3701	6.2e-07	1.3e-09
	WSW	M	1.5	2414	1.7e-06	4.9e-09
	W	N	1.1	1770	1.9e-06	5.7e-09
	WNW	P	0.9	1448	5.6e-06	2.0e-08
	NW	Q	0.9	1448	7.7e-06	2.3e-08
	NNW	R	3.0	4828	7.7e-06	1.3e-09
Beef Cow	E	E	3.2	5150	3.7e-07	4.2e-10
	ESE	F	3.5	5633	3.0e-07	3.6e-10
	SE	G	4.5	7242	1.9e-07	2.8e-10
	WSW	M	1.2	1931	2.7e-06	8.6e-09
	WNW	P	0.9	1448	5.6e-06	2.0e-08
	NW	Q	0.9	1448	7.7e-06	2.3e-08
	NNW	R	2.3	3701	1.3e-06	2.4e-09

Notes: [a] The site boundary in this sector is located over water. The location cannot be occupied continuously for the life of the plant.

[b] The animals at this location do not produce milk for human consumption.

SITE RELATED LIQUID INGESTION DOSE COMMITMENT FACTORS (A_i) FOR INDIVIDUAL NUCLIDES

Ai factors for Adult age group by nuclide.
Waterford Steam Electric Station Unit III
Discharge point : Circulating Water Discharge to Mississippi River
Dilution Factor DW = 220.0

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	1.52e-01	1.52e-01	1.52e-01	1.52e-01	1.52e-01	1.52e-01
Be-10	1.64e+01	2.54e+00	4.10e-01	0.00e+00	1.92e+00	0.00e+00	1.38e+02
C-14	3.13e+04	6.26e+03	6.26e+03	6.26e+03	6.26e+03	6.26e+03	6.26e+03
N-13	3.00e+03	3.00e+03	3.00e+03	3.00e+03	3.00e+03	3.00e+03	3.00e+03
F-18	1.52e+01	0.00e+00	1.68e+00	0.00e+00	0.00e+00	0.00e+00	4.50e-01
Na-22	4.17e+03	4.17e+03	4.17e+03	4.17e+03	4.17e+03	4.17e+03	4.17e+03
Na-24	4.08e+02	4.08e+02	4.08e+02	4.08e+02	4.08e+02	4.08e+02	4.08e+02
P-32	4.62e+07	2.87e+06	1.79e+06	0.00e+00	0.00e+00	0.00e+00	5.19e+06
Ca-41	1.78e+04	0.00e+00	1.92e+03	0.00e+00	0.00e+00	0.00e+00	1.77e+01
Sc-46	2.85e-02	5.53e-02	1.61e-02	0.00e+00	5.16e-02	0.00e+00	2.69e+02
Cr-51	0.00e+00	0.00e+00	1.27e+00	7.62e-01	2.81e-01	1.69e+00	3.21e+02
Mn-54	0.00e+00	4.38e+03	8.35e+02	0.00e+00	1.30e+03	0.00e+00	1.34e+04
Mn-56	0.00e+00	1.10e+02	1.95e+01	0.00e+00	1.40e+02	0.00e+00	3.52e+03
Fe-55	6.59e+02	4.56e+02	1.06e+02	0.00e+00	0.00e+00	2.54e+02	2.61e+02
Fe-59	1.04e+03	2.45e+03	9.38e+02	0.00e+00	0.00e+00	6.83e+02	8.15e+03
Co-57	0.00e+00	2.10e+01	3.49e+01	0.00e+00	0.00e+00	0.00e+00	5.33e+02
Co-58	0.00e+00	8.95e+01	2.01e+02	0.00e+00	0.00e+00	0.00e+00	1.81e+03
Co-60	0.00e+00	2.57e+02	5.67e+02	0.00e+00	0.00e+00	0.00e+00	4.83e+03
Ni-59	2.34e+03	8.03e+02	3.91e+02	0.00e+00	0.00e+00	0.00e+00	1.65e+02
Ni-63	3.12e+04	2.16e+03	1.05e+03	0.00e+00	0.00e+00	0.00e+00	4.51e+02
Ni-65	1.27e+02	1.64e+01	7.51e+00	0.00e+00	0.00e+00	0.00e+00	4.17e+02
Cu-64	0.00e+00	1.00e+01	4.70e+00	0.00e+00	2.52e+01	0.00e+00	8.53e+02
Zn-65	2.32e+04	7.37e+04	3.33e+04	0.00e+00	4.93e+04	0.00e+00	4.64e+04
Zn-69	4.93e+01	9.43e+01	6.56e+00	0.00e+00	6.13e+01	0.00e+00	1.42e+01
Zn-69m	8.14e+02	1.95e+03	1.79e+02	0.00e+00	1.18e+03	0.00e+00	1.19e+05
Se-79	0.00e+00	1.07e+03	1.79e+02	0.00e+00	1.85e+03	0.00e+00	2.19e+02
Br-82	0.00e+00	0.00e+00	2.27e+03	0.00e+00	0.00e+00	0.00e+00	2.61e+03
Br-83	0.00e+00	0.00e+00	4.04e+01	0.00e+00	0.00e+00	0.00e+00	5.82e+01
Br-84	0.00e+00	0.00e+00	5.24e+01	0.00e+00	0.00e+00	0.00e+00	4.11e-04
Br-85	0.00e+00	0.00e+00	2.15e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of mrem/hr per uCi/ml.

SITE RELATED LIQUID INGESTION DOSE COMMITMENT FACTORS (A_i) FOR INDIVIDUAL NUCLIDES

Ai factors for Adult age group by nuclide.
Waterford Steam Electric Station Unit III
Discharge point : Circulating Water Discharge to Mississippi River
Dilution Factor DW = 220.0

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	1.01e+05	4.71e+04	0.00e+00	0.00e+00	0.00e+00	1.99e+04
Rb-87	0.00e+00	5.89e+04	2.05e+04	0.00e+00	0.00e+00	0.00e+00	2.76e+03
Rb-88	0.00e+00	2.90e+02	1.54e+02	0.00e+00	0.00e+00	0.00e+00	4.00e-09
Rb-89	0.00e+00	1.92e+02	1.35e+02	0.00e+00	0.00e+00	0.00e+00	1.12e-11
Sr-89	2.22e+04	0.00e+00	6.38e+02	0.00e+00	0.00e+00	0.00e+00	3.57e+03
Sr-90	6.29e+05	0.00e+00	1.26e+04	0.00e+00	0.00e+00	0.00e+00	1.58e+04
Sr-91	4.09e+02	0.00e+00	1.65e+01	0.00e+00	0.00e+00	0.00e+00	1.95e+03
Sr-92	1.55e+02	0.00e+00	6.71e+00	0.00e+00	0.00e+00	0.00e+00	3.08e+03
Y-90	5.79e-01	0.00e+00	1.55e-02	0.00e+00	0.00e+00	0.00e+00	6.14e+03
Y-91	8.49e+00	0.00e+00	2.27e-01	0.00e+00	0.00e+00	0.00e+00	4.67e+03
Y-91m	5.47e-03	0.00e+00	2.12e-04	0.00e+00	0.00e+00	0.00e+00	1.61e-02
Y-92	5.09e-02	0.00e+00	1.49e-03	0.00e+00	0.00e+00	0.00e+00	8.91e+02
Y-93	1.61e-01	0.00e+00	4.46e-03	0.00e+00	0.00e+00	0.00e+00	5.12e+03
Zr-93	3.46e-01	1.94e-02	9.02e-03	0.00e+00	7.34e-02	0.00e+00	2.01e+01
Zr-95	2.52e-01	8.07e-02	5.46e-02	0.00e+00	1.27e-01	0.00e+00	2.56e+02
Zr-97	1.39e-02	2.81e-03	1.28e-03	0.00e+00	4.24e-03	0.00e+00	8.69e+02
Nb-93m	1.83e+01	5.98e+00	1.47e+00	0.00e+00	6.88e+00	0.00e+00	2.76e+03
Nb-95	4.47e+00	2.49e+00	1.34e+00	0.00e+00	2.46e+00	0.00e+00	1.51e+04
Nb-97	3.75e-02	9.49e-03	3.46e-03	0.00e+00	1.11e-02	0.00e+00	3.50e+01
Mo-93	0.00e+00	1.83e+02	4.94e+00	0.00e+00	5.18e+01	0.00e+00	2.97e+01
Mo-99	0.00e+00	1.05e+02	1.99e+01	0.00e+00	2.37e+02	0.00e+00	2.43e+02
Tc-101	9.22e-03	1.33e-02	1.30e-01	0.00e+00	2.39e-01	6.79e-03	3.99e-14
Tc-99	4.54e+00	6.75e+00	1.82e+00	0.00e+00	8.49e+01	5.73e-01	2.21e+02
Tc-99m	8.96e-03	2.53e-02	3.23e-01	0.00e+00	3.85e-01	1.24e-02	1.50e+01
Ru-103	4.50e+00	0.00e+00	1.94e+00	0.00e+00	1.72e+01	0.00e+00	5.25e+02
Ru-105	3.75e-01	0.00e+00	1.48e-01	0.00e+00	4.84e+00	0.00e+00	2.29e+02
Ru-106	6.69e+01	0.00e+00	8.46e+00	0.00e+00	1.29e+02	0.00e+00	4.33e+03
Rh-105	2.94e+00	2.15e+00	1.42e+00	0.00e+00	9.14e+00	0.00e+00	3.43e+02
Pd-107	0.00e+00	3.57e+00	2.29e-01	0.00e+00	3.21e+01	0.00e+00	2.22e+01
Pd-109	0.00e+00	4.30e+00	9.70e-01	0.00e+00	2.46e+01	0.00e+00	4.77e+02

Conversion factors are in units of mrem/hr per uCi/ml.

SITE RELATED LIQUID INGESTION DOSE COMMITMENT FACTORS (A_i) FOR INDIVIDUAL NUCLIDES

Ai factors for Adult age group by nuclide.
Waterford Steam Electric Station Unit III
Discharge point : Circulating Water Discharge to Mississippi River
Dilution Factor DW = 220.0

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	9.42e-01	8.71e-01	5.17e-01	0.00e+00	1.71e+00	0.00e+00	3.55e+02
Ag-111	3.42e-01	1.43e-01	7.12e-02	0.00e+00	4.61e-01	0.00e+00	2.62e+02
Cd-113m	0.00e+00	1.52e+03	4.89e+01	0.00e+00	1.68e+03	0.00e+00	1.23e+04
Cd-115m	0.00e+00	8.82e+02	2.81e+01	0.00e+00	7.00e+02	0.00e+00	3.71e+04
Sn-123	2.23e+05	3.70e+03	5.45e+03	3.15e+03	0.00e+00	0.00e+00	4.55e+05
Sn-125	5.98e+04	1.21e+03	2.71e+03	9.98e+02	0.00e+00	0.00e+00	7.47e+05
Sn-126	6.07e+05	1.20e+04	1.72e+04	3.53e+03	0.00e+00	0.00e+00	1.75e+05
Sb-124	7.76e+00	1.47e-01	3.08e+00	1.88e-02	0.00e+00	6.04e+00	2.20e+02
Sb-125	4.96e+00	5.54e-02	1.18e+00	5.05e-03	0.00e+00	3.83e+00	5.46e+01
Sb-126	3.19e+00	6.49e-02	1.15e+00	1.95e-02	0.00e+00	1.95e+00	2.61e+02
Sb-127	7.15e-01	1.57e-02	2.74e-01	8.59e-03	0.00e+00	4.24e-01	1.64e+02
Te-125m	2.57e+03	9.30e+02	3.44e+02	7.72e+02	1.04e+04	0.00e+00	1.03e+04
Te-127	1.05e+02	3.78e+01	2.28e+01	7.81e+01	4.29e+02	0.00e+00	8.32e+03
Te-127m	6.49e+03	2.32e+03	7.90e+02	1.66e+03	2.63e+04	0.00e+00	2.17e+04
Te-129	3.01e+01	1.13e+01	7.33e+00	2.31e+01	1.26e+02	0.00e+00	2.27e+01
Te-129m	1.10e+04	4.11e+03	1.74e+03	3.78e+03	4.60e+04	0.00e+00	5.55e+04
Te-131	1.89e+01	7.88e+00	5.96e+00	1.55e+01	8.27e+01	0.00e+00	2.67e+00
Te-131m	1.66e+03	8.10e+02	6.75e+02	1.28e+03	8.21e+03	0.00e+00	8.05e+04
Te-132	2.41e+03	1.56e+03	1.47e+03	1.72e+03	1.50e+04	0.00e+00	7.39e+04
Te-133m	4.43e+01	2.59e+01	2.49e+01	3.75e+01	2.56e+02	0.00e+00	8.87e+00
Te-134	3.10e+01	2.03e+01	1.25e+01	2.71e+01	1.96e+02	0.00e+00	3.44e-02
I-129	1.19e+02	1.02e+02	3.34e+02	2.62e+05	2.19e+02	0.00e+00	1.61e+01
I-130	2.74e+01	8.09e+01	3.19e+01	6.86e+03	1.26e+02	0.00e+00	6.97e+01
I-131	1.51e+02	2.16e+02	1.24e+02	7.08e+04	3.70e+02	0.00e+00	5.70e+01
I-132	7.37e+00	1.97e+01	6.89e+00	6.89e+02	3.14e+01	0.00e+00	3.70e+00
I-133	5.15e+01	8.96e+01	2.73e+01	1.32e+04	1.56e+02	0.00e+00	8.06e+01
I-134	3.85e+00	1.05e+01	3.74e+00	1.81e+02	1.66e+01	0.00e+00	9.11e-03
I-135	1.61e+01	4.21e+01	1.55e+01	2.78e+03	6.75e+01	0.00e+00	4.75e+01
Cs-134	2.98e+05	7.09e+05	5.79e+05	0.00e+00	2.29e+05	7.61e+04	1.24e+04
Cs-134m	1.02e+02	2.15e+02	1.10e+02	0.00e+00	1.16e+02	1.83e+01	7.57e+01

Conversion factors are in units of mrem/hr per uCi/ml.

SITE RELATED LIQUID INGESTION DOSE COMMITMENT FACTORS (A_i) FOR INDIVIDUAL NUCLIDES

Ai factors for Adult age group by nuclide.
Waterford Steam Electric Station Unit III
Discharge point : Circulating Water Discharge to Mississippi River
Dilution Factor DW = 220.0

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	9.34e+04	8.62e+04	3.83e+04	0.00e+00	3.26e+04	9.77e+03	2.02e+03
Cs-136	3.12e+04	1.23e+05	8.86e+04	0.00e+00	6.85e+04	9.39e+03	1.40e+04
Cs-137	3.82e+05	5.22e+05	3.42e+05	0.00e+00	1.77e+05	5.89e+04	1.01e+04
Cs-138	2.64e+02	5.22e+02	2.59e+02	0.00e+00	3.84e+02	3.79e+01	2.23e-03
Cs-139	1.63e+02	2.43e+02	8.86e+01	0.00e+00	1.95e+02	1.77e+01	5.27e-21
Ba-139	9.66e-01	6.88e-04	2.83e-02	0.00e+00	6.43e-04	3.90e-04	1.71e+00
Ba-140	2.02e+02	2.54e-01	1.32e+01	0.00e+00	8.63e-02	1.45e-01	4.16e+02
Ba-141	4.69e-01	3.54e-04	1.58e-02	0.00e+00	3.29e-04	2.01e-04	2.21e-10
Ba-142	2.12e-01	2.18e-04	1.33e-02	0.00e+00	1.84e-04	1.23e-04	2.99e-19
La-140	1.51e-01	7.59e-02	2.01e-02	0.00e+00	0.00e+00	0.00e+00	5.57e+03
La-141	1.92e-02	5.96e-03	9.76e-04	0.00e+00	0.00e+00	0.00e+00	7.11e+02
La-142	7.71e-03	3.51e-03	8.73e-04	0.00e+00	0.00e+00	0.00e+00	2.56e+01
Ce-141	2.59e-02	1.75e-02	1.99e-03	0.00e+00	8.15e-03	0.00e+00	6.71e+01
Ce-143	4.57e-03	3.38e+00	3.74e-04	0.00e+00	1.49e-03	0.00e+00	1.26e+02
Ce-144	1.35e+00	5.66e-01	7.26e-02	0.00e+00	3.35e-01	0.00e+00	4.57e+02
Pr-143	5.54e-01	2.22e-01	2.75e-02	0.00e+00	1.28e-01	0.00e+00	2.43e+03
Pr-144	1.81e-03	7.53e-04	9.21e-05	0.00e+00	4.25e-04	0.00e+00	2.61e-10
Nd-147	3.79e-01	4.38e-01	2.62e-02	0.00e+00	2.56e-01	0.00e+00	2.10e+03
Pm-147	4.54e+00	4.27e-01	1.73e-01	0.00e+00	8.07e-01	0.00e+00	5.38e+02
Pm-148	4.32e-01	7.17e-02	3.61e-02	0.00e+00	1.36e-01	0.00e+00	5.63e+03
Pm-148m	1.85e+00	4.79e-01	3.66e-01	0.00e+00	7.23e-01	0.00e+00	4.06e+03
Pm-149	9.15e-02	1.29e-02	5.29e-03	0.00e+00	2.45e-02	0.00e+00	2.43e+03
Pm-151	4.20e-02	7.05e-03	3.56e-03	0.00e+00	1.26e-02	0.00e+00	1.94e+03
Sm-151	4.16e+00	7.17e-01	1.72e-01	0.00e+00	8.01e-01	0.00e+00	3.16e+02
Sm-153	5.16e-02	4.31e-02	3.14e-03	0.00e+00	1.39e-02	0.00e+00	1.54e+03
Eu-152	1.17e+01	2.67e+00	2.35e+00	0.00e+00	1.66e+01	0.00e+00	1.54e+03
Eu-154	3.70e+01	4.55e+00	3.24e+00	0.00e+00	2.18e+01	0.00e+00	3.30e+03
Eu-155	5.18e+00	7.35e-01	4.74e-01	0.00e+00	3.39e+00	0.00e+00	5.78e+02
Eu-156	8.25e-01	6.38e-01	1.03e-01	0.00e+00	4.26e-01	0.00e+00	4.37e+03
Tb-160	2.83e+00	0.00e+00	3.53e-01	0.00e+00	1.17e+00	0.00e+00	2.61e+03

Conversion factors are in units of mrem/hr per uCi/ml.

SITE RELATED LIQUID INGESTION DOSE COMMITMENT FACTORS (A_i) FOR INDIVIDUAL NUCLIDES

Ai factors for Adult age group by nuclide.
Waterford Steam Electric Station Unit III
Discharge point : Circulating Water Discharge to Mississippi River
Dilution Factor DW = 220.0

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	1.63e+01	5.08e+00	3.85e+00	0.00e+00	7.59e+00	0.00e+00	1.54e+03
W-181	2.85e+01	9.28e+00	9.94e-01	0.00e+00	0.00e+00	0.00e+00	1.06e+03
W-185	1.16e+03	3.88e+02	4.08e+01	0.00e+00	0.00e+00	0.00e+00	4.48e+04
W-187	2.96e+02	2.47e+02	8.65e+01	0.00e+00	0.00e+00	0.00e+00	8.10e+04
Pb-210	3.67e+06	1.05e+06	1.30e+05	0.00e+00	2.95e+06	0.00e+00	5.37e+02
Bi-210	1.67e+01	1.15e+02	9.58e+00	0.00e+00	1.39e+03	0.00e+00	1.72e+03
Po-210	4.26e+05	9.05e+05	1.03e+05	0.00e+00	3.02e+06	0.00e+00	7.62e+04
Ra-223	5.97e+05	9.19e+02	1.19e+05	0.00e+00	2.61e+04	0.00e+00	3.85e+04
Ra-224	1.93e+05	4.68e+02	3.88e+04	0.00e+00	1.32e+04	0.00e+00	4.08e+04
Ra-225	7.88e+05	9.34e+02	1.57e+05	0.00e+00	2.65e+04	0.00e+00	3.67e+04
Ra-226	3.63e+07	6.89e+02	2.64e+07	0.00e+00	1.96e+04	0.00e+00	3.99e+04
Ra-228	1.34e+07	3.75e+02	1.45e+07	0.00e+00	1.06e+04	0.00e+00	6.77e+03
Ac-225	2.65e+02	3.65e+02	1.78e+01	0.00e+00	4.16e+01	0.00e+00	2.45e+04
Ac-227	1.13e+05	1.49e+04	6.69e+03	0.00e+00	4.82e+03	0.00e+00	4.93e+03
Th-227	9.89e+02	1.79e+01	2.85e+01	0.00e+00	1.02e+02	0.00e+00	3.90e+04
Th-228	3.58e+04	6.06e+02	1.21e+03	0.00e+00	3.37e+03	0.00e+00	4.06e+04
Th-229	9.82e+05	2.81e+04	1.62e+04	0.00e+00	1.36e+05	0.00e+00	5.64e+03
Th-230	1.49e+05	8.45e+03	4.12e+03	0.00e+00	4.08e+04	0.00e+00	4.35e+03
Th-232	1.66e+05	7.22e+03	1.08e+02	0.00e+00	3.48e+04	0.00e+00	3.70e+03
Th-234	5.78e+00	3.40e-01	1.67e-01	0.00e+00	1.93e+00	0.00e+00	8.16e+03
Pa-231	1.10e+05	4.11e+03	4.25e+03	0.00e+00	2.31e+04	0.00e+00	1.92e+03
Pa-233	1.41e-01	2.83e-02	2.44e-02	0.00e+00	1.07e-01	0.00e+00	4.38e+02
U-232	2.13e+04	0.00e+00	1.52e+03	0.00e+00	2.31e+03	0.00e+00	3.50e+02
U-233	4.50e+03	0.00e+00	2.73e+02	0.00e+00	1.05e+03	0.00e+00	3.24e+02
U-234	4.32e+03	0.00e+00	2.67e+02	0.00e+00	1.03e+03	0.00e+00	3.17e+02
U-235	4.14e+03	0.00e+00	2.51e+02	0.00e+00	9.66e+02	0.00e+00	4.03e+02
U-236	4.14e+03	0.00e+00	2.56e+02	0.00e+00	9.87e+02	0.00e+00	2.98e+02
U-237	2.85e-01	0.00e+00	7.59e-02	0.00e+00	1.17e+00	0.00e+00	1.00e+02
U-238	3.96e+03	0.00e+00	2.35e+02	0.00e+00	9.04e+02	0.00e+00	2.84e+02
Np-237	3.06e+04	2.18e+03	1.35e+03	0.00e+00	1.00e+04	0.00e+00	1.93e+03

Conversion factors are in units of mrem/hr per uCi/ml.

SITE RELATED LIQUID INGESTION DOSE COMMITMENT FACTORS (A_i) FOR INDIVIDUAL NUCLIDES

Ai factors for Adult age group by nuclide.
Waterford Steam Electric Station Unit III
Discharge point : Circulating Water Discharge to Mississippi River
Dilution Factor DW = 220.0

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	3.33e-01	8.97e-03	5.18e-03	0.00e+00	3.04e-02	0.00e+00	8.34e+02
Np-239	2.89e-02	2.85e-03	1.57e-03	0.00e+00	8.88e-03	0.00e+00	5.84e+02
Pu-238	5.52e+03	6.99e+02	1.50e+02	0.00e+00	6.41e+02	0.00e+00	6.39e+02
Pu-239	6.35e+03	7.63e+02	1.67e+02	0.00e+00	7.10e+02	0.00e+00	5.83e+02
Pu-240	6.34e+03	7.62e+02	1.67e+02	0.00e+00	7.09e+02	0.00e+00	5.94e+02
Pu-241	1.37e+02	6.52e+00	2.91e+00	0.00e+00	1.34e+01	0.00e+00	1.23e+01
Pu-242	5.88e+03	7.35e+02	1.61e+02	0.00e+00	6.84e+02	0.00e+00	5.72e+02
Pu-244	6.87e+03	8.42e+02	1.85e+02	0.00e+00	7.84e+02	0.00e+00	8.52e+02
Am-241	4.55e+04	4.25e+04	3.26e+03	0.00e+00	2.45e+04	0.00e+00	4.47e+03
Am-242m	4.58e+04	3.99e+04	3.27e+03	0.00e+00	2.44e+04	0.00e+00	5.63e+03
Am-243	4.54e+04	4.16e+04	3.19e+03	0.00e+00	2.40e+04	0.00e+00	5.24e+03
Cm-242	1.24e+03	1.32e+03	8.25e+01	0.00e+00	3.75e+02	0.00e+00	4.77e+03
Cm-243	3.61e+04	3.31e+04	2.26e+03	0.00e+00	1.05e+04	0.00e+00	4.70e+03
Cm-244	2.75e+04	2.57e+04	1.73e+03	0.00e+00	8.07e+03	0.00e+00	4.55e+03
Cm-245	5.65e+04	4.92e+04	3.47e+03	0.00e+00	1.62e+04	0.00e+00	4.24e+03
Cm-246	5.60e+04	4.91e+04	3.46e+03	0.00e+00	1.61e+04	0.00e+00	4.16e+03
Cm-247	5.46e+04	4.84e+04	3.41e+03	0.00e+00	1.59e+04	0.00e+00	5.47e+03
Cm-248	4.54e+05	3.99e+05	2.81e+04	0.00e+00	1.31e+05	0.00e+00	8.85e+04
Cf-252	1.57e+04	0.00e+00	3.79e+02	0.00e+00	0.00e+00	0.00e+00	1.73e+04

Conversion factors are in units of mrem/hr per uCi/ml.

SITE RELATED LIQUID INGESTION DOSE COMMITMENT FACTORS (A_i) FOR INDIVIDUAL NUCLIDES

Ai factors for Adult age group by nuclide.
Waterford Steam Electric Station Unit III
Discharge point : 40 Arpent Canal
Dilution Factor DW = 1.0

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	1.29e-01	1.29e-01	1.29e-01	1.29e-01	1.29e-01	1.29e-01
Be-10	1.52e+01	2.35e+00	3.80e-01	0.00e+00	1.78e+00	0.00e+00	1.28e+02
C-14	3.13e+04	6.26e+03	6.26e+03	6.26e+03	6.26e+03	6.26e+03	6.26e+03
N-13	3.00e+03	3.00e+03	3.00e+03	3.00e+03	3.00e+03	3.00e+03	3.00e+03
F-18	1.49e+01	0.00e+00	1.66e+00	0.00e+00	0.00e+00	0.00e+00	4.43e-01
Na-22	4.17e+03	4.17e+03	4.17e+03	4.17e+03	4.17e+03	4.17e+03	4.17e+03
Na-24	4.07e+02	4.07e+02	4.07e+02	4.07e+02	4.07e+02	4.07e+02	4.07e+02
P-32	4.62e+07	2.87e+06	1.79e+06	0.00e+00	0.00e+00	0.00e+00	5.19e+06
Ca-41	1.77e+04	0.00e+00	1.92e+03	0.00e+00	0.00e+00	0.00e+00	1.76e+01
Sc-46	2.64e-02	5.12e-02	1.49e-02	0.00e+00	4.78e-02	0.00e+00	2.49e+02
Cr-51	0.00e+00	0.00e+00	1.27e+00	7.61e-01	2.81e-01	1.69e+00	3.20e+02
Mn-54	0.00e+00	4.38e+03	8.35e+02	0.00e+00	1.30e+03	0.00e+00	1.34e+04
Mn-56	0.00e+00	1.10e+02	1.95e+01	0.00e+00	1.40e+02	0.00e+00	3.51e+03
Fe-55	6.58e+02	4.55e+02	1.06e+02	0.00e+00	0.00e+00	2.54e+02	2.61e+02
Fe-59	1.04e+03	2.44e+03	9.36e+02	0.00e+00	0.00e+00	6.82e+02	8.14e+03
Co-57	0.00e+00	2.09e+01	3.48e+01	0.00e+00	0.00e+00	0.00e+00	5.31e+02
Co-58	0.00e+00	8.92e+01	2.00e+02	0.00e+00	0.00e+00	0.00e+00	1.81e+03
Co-60	0.00e+00	2.56e+02	5.65e+02	0.00e+00	0.00e+00	0.00e+00	4.81e+03
Ni-59	2.34e+03	8.02e+02	3.90e+02	0.00e+00	0.00e+00	0.00e+00	1.65e+02
Ni-63	3.11e+04	2.16e+03	1.04e+03	0.00e+00	0.00e+00	0.00e+00	4.50e+02
Ni-65	1.26e+02	1.64e+01	7.49e+00	0.00e+00	0.00e+00	0.00e+00	4.17e+02
Cu-64	0.00e+00	9.97e+00	4.68e+00	0.00e+00	2.51e+01	0.00e+00	8.50e+02
Zn-65	2.32e+04	7.37e+04	3.33e+04	0.00e+00	4.93e+04	0.00e+00	4.64e+04
Zn-69	4.93e+01	9.43e+01	6.56e+00	0.00e+00	6.13e+01	0.00e+00	1.42e+01
Zn-69m	8.14e+02	1.95e+03	1.79e+02	0.00e+00	1.18e+03	0.00e+00	1.19e+05
Se-79	0.00e+00	1.07e+03	1.79e+02	0.00e+00	1.85e+03	0.00e+00	2.19e+02
Br-82	0.00e+00	0.00e+00	2.27e+03	0.00e+00	0.00e+00	0.00e+00	2.60e+03
Br-83	0.00e+00	0.00e+00	4.04e+01	0.00e+00	0.00e+00	0.00e+00	5.82e+01
Br-84	0.00e+00	0.00e+00	5.24e+01	0.00e+00	0.00e+00	0.00e+00	4.11e-04
Br-85	0.00e+00	0.00e+00	2.15e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of mrem/hr per uCi/ml.

SITE RELATED LIQUID INGESTION DOSE COMMITMENT FACTORS (A_i) FOR INDIVIDUAL NUCLIDES

Ai factors for Adult age group by nuclide.
Waterford Steam Electric Station Unit III
Discharge point : 40 Arpent Canal
Dilution Factor DW = 1.0

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	1.01e+05	4.71e+04	0.00e+00	0.00e+00	0.00e+00	1.99e+04
Rb-87	0.00e+00	5.89e+04	2.05e+04	0.00e+00	0.00e+00	0.00e+00	2.76e+03
Rb-88	0.00e+00	2.90e+02	1.54e+02	0.00e+00	0.00e+00	0.00e+00	4.00e-09
Rb-89	0.00e+00	1.92e+02	1.35e+02	0.00e+00	0.00e+00	0.00e+00	1.12e-11
Sr-89	2.21e+04	0.00e+00	6.35e+02	0.00e+00	0.00e+00	0.00e+00	3.55e+03
Sr-90	6.26e+05	0.00e+00	1.26e+04	0.00e+00	0.00e+00	0.00e+00	1.57e+04
Sr-91	4.07e+02	0.00e+00	1.64e+01	0.00e+00	0.00e+00	0.00e+00	1.94e+03
Sr-92	1.54e+02	0.00e+00	6.68e+00	0.00e+00	0.00e+00	0.00e+00	3.06e+03
Y-90	5.76e-01	0.00e+00	1.54e-02	0.00e+00	0.00e+00	0.00e+00	6.10e+03
Y-91	8.44e+00	0.00e+00	2.26e-01	0.00e+00	0.00e+00	0.00e+00	4.64e+03
Y-91m	5.44e-03	0.00e+00	2.11e-04	0.00e+00	0.00e+00	0.00e+00	1.60e-02
Y-92	5.06e-02	0.00e+00	1.48e-03	0.00e+00	0.00e+00	0.00e+00	8.86e+02
Y-93	1.60e-01	0.00e+00	4.43e-03	0.00e+00	0.00e+00	0.00e+00	5.09e+03
Zr-93	3.30e-01	1.85e-02	8.61e-03	0.00e+00	7.01e-02	0.00e+00	1.92e+01
Zr-95	2.40e-01	7.70e-02	5.21e-02	0.00e+00	1.21e-01	0.00e+00	2.44e+02
Zr-97	1.33e-02	2.68e-03	1.22e-03	0.00e+00	4.04e-03	0.00e+00	8.30e+02
Nb-93m	1.83e+01	5.98e+00	1.47e+00	0.00e+00	6.87e+00	0.00e+00	2.76e+03
Nb-95	4.47e+00	2.48e+00	1.34e+00	0.00e+00	2.46e+00	0.00e+00	1.51e+04
Nb-97	3.75e-02	9.48e-03	3.46e-03	0.00e+00	1.11e-02	0.00e+00	3.50e+01
Mo-93	0.00e+00	1.80e+02	4.86e+00	0.00e+00	5.10e+01	0.00e+00	2.92e+01
Mo-99	0.00e+00	1.03e+02	1.96e+01	0.00e+00	2.34e+02	0.00e+00	2.39e+02
Tc-101	9.12e-03	1.31e-02	1.29e-01	0.00e+00	2.37e-01	6.72e-03	3.95e-14
Tc-99	4.49e+00	6.68e+00	1.80e+00	0.00e+00	8.40e+01	5.67e-01	2.18e+02
Tc-99m	8.87e-03	2.51e-02	3.19e-01	0.00e+00	3.81e-01	1.23e-02	1.48e+01
Ru-103	4.43e+00	0.00e+00	1.91e+00	0.00e+00	1.69e+01	0.00e+00	5.17e+02
Ru-105	3.69e-01	0.00e+00	1.46e-01	0.00e+00	4.76e+00	0.00e+00	2.26e+02
Ru-106	6.58e+01	0.00e+00	8.33e+00	0.00e+00	1.27e+02	0.00e+00	4.26e+03
Rh-105	2.90e+00	2.12e+00	1.40e+00	0.00e+00	9.00e+00	0.00e+00	3.38e+02
Pd-107	0.00e+00	3.52e+00	2.25e-01	0.00e+00	3.16e+01	0.00e+00	2.18e+01
Pd-109	0.00e+00	4.24e+00	9.55e-01	0.00e+00	2.42e+01	0.00e+00	4.69e+02

Conversion factors are in units of mrem/hr per uCi/ml.

SITE RELATED LIQUID INGESTION DOSE COMMITMENT FACTORS (A_i) FOR INDIVIDUAL NUCLIDES

Ai factors for Adult age group by nuclide.
Waterford Steam Electric Station Unit III
Discharge point : 40 Arpent Canal
Dilution Factor DW = 1.0

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	8.81e-01	8.15e-01	4.84e-01	0.00e+00	1.60e+00	0.00e+00	3.33e+02
Ag-111	3.20e-01	1.34e-01	6.66e-02	0.00e+00	4.32e-01	0.00e+00	2.46e+02
Cd-113m	0.00e+00	1.52e+03	4.88e+01	0.00e+00	1.68e+03	0.00e+00	1.23e+04
Cd-115m	0.00e+00	8.81e+02	2.81e+01	0.00e+00	6.99e+02	0.00e+00	3.71e+04
Sn-123	2.23e+05	3.70e+03	5.45e+03	3.15e+03	0.00e+00	0.00e+00	4.55e+05
Sn-125	5.98e+04	1.21e+03	2.71e+03	9.98e+02	0.00e+00	0.00e+00	7.47e+05
Sn-126	6.07e+05	1.20e+04	1.72e+04	3.53e+03	0.00e+00	0.00e+00	1.75e+05
Sb-124	6.70e+00	1.27e-01	2.66e+00	1.63e-02	0.00e+00	5.22e+00	1.90e+02
Sb-125	4.29e+00	4.79e-02	1.02e+00	4.36e-03	0.00e+00	3.30e+00	4.72e+01
Sb-126	2.75e+00	5.60e-02	9.94e-01	1.69e-02	0.00e+00	1.69e+00	2.25e+02
Sb-127	6.18e-01	1.35e-02	2.37e-01	7.42e-03	0.00e+00	3.66e-01	1.41e+02
Te-125m	2.57e+03	9.30e+02	3.44e+02	7.72e+02	1.04e+04	0.00e+00	1.02e+04
Te-127	1.05e+02	3.78e+01	2.28e+01	7.80e+01	4.29e+02	0.00e+00	8.31e+03
Te-127m	6.48e+03	2.32e+03	7.90e+02	1.66e+03	2.63e+04	0.00e+00	2.17e+04
Te-129	3.01e+01	1.13e+01	7.33e+00	2.31e+01	1.26e+02	0.00e+00	2.27e+01
Te-129m	1.10e+04	4.11e+03	1.74e+03	3.78e+03	4.60e+04	0.00e+00	5.54e+04
Te-131	1.89e+01	7.88e+00	5.96e+00	1.55e+01	8.26e+01	0.00e+00	2.67e+00
Te-131m	1.66e+03	8.10e+02	6.75e+02	1.28e+03	8.21e+03	0.00e+00	8.04e+04
Te-132	2.41e+03	1.56e+03	1.47e+03	1.72e+03	1.50e+04	0.00e+00	7.38e+04
Te-133m	4.42e+01	2.59e+01	2.49e+01	3.74e+01	2.56e+02	0.00e+00	8.87e+00
Te-134	3.10e+01	2.03e+01	1.24e+01	2.71e+01	1.96e+02	0.00e+00	3.44e-02
I-129	1.17e+02	1.01e+02	3.31e+02	2.60e+05	2.17e+02	0.00e+00	1.59e+01
I-130	2.71e+01	8.01e+01	3.16e+01	6.79e+03	1.25e+02	0.00e+00	6.89e+01
I-131	1.49e+02	2.14e+02	1.22e+02	7.00e+04	3.66e+02	0.00e+00	5.64e+01
I-132	7.29e+00	1.95e+01	6.82e+00	6.82e+02	3.11e+01	0.00e+00	3.66e+00
I-133	5.10e+01	8.87e+01	2.70e+01	1.30e+04	1.55e+02	0.00e+00	7.97e+01
I-134	3.81e+00	1.03e+01	3.70e+00	1.79e+02	1.64e+01	0.00e+00	9.01e-03
I-135	1.59e+01	4.17e+01	1.54e+01	2.75e+03	6.68e+01	0.00e+00	4.70e+01
Cs-134	2.98e+05	7.09e+05	5.79e+05	0.00e+00	2.29e+05	7.61e+04	1.24e+04
Cs-134m	1.02e+02	2.15e+02	1.10e+02	0.00e+00	1.16e+02	1.83e+01	7.57e+01

Conversion factors are in units of mrem/hr per uCi/ml.

SITE RELATED LIQUID INGESTION DOSE COMMITMENT FACTORS (A_i) FOR INDIVIDUAL NUCLIDES

Ai factors for Adult age group by nuclide.
Waterford Steam Electric Station Unit III
Discharge point : 40 Arpent Canal
Dilution Factor DW = 1.0

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	9.34e+04	8.62e+04	3.83e+04	0.00e+00	3.26e+04	9.77e+03	2.02e+03
Cs-136	3.12e+04	1.23e+05	8.86e+04	0.00e+00	6.85e+04	9.38e+03	1.40e+04
Cs-137	3.82e+05	5.22e+05	3.42e+05	0.00e+00	1.77e+05	5.89e+04	1.01e+04
Cs-138	2.64e+02	5.22e+02	2.59e+02	0.00e+00	3.84e+02	3.79e+01	2.23e-03
Cs-139	1.63e+02	2.43e+02	8.86e+01	0.00e+00	1.95e+02	1.77e+01	5.27e-21
Ba-139	9.29e-01	6.62e-04	2.72e-02	0.00e+00	6.19e-04	3.75e-04	1.65e+00
Ba-140	1.94e+02	2.44e-01	1.27e+01	0.00e+00	8.30e-02	1.40e-01	4.00e+02
Ba-141	4.51e-01	3.41e-04	1.52e-02	0.00e+00	3.17e-04	1.93e-04	2.13e-10
Ba-142	2.04e-01	2.10e-04	1.28e-02	0.00e+00	1.77e-04	1.19e-04	2.87e-19
La-140	1.50e-01	7.54e-02	1.99e-02	0.00e+00	0.00e+00	0.00e+00	5.54e+03
La-141	1.91e-02	5.93e-03	9.70e-04	0.00e+00	0.00e+00	0.00e+00	7.06e+02
La-142	7.66e-03	3.48e-03	8.68e-04	0.00e+00	0.00e+00	0.00e+00	2.54e+01
Ce-141	2.24e-02	1.52e-02	1.72e-03	0.00e+00	7.04e-03	0.00e+00	5.79e+01
Ce-143	3.95e-03	2.92e+00	3.23e-04	0.00e+00	1.29e-03	0.00e+00	1.09e+02
Ce-144	1.17e+00	4.88e-01	6.27e-02	0.00e+00	2.90e-01	0.00e+00	3.95e+02
Pr-143	5.51e-01	2.21e-01	2.73e-02	0.00e+00	1.27e-01	0.00e+00	2.41e+03
Pr-144	1.80e-03	7.48e-04	9.16e-05	0.00e+00	4.22e-04	0.00e+00	2.59e-10
Nd-147	3.76e-01	4.35e-01	2.60e-02	0.00e+00	2.54e-01	0.00e+00	2.09e+03
Pm-147	4.51e+00	4.24e-01	1.72e-01	0.00e+00	8.02e-01	0.00e+00	5.34e+02
Pm-148	4.29e-01	7.12e-02	3.59e-02	0.00e+00	1.35e-01	0.00e+00	5.60e+03
Pm-148m	1.84e+00	4.76e-01	3.64e-01	0.00e+00	7.18e-01	0.00e+00	4.03e+03
Pm-149	9.10e-02	1.29e-02	5.25e-03	0.00e+00	2.43e-02	0.00e+00	2.41e+03
Pm-151	4.17e-02	7.00e-03	3.54e-03	0.00e+00	1.25e-02	0.00e+00	1.93e+03
Sm-151	4.13e+00	7.12e-01	1.71e-01	0.00e+00	7.96e-01	0.00e+00	3.14e+02
Sm-153	5.13e-02	4.28e-02	3.12e-03	0.00e+00	1.38e-02	0.00e+00	1.53e+03
Eu-152	1.17e+01	2.66e+00	2.33e+00	0.00e+00	1.65e+01	0.00e+00	1.53e+03
Eu-154	3.68e+01	4.52e+00	3.22e+00	0.00e+00	2.17e+01	0.00e+00	3.28e+03
Eu-155	5.15e+00	7.30e-01	4.71e-01	0.00e+00	3.37e+00	0.00e+00	5.75e+02
Eu-156	8.20e-01	6.34e-01	1.02e-01	0.00e+00	4.24e-01	0.00e+00	4.35e+03
Tb-160	2.81e+00	0.00e+00	3.51e-01	0.00e+00	1.16e+00	0.00e+00	2.59e+03

Conversion factors are in units of mrem/hr per uCi/ml.

SITE RELATED LIQUID INGESTION DOSE COMMITMENT FACTORS (A_i) FOR INDIVIDUAL NUCLIDES

Ai factors for Adult age group by nuclide.
Waterford Steam Electric Station Unit III
Discharge point : 40 Arpent Canal
Dilution Factor DW = 1.0

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	1.62e+01	5.05e+00	3.83e+00	0.00e+00	7.54e+00	0.00e+00	1.53e+03
W-181	2.85e+01	9.28e+00	9.94e-01	0.00e+00	0.00e+00	0.00e+00	1.06e+03
W-185	1.16e+03	3.88e+02	4.08e+01	0.00e+00	0.00e+00	0.00e+00	4.48e+04
W-187	2.96e+02	2.47e+02	8.65e+01	0.00e+00	0.00e+00	0.00e+00	8.10e+04
Pb-210	3.66e+06	1.05e+06	1.30e+05	0.00e+00	2.94e+06	0.00e+00	5.36e+02
Bi-210	1.66e+01	1.14e+02	9.48e+00	0.00e+00	1.38e+03	0.00e+00	1.71e+03
Po-210	4.26e+05	9.05e+05	1.03e+05	0.00e+00	3.02e+06	0.00e+00	7.61e+04
Ra-223	5.95e+05	9.16e+02	1.19e+05	0.00e+00	2.60e+04	0.00e+00	3.84e+04
Ra-224	1.93e+05	4.67e+02	3.87e+04	0.00e+00	1.32e+04	0.00e+00	4.07e+04
Ra-225	7.85e+05	9.31e+02	1.57e+05	0.00e+00	2.65e+04	0.00e+00	3.66e+04
Ra-226	3.61e+07	6.87e+02	2.63e+07	0.00e+00	1.95e+04	0.00e+00	3.97e+04
Ra-228	1.34e+07	3.73e+02	1.45e+07	0.00e+00	1.06e+04	0.00e+00	6.75e+03
Ac-225	2.63e+02	3.63e+02	1.77e+01	0.00e+00	4.13e+01	0.00e+00	2.44e+04
Ac-227	1.12e+05	1.48e+04	6.64e+03	0.00e+00	4.79e+03	0.00e+00	4.90e+03
Th-227	9.84e+02	1.78e+01	2.84e+01	0.00e+00	1.01e+02	0.00e+00	3.88e+04
Th-228	3.56e+04	6.03e+02	1.21e+03	0.00e+00	3.35e+03	0.00e+00	4.04e+04
Th-229	9.77e+05	2.79e+04	1.62e+04	0.00e+00	1.35e+05	0.00e+00	5.61e+03
Th-230	1.48e+05	8.40e+03	4.09e+03	0.00e+00	4.06e+04	0.00e+00	4.32e+03
Th-232	1.65e+05	7.18e+03	1.08e+02	0.00e+00	3.46e+04	0.00e+00	3.68e+03
Th-234	5.75e+00	3.38e-01	1.66e-01	0.00e+00	1.92e+00	0.00e+00	8.12e+03
Pa-231	1.08e+05	4.06e+03	4.19e+03	0.00e+00	2.28e+04	0.00e+00	1.89e+03
Pa-233	1.39e-01	2.79e-02	2.40e-02	0.00e+00	1.05e-01	0.00e+00	4.32e+02
U-232	1.98e+04	0.00e+00	1.41e+03	0.00e+00	2.14e+03	0.00e+00	3.25e+02
U-233	4.17e+03	0.00e+00	2.53e+02	0.00e+00	9.72e+02	0.00e+00	3.00e+02
U-234	4.00e+03	0.00e+00	2.48e+02	0.00e+00	9.53e+02	0.00e+00	2.94e+02
U-235	3.84e+03	0.00e+00	2.33e+02	0.00e+00	8.95e+02	0.00e+00	3.74e+02
U-236	3.84e+03	0.00e+00	2.37e+02	0.00e+00	9.15e+02	0.00e+00	2.76e+02
U-237	2.64e-01	0.00e+00	7.04e-02	0.00e+00	1.09e+00	0.00e+00	9.29e+01
U-238	3.67e+03	0.00e+00	2.17e+02	0.00e+00	8.38e+02	0.00e+00	2.63e+02
Np-237	3.02e+04	2.15e+03	1.33e+03	0.00e+00	9.86e+03	0.00e+00	1.90e+03

Conversion factors are in units of mrem/hr per uCi/ml.

SITE RELATED LIQUID INGESTION DOSE COMMITMENT FACTORS (A_i) FOR INDIVIDUAL NUCLIDES

Ai factors for Adult age group by nuclide.
Waterford Steam Electric Station Unit III
Discharge point : 40 Arpent Canal
Dilution Factor DW = 1.0

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	3.28e-01	8.83e-03	5.10e-03	0.00e+00	2.99e-02	0.00e+00	8.21e+02
Np-239	2.85e-02	2.80e-03	1.54e-03	0.00e+00	8.74e-03	0.00e+00	5.75e+02
Pu-238	5.28e+03	6.69e+02	1.43e+02	0.00e+00	6.13e+02	0.00e+00	6.12e+02
Pu-239	6.07e+03	7.30e+02	1.60e+02	0.00e+00	6.80e+02	0.00e+00	5.58e+02
Pu-240	6.07e+03	7.29e+02	1.60e+02	0.00e+00	6.79e+02	0.00e+00	5.68e+02
Pu-241	1.32e+02	6.24e+00	2.78e+00	0.00e+00	1.28e+01	0.00e+00	1.17e+01
Pu-242	5.63e+03	7.03e+02	1.54e+02	0.00e+00	6.54e+02	0.00e+00	5.47e+02
Pu-244	6.57e+03	8.05e+02	1.77e+02	0.00e+00	7.50e+02	0.00e+00	8.15e+02
Am-241	4.52e+04	4.22e+04	3.24e+03	0.00e+00	2.44e+04	0.00e+00	4.44e+03
Am-242m	4.55e+04	3.97e+04	3.25e+03	0.00e+00	2.42e+04	0.00e+00	5.59e+03
Am-243	4.51e+04	4.13e+04	3.17e+03	0.00e+00	2.39e+04	0.00e+00	5.21e+03
Cm-242	1.23e+03	1.31e+03	8.20e+01	0.00e+00	3.72e+02	0.00e+00	4.74e+03
Cm-243	3.59e+04	3.29e+04	2.24e+03	0.00e+00	1.05e+04	0.00e+00	4.67e+03
Cm-244	2.73e+04	2.56e+04	1.72e+03	0.00e+00	8.02e+03	0.00e+00	4.52e+03
Cm-245	5.61e+04	4.89e+04	3.45e+03	0.00e+00	1.61e+04	0.00e+00	4.21e+03
Cm-246	5.57e+04	4.88e+04	3.44e+03	0.00e+00	1.60e+04	0.00e+00	4.14e+03
Cm-247	5.43e+04	4.81e+04	3.39e+03	0.00e+00	1.58e+04	0.00e+00	5.44e+03
Cm-248	4.51e+05	3.97e+05	2.79e+04	0.00e+00	1.30e+05	0.00e+00	8.80e+04
Cf-252	1.56e+04	0.00e+00	3.76e+02	0.00e+00	0.00e+00	0.00e+00	1.72e+04

Conversion factors are in units of mrem/hr per uCi/ml.

DOSE FACTORS FOR EXPOSURE TO A SEMI-INFINITE CLOUD OF NOBLE GASES

Nuclide	(N_i) β-air*	(L_i) β-Skin**	(M_i) γ-air*	(K_i) γ-Body**
Kr-83m	2.88E+02	---	1.93E+01	7.56E-02
Kr-85m	1.97E+03	1.46E+03	1.23E+03	1.17E+03
Kr-85	1.95E+03	1.34E+03	1.72E+01	1.61E+01
Kr-87	1.03E+04	9.73E+03	6.17E+03	5.92E+03
Kr-88	2.93E+03	2.37E+03	1.52E+04	1.47E+04
Kr-89	1.06E+04	1.01E+04	1.73E+04	1.66E+04
Kr-90	7.83E+03	7.29E+03	1.63E+04	1.56E+04
Xe-131m	1.11E+03	4.76E+02	1.56E+02	9.15E+01
Xe-133m	1.48E+03	9.94E+02	3.27E+02	2.51E+02
Xe-133	1.05E+03	3.06E+02	3.53E+02	2.94E+02
Xe-135m	7.39E+02	7.11E+02	3.36E+03	3.12E+03
Xe-135	2.46E+03	1.86E+03	1.92E+03	1.81E+03
Xe-137	1.27E+04	1.22E+04	1.51E+03	1.42E+03
Xe-138	4.75E+03	4.13E+03	9.21E+03	8.83E+03
Ar-41	3.28E+03	2.69E+03	9.30E+03	8.84E+03

* $\frac{mrad - m^3}{\mu Ci - yr}$

** $\frac{mrem - m^3}{\mu Ci - yr}$

Extracted from Table B-1 of Regulatory Guide 1.109, Revision 1, 1977 multiplied by 1E6 pCi/μCi.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	7.18e+02	7.18e+02	7.18e+02	7.18e+02	7.18e+02	7.18e+02
Be-10	1.58e+06	2.45e+05	3.97e+04	0.00e+00	0.00e+00	1.78e+06	1.34e+05
C-14	1.82e+04	3.41e+03	3.41e+03	3.41e+03	3.41e+03	3.41e+03	3.41e+03
N-13	5.02e+01	5.02e+01	5.02e+01	5.02e+01	5.02e+01	5.02e+01	5.02e+01
F-18	3.77e+03	0.00e+00	4.15e+02	0.00e+00	0.00e+00	0.00e+00	7.39e+01
Na-22	1.04e+05	1.04e+05	1.04e+05	1.04e+05	1.04e+05	1.04e+05	1.04e+05
Na-24	1.02e+04	1.02e+04	1.02e+04	1.02e+04	1.02e+04	1.02e+04	1.02e+04
P-32	1.32e+06	7.71e+04	5.01e+04	0.00e+00	0.00e+00	0.00e+00	8.64e+04
Ca-41	3.06e+05	0.00e+00	3.30e+04	0.00e+00	0.00e+00	3.06e+04	2.29e+03
Sc-46	4.41e+05	8.56e+05	2.49e+05	0.00e+00	7.99e+05	0.00e+00	2.58e+05
Cr-51	0.00e+00	0.00e+00	1.00e+02	5.95e+01	2.28e+01	1.44e+04	3.32e+03
Mn-54	0.00e+00	3.96e+04	6.30e+03	0.00e+00	9.84e+03	1.40e+06	7.74e+04
Mn-56	0.00e+00	1.24e+00	1.83e-01	0.00e+00	1.30e+00	9.44e+03	2.02e+04
Fe-55	2.46e+04	1.70e+04	3.94e+03	0.00e+00	0.00e+00	7.21e+04	6.03e+03
Fe-59	1.18e+04	2.78e+04	1.06e+04	0.00e+00	0.00e+00	1.02e+06	1.88e+05
Co-57	0.00e+00	6.92e+02	6.71e+02	0.00e+00	0.00e+00	3.70e+05	3.14e+04
Co-58	0.00e+00	1.58e+03	2.07e+03	0.00e+00	0.00e+00	9.28e+05	1.06e+05
Co-60	0.00e+00	1.15e+04	1.48e+04	0.00e+00	0.00e+00	5.97e+06	2.85e+05
Ni-59	3.25e+04	1.17e+04	5.42e+03	0.00e+00	0.00e+00	6.56e+04	4.89e+03
Ni-63	4.32e+05	3.14e+04	1.45e+04	0.00e+00	0.00e+00	1.78e+05	1.34e+04
Ni-65	1.54e+00	2.10e-01	9.12e-02	0.00e+00	0.00e+00	5.60e+03	1.23e+04
Cu-64	0.00e+00	1.46e+00	6.15e-01	0.00e+00	4.62e+00	6.78e+03	4.90e+04
Zn-65	3.24e+04	1.03e+05	4.66e+04	0.00e+00	6.90e+04	8.64e+05	5.34e+04
Zn-69	3.38e-02	6.51e-02	4.52e-03	0.00e+00	4.22e-02	9.20e+02	1.63e+01
Zn-69m	8.16e+00	1.96e+01	1.79e+00	0.00e+00	1.18e+01	1.90e+04	1.37e+05
Se-79	0.00e+00	3.06e+03	4.87e+02	0.00e+00	4.55e+03	3.58e+05	2.66e+04
Br-82	0.00e+00	0.00e+00	1.35e+04	0.00e+00	0.00e+00	0.00e+00	1.04e+04
Br-83	0.00e+00	0.00e+00	2.41e+02	0.00e+00	0.00e+00	0.00e+00	2.32e+02
Br-84	0.00e+00	0.00e+00	3.13e+02	0.00e+00	0.00e+00	0.00e+00	1.64e-03
Br-85	0.00e+00	0.00e+00	1.28e+01	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	1.35e+05	5.90e+04	0.00e+00	0.00e+00	0.00e+00	1.66e+04
Rb-87	0.00e+00	7.89e+04	2.57e+04	0.00e+00	0.00e+00	0.00e+00	2.30e+03
Rb-88	0.00e+00	3.87e+02	1.93e+02	0.00e+00	0.00e+00	0.00e+00	3.34e-09
Rb-89	0.00e+00	2.56e+02	1.70e+02	0.00e+00	0.00e+00	0.00e+00	9.28e-12
Sr-89	3.04e+05	0.00e+00	8.72e+03	0.00e+00	0.00e+00	1.40e+06	3.50e+05
Sr-90	2.87e+07	0.00e+00	5.77e+05	0.00e+00	0.00e+00	9.60e+06	7.22e+05
Sr-91	6.19e+01	0.00e+00	2.50e+00	0.00e+00	0.00e+00	3.65e+04	1.91e+05
Sr-92	6.74e+00	0.00e+00	2.91e-01	0.00e+00	0.00e+00	1.65e+04	4.30e+04
Y-90	2.09e+03	0.00e+00	5.61e+01	0.00e+00	0.00e+00	1.70e+05	5.06e+05
Y-91	4.62e+05	0.00e+00	1.24e+04	0.00e+00	0.00e+00	1.70e+06	3.85e+05
Y-91m	2.61e-01	0.00e+00	1.02e-02	0.00e+00	0.00e+00	1.92e+03	1.33e+00
Y-92	1.03e+01	0.00e+00	3.02e-01	0.00e+00	0.00e+00	1.57e+04	7.35e+04
Y-93	9.44e+01	0.00e+00	2.61e+00	0.00e+00	0.00e+00	4.85e+04	4.22e+05
Zr-93	4.18e+05	2.34e+04	1.10e+04	0.00e+00	8.88e+04	1.70e+05	1.21e+04
Zr-95	1.07e+05	3.44e+04	2.33e+04	0.00e+00	5.42e+04	1.77e+06	1.50e+05
Zr-97	9.68e+01	1.96e+01	9.04e+00	0.00e+00	2.97e+01	7.87e+04	5.23e+05
Nb-93m	2.48e+05	8.08e+04	1.99e+04	0.00e+00	9.28e+04	2.49e+05	1.90e+04
Nb-95	1.41e+04	7.82e+03	4.21e+03	0.00e+00	7.74e+03	5.05e+05	1.04e+05
Nb-97	2.22e-01	5.62e-02	2.05e-02	0.00e+00	6.54e-02	2.40e+03	2.42e+02
Mo-93	0.00e+00	9.36e+03	2.54e+02	0.00e+00	2.84e+03	4.09e+05	3.03e+04
Mo-99	0.00e+00	1.21e+02	2.30e+01	0.00e+00	2.91e+02	9.12e+04	2.48e+05
Tc-101	4.18e-05	6.02e-05	5.90e-04	0.00e+00	1.08e-03	3.99e+02	1.09e-11
Tc-99	2.50e+02	3.71e+02	1.00e+02	0.00e+00	4.68e+03	8.08e+05	6.03e+04
Tc-99m	1.03e-03	2.91e-03	3.70e-02	0.00e+00	4.42e-02	7.64e+02	4.16e+03
Ru-103	1.53e+03	0.00e+00	6.58e+02	0.00e+00	5.83e+03	5.05e+05	1.10e+05
Ru-105	7.90e-01	0.00e+00	3.11e-01	0.00e+00	1.02e+00	1.10e+04	4.82e+04
Ru-106	6.91e+04	0.00e+00	8.72e+03	0.00e+00	1.34e+05	9.36e+06	9.12e+05
Rh-105	7.39e+00	5.38e+00	3.54e+00	0.00e+00	2.29e+01	1.93e+04	8.72e+04
Pd-107	0.00e+00	6.62e+02	4.70e+01	0.00e+00	5.26e+03	7.58e+04	5.65e+03
Pd-109	0.00e+00	3.70e+00	9.28e-01	0.00e+00	1.88e+01	1.48e+04	1.22e+05

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	1.08e+04	1.00e+04	5.94e+03	0.00e+00	1.97e+04	4.63e+06	3.02e+05
Ag-111	3.40e+02	1.42e+02	7.10e+01	0.00e+00	4.59e+02	1.86e+05	2.23e+05
Cd-113m	0.00e+00	1.23e+06	3.98e+04	0.00e+00	1.37e+06	1.66e+06	1.27e+05
Cd-115m	0.00e+00	1.97e+05	6.36e+03	0.00e+00	1.58e+05	1.41e+06	3.84e+05
Sn-123	2.42e+05	5.34e+03	7.86e+03	4.54e+03	0.00e+00	2.30e+06	3.14e+05
Sn-125	9.28e+03	2.50e+02	5.62e+02	2.07e+02	0.00e+00	5.90e+05	5.45e+05
Sn-126	1.26e+06	3.34e+04	4.80e+04	9.84e+03	0.00e+00	9.36e+06	1.27e+05
Sb-124	3.12e+04	5.89e+02	1.24e+04	7.55e+01	0.00e+00	2.48e+06	4.06e+05
Sb-125	5.34e+04	5.95e+02	1.26e+04	5.40e+01	0.00e+00	1.74e+06	1.01e+05
Sb-126	3.60e+03	7.30e+01	1.30e+03	2.20e+01	0.00e+00	7.66e+05	4.81e+05
Sb-127	2.64e+02	5.78e+00	1.02e+02	3.18e+00	0.00e+00	1.64e+05	3.02e+05
Te-125m	3.42e+03	1.58e+03	4.67e+02	1.05e+03	1.24e+04	3.14e+05	7.06e+04
Te-127	1.40e+00	6.42e-01	3.10e-01	1.06e+00	5.10e+00	6.51e+03	5.74e+04
Te-127m	1.26e+04	5.77e+03	1.57e+03	3.29e+03	4.58e+04	9.60e+05	1.50e+05
Te-129	4.98e-02	2.39e-02	1.24e-02	3.90e-02	1.87e-01	1.94e+03	1.57e+02
Te-129m	9.76e+03	4.67e+03	1.58e+03	3.44e+03	3.66e+04	1.16e+06	3.83e+05
Te-131	1.11e-02	5.95e-03	3.59e-03	9.36e-03	4.37e-02	1.39e+03	1.84e+01
Te-131m	6.99e+01	4.36e+01	2.90e+01	5.50e+01	3.09e+02	1.46e+05	5.56e+05
Te-132	2.60e+02	2.15e+02	1.62e+02	1.90e+02	1.46e+03	2.88e+05	5.10e+05
Te-133m	5.79e-02	4.32e-02	3.34e-02	5.02e-02	2.99e-01	4.41e+03	6.12e+01
Te-134	3.07e-02	2.58e-02	1.26e-02	2.75e-02	1.74e-01	3.47e+03	2.38e-01
I-129	1.98e+04	1.69e+04	5.53e+04	4.43e+07	3.62e+04	0.00e+00	1.78e+03
I-130	4.58e+03	1.34e+04	5.28e+03	1.14e+06	2.09e+04	0.00e+00	7.69e+03
I-131	2.52e+04	3.58e+04	2.05e+04	1.19e+07	6.13e+04	0.00e+00	6.28e+03
I-132	1.16e+03	3.26e+03	1.16e+03	1.14e+05	5.18e+03	0.00e+00	4.06e+02
I-133	8.64e+03	1.48e+04	4.52e+03	2.15e+06	2.58e+04	0.00e+00	8.88e+03
I-134	6.44e+02	1.73e+03	6.15e+02	2.98e+04	2.75e+03	0.00e+00	1.01e+00
I-135	2.68e+03	6.98e+03	2.57e+03	4.48e+05	1.11e+04	0.00e+00	5.25e+03
Cs-134	3.73e+05	8.48e+05	7.28e+05	0.00e+00	2.87e+05	9.76e+04	1.04e+04
Cs-134m	1.27e+02	2.56e+02	1.38e+02	0.00e+00	1.46e+02	2.34e+01	6.34e+01

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	1.17e+05	1.03e+05	4.79e+04	0.00e+00	4.09e+04	1.26e+04	1.69e+03
Cs-136	3.90e+04	1.46e+05	1.10e+05	0.00e+00	8.56e+04	1.20e+04	1.17e+04
Cs-137	4.78e+05	6.21e+05	4.28e+05	0.00e+00	2.22e+05	7.52e+04	8.40e+03
Cs-138	3.31e+02	6.21e+02	3.24e+02	0.00e+00	4.80e+02	4.86e+01	1.86e-03
Cs-139	2.05e+02	2.90e+02	1.11e+02	0.00e+00	2.44e+02	2.27e+01	4.39e-21
Ba-139	9.36e-01	6.66e-04	2.74e-02	0.00e+00	6.22e-04	3.76e+03	8.96e+02
Ba-140	3.90e+04	4.90e+01	2.57e+03	0.00e+00	1.67e+01	1.27e+06	2.18e+05
Ba-141	1.00e-01	7.53e-05	3.36e-03	0.00e+00	7.00e-05	1.94e+03	1.16e-07
Ba-142	2.63e-02	2.70e-05	1.66e-03	0.00e+00	2.29e-05	1.19e+03	1.57e-16
La-140	3.44e+02	1.74e+02	4.58e+01	0.00e+00	0.00e+00	1.36e+05	4.58e+05
La-141	4.27e+00	1.33e+00	2.17e-01	0.00e+00	0.00e+00	1.08e+04	5.85e+04
La-142	6.83e-01	3.10e-01	7.72e-02	0.00e+00	0.00e+00	6.33e+03	2.11e+03
Ce-141	1.99e+04	1.35e+04	1.53e+03	0.00e+00	6.26e+03	3.62e+05	1.20e+05
Ce-143	1.86e+02	1.38e+02	1.53e+01	0.00e+00	6.08e+01	7.98e+04	2.26e+05
Ce-144	3.43e+06	1.43e+06	1.84e+05	0.00e+00	8.48e+05	7.78e+06	8.16e+05
Pr-143	9.36e+03	3.75e+03	4.64e+02	0.00e+00	2.16e+03	2.81e+05	2.00e+05
Pr-144	3.01e-02	1.25e-02	1.53e-03	0.00e+00	7.05e-03	1.02e+03	2.15e-08
Nd-147	5.27e+03	6.10e+03	3.65e+02	0.00e+00	3.56e+03	2.21e+05	1.73e+05
Pm-147	6.70e+05	6.30e+04	2.55e+04	0.00e+00	1.19e+05	5.28e+05	4.43e+04
Pm-148	3.07e+03	5.10e+02	2.56e+02	0.00e+00	9.60e+02	3.13e+05	4.64e+05
Pm-148m	7.86e+04	2.03e+04	1.55e+04	0.00e+00	3.08e+04	1.71e+06	3.34e+05
Pm-149	2.75e+02	3.90e+01	1.59e+01	0.00e+00	7.35e+01	5.77e+04	2.00e+05
Pm-151	6.80e+01	1.14e+01	5.77e+00	0.00e+00	2.04e+01	3.15e+04	1.60e+05
Sm-151	6.87e+05	1.18e+05	2.84e+04	0.00e+00	1.33e+05	3.56e+05	2.60e+04
Sm-153	1.36e+02	1.14e+02	8.32e+00	0.00e+00	3.67e+01	3.31e+04	1.26e+05
Eu-152	1.90e+06	4.33e+05	3.81e+05	0.00e+00	2.68e+06	2.74e+06	1.27e+05
Eu-154	5.92e+06	7.28e+05	5.18e+05	0.00e+00	3.49e+06	4.67e+06	2.72e+05
Eu-155	8.08e+05	1.14e+05	7.37e+04	0.00e+00	5.27e+05	7.57e+05	4.76e+04
Eu-156	1.54e+04	1.18e+04	1.92e+03	0.00e+00	7.96e+03	6.85e+05	3.60e+05
Tb-160	1.77e+05	0.00e+00	2.20e+04	0.00e+00	7.28e+04	1.54e+06	2.14e+05

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
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Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	2.70e+06	8.40e+05	6.40e+05	0.00e+00	1.26e+06	3.15e+06	1.27e+05
W-181	4.98e+01	1.62e+01	1.74e+00	0.00e+00	0.00e+00	1.37e+04	2.02e+03
W-185	1.56e+03	5.18e+02	5.45e+01	0.00e+00	0.00e+00	4.46e+05	8.56e+04
W-187	8.48e+00	7.08e+00	2.48e+00	0.00e+00	0.00e+00	2.90e+04	1.55e+05
Pb-210	2.11e+08	5.38e+07	6.70e+06	0.00e+00	1.70e+08	2.10e+08	1.21e+04
Bi-210	1.85e+03	1.27e+04	1.06e+03	0.00e+00	1.54e+05	8.88e+06	2.36e+05
Po-210	3.18e+06	6.88e+06	7.66e+05	0.00e+00	2.36e+07	2.51e+08	3.35e+05
Ra-223	1.44e+06	2.22e+03	2.88e+05	0.00e+00	6.28e+04	2.04e+08	2.27e+06
Ra-224	1.58e+05	3.82e+02	3.17e+04	0.00e+00	1.08e+04	7.02e+07	2.41e+06
Ra-225	2.40e+06	2.85e+03	4.79e+05	0.00e+00	8.08e+04	2.34e+08	2.17e+06
Ra-226	1.00e+09	1.91e+04	7.31e+08	0.00e+00	5.42e+05	9.36e+08	2.35e+06
Ra-228	3.53e+08	9.84e+03	3.82e+08	0.00e+00	2.78e+05	1.29e+09	4.00e+05
Ac-225	3.38e+06	4.66e+06	2.27e+05	0.00e+00	5.30e+05	1.77e+08	2.02e+06
Ac-227	1.84e+10	2.44e+09	1.09e+09	0.00e+00	7.86e+08	1.93e+09	4.06e+05
Th-227	1.74e+06	3.14e+04	5.00e+04	0.00e+00	1.78e+05	3.02e+08	2.67e+06
Th-228	1.60e+09	2.71e+07	5.42e+07	0.00e+00	1.51e+08	8.08e+09	2.79e+06
Th-229	1.21e+11	3.47e+09	2.01e+09	0.00e+00	1.70e+10	2.90e+10	3.86e+05
Th-230	1.83e+10	1.05e+09	5.09e+08	0.00e+00	5.12e+09	4.97e+09	2.98e+05
Th-232	2.05e+10	8.96e+08	7.23e+06	0.00e+00	4.38e+09	4.77e+09	2.54e+05
Th-234	1.30e+04	7.65e+02	3.76e+02	0.00e+00	4.33e+03	1.51e+06	5.62e+05
Pa-231	4.06e+10	1.53e+09	1.58e+09	0.00e+00	8.56e+09	4.60e+08	3.55e+05
Pa-233	9.68e+03	1.94e+03	1.67e+03	0.00e+00	7.32e+03	2.82e+05	8.16e+04
U-232	4.11e+08	0.00e+00	2.93e+07	0.00e+00	4.45e+07	1.78e+09	3.37e+05
U-233	8.72e+07	0.00e+00	5.28e+06	0.00e+00	2.03e+07	4.26e+08	3.11e+05
U-234	8.32e+07	0.00e+00	5.17e+06	0.00e+00	1.99e+07	4.18e+08	3.05e+05
U-235	8.00e+07	0.00e+00	4.86e+06	0.00e+00	1.87e+07	3.92e+08	3.87e+05
U-236	8.00e+07	0.00e+00	4.96e+06	0.00e+00	1.91e+07	4.00e+08	2.86e+05
U-237	2.94e+02	0.00e+00	7.82e+01	0.00e+00	1.21e+03	8.16e+04	9.60e+04
U-238	7.66e+07	0.00e+00	4.54e+06	0.00e+00	1.74e+07	3.66e+08	2.73e+05
Np-237	1.25e+10	8.00e+09	5.50e+08	0.00e+00	4.08e+09	4.18e+08	3.94e+05

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	2.37e+03	5.76e+02	3.69e+01	0.00e+00	2.18e+02	8.16e+04	1.70e+05
Np-239	2.30e+02	2.03e+02	1.24e+01	0.00e+00	7.00e+01	3.76e+04	1.19e+05
Pu-238	1.14e+10	7.77e+09	5.52e+08	0.00e+00	2.37e+09	1.46e+09	3.62e+05
Pu-239	1.33e+10	8.56e+09	6.20e+08	0.00e+00	2.64e+09	1.38e+09	3.30e+05
Pu-240	1.32e+10	8.56e+09	6.18e+08	0.00e+00	2.63e+09	1.38e+09	3.37e+05
Pu-241	2.74e+08	6.95e+07	1.03e+07	0.00e+00	4.74e+07	1.22e+06	6.92e+03
Pu-242	1.22e+10	8.24e+09	5.97e+08	0.00e+00	2.54e+09	1.32e+09	3.24e+05
Pu-244	1.43e+10	9.44e+09	6.83e+08	0.00e+00	2.91e+09	1.51e+09	4.82e+05
Am-241	1.34e+10	9.04e+09	5.37e+08	0.00e+00	4.03e+09	4.85e+08	3.68e+05
Am-242m	1.36e+10	8.48e+09	5.38e+08	0.00e+00	4.01e+09	1.95e+08	4.63e+05
Am-243	1.34e+10	8.80e+09	5.26e+08	0.00e+00	3.96e+09	4.60e+08	4.32e+05
Cm-242	1.78e+08	1.42e+08	7.87e+06	0.00e+00	3.58e+07	3.14e+08	3.93e+05
Cm-243	8.80e+09	6.09e+09	3.69e+08	0.00e+00	1.72e+09	5.05e+08	3.87e+05
Cm-244	6.70e+09	4.70e+09	2.81e+08	0.00e+00	1.31e+09	4.85e+08	3.74e+05
Cm-245	1.39e+10	9.12e+09	5.71e+08	0.00e+00	2.66e+09	4.68e+08	3.49e+05
Cm-246	1.38e+10	9.12e+09	5.70e+08	0.00e+00	2.66e+09	4.77e+08	3.43e+05
Cm-247	1.34e+10	8.96e+09	5.62e+08	0.00e+00	2.62e+09	4.68e+08	4.50e+05
Cm-248	1.12e+11	7.41e+10	4.63e+09	0.00e+00	2.16e+10	3.86e+09	7.27e+06
Cf-252	4.34e+09	0.00e+00	1.86e+08	0.00e+00	0.00e+00	1.59e+09	1.42e+06

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	7.25e+02	7.25e+02	7.25e+02	7.25e+02	7.25e+02	7.25e+02
Be-10	2.22e+06	3.46e+05	5.67e+04	0.00e+00	0.00e+00	3.07e+06	1.42e+05
C-14	2.60e+04	4.87e+03	4.87e+03	4.87e+03	4.87e+03	4.87e+03	4.87e+03
N-13	6.92e+01	6.92e+01	6.92e+01	6.92e+01	6.92e+01	6.92e+01	6.92e+01
F-18	5.22e+03	0.00e+00	5.68e+02	0.00e+00	0.00e+00	0.00e+00	3.11e+02
Na-22	1.41e+05	1.41e+05	1.41e+05	1.41e+05	1.41e+05	1.41e+05	1.41e+05
Na-24	1.38e+04	1.38e+04	1.38e+04	1.38e+04	1.38e+04	1.38e+04	1.38e+04
P-32	1.89e+06	1.10e+05	7.16e+04	0.00e+00	0.00e+00	0.00e+00	9.28e+04
Ca-41	3.24e+05	0.00e+00	3.50e+04	0.00e+00	0.00e+00	8.08e+08	2.42e+03
Sc-46	5.79e+05	1.13e+06	3.34e+05	0.00e+00	1.08e+06	0.00e+00	2.38e+05
Cr-51	0.00e+00	0.00e+00	1.35e+02	7.50e+01	3.07e+01	2.10e+04	3.00e+03
Mn-54	0.00e+00	5.11e+04	8.40e+03	0.00e+00	1.27e+04	1.98e+06	6.68e+04
Mn-56	0.00e+00	1.70e+00	2.52e-01	0.00e+00	1.79e+00	1.52e+04	5.74e+04
Fe-55	3.34e+04	2.38e+04	5.54e+03	0.00e+00	0.00e+00	1.24e+05	6.39e+03
Fe-59	1.59e+04	3.70e+04	1.43e+04	0.00e+00	0.00e+00	1.53e+06	1.78e+05
Co-57	0.00e+00	9.44e+02	9.20e+02	0.00e+00	0.00e+00	5.86e+05	3.14e+04
Co-58	0.00e+00	2.07e+03	2.78e+03	0.00e+00	0.00e+00	1.34e+06	9.52e+04
Co-60	0.00e+00	1.51e+04	1.98e+04	0.00e+00	0.00e+00	8.72e+06	2.59e+05
Ni-59	4.35e+04	1.62e+04	7.39e+03	0.00e+00	0.00e+00	1.13e+05	5.18e+03
Ni-63	5.80e+05	4.34e+04	1.98e+04	0.00e+00	0.00e+00	3.07e+05	1.42e+04
Ni-65	2.18e+00	2.93e-01	1.27e-01	0.00e+00	0.00e+00	9.36e+03	3.67e+04
Cu-64	0.00e+00	2.03e+00	8.48e-01	0.00e+00	6.41e+00	1.11e+04	6.14e+04
Zn-65	3.86e+04	1.34e+05	6.24e+04	0.00e+00	8.64e+04	1.24e+06	4.66e+04
Zn-69	4.83e-02	9.20e-02	6.46e-03	0.00e+00	6.02e-02	1.58e+03	2.85e+02
Zn-69m	1.15e+01	2.71e+01	2.49e+00	0.00e+00	1.65e+01	3.14e+04	1.71e+05
Se-79	0.00e+00	4.34e+03	6.97e+02	0.00e+00	6.50e+03	6.17e+05	2.82e+04
Br-82	0.00e+00	0.00e+00	1.82e+04	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-83	0.00e+00	0.00e+00	3.44e+02	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-84	0.00e+00	0.00e+00	4.33e+02	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-85	0.00e+00	0.00e+00	1.83e+01	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	1.90e+05	8.40e+04	0.00e+00	0.00e+00	0.00e+00	1.77e+04
Rb-87	0.00e+00	1.12e+05	3.66e+04	0.00e+00	0.00e+00	0.00e+00	2.44e+03
Rb-88	0.00e+00	5.46e+02	2.72e+02	0.00e+00	0.00e+00	0.00e+00	2.92e-05
Rb-89	0.00e+00	3.52e+02	2.33e+02	0.00e+00	0.00e+00	0.00e+00	3.38e-07
Sr-89	4.34e+05	0.00e+00	1.25e+04	0.00e+00	0.00e+00	2.42e+06	3.71e+05
Sr-90	3.31e+07	0.00e+00	6.66e+05	0.00e+00	0.00e+00	1.65e+07	7.65e+05
Sr-91	8.80e+01	0.00e+00	3.51e+00	0.00e+00	0.00e+00	6.07e+04	2.59e+05
Sr-92	9.52e+00	0.00e+00	4.06e-01	0.00e+00	0.00e+00	2.74e+04	1.19e+05
Y-90	2.98e+03	0.00e+00	8.00e+01	0.00e+00	0.00e+00	2.93e+05	5.59e+05
Y-91	6.61e+05	0.00e+00	1.77e+04	0.00e+00	0.00e+00	2.94e+06	4.09e+05
Y-91m	3.70e-01	0.00e+00	1.42e-02	0.00e+00	0.00e+00	3.20e+03	3.02e+01
Y-92	1.47e+01	0.00e+00	4.29e-01	0.00e+00	0.00e+00	2.68e+04	1.65e+05
Y-93	1.35e+02	0.00e+00	3.72e+00	0.00e+00	0.00e+00	8.32e+04	5.79e+05
Zr-93	5.46e+05	2.70e+04	1.47e+04	0.00e+00	9.28e+04	2.94e+05	1.28e+04
Zr-95	1.46e+05	4.58e+04	3.15e+04	0.00e+00	6.74e+04	2.69e+06	1.49e+05
Zr-97	1.38e+02	2.72e+01	1.26e+01	0.00e+00	4.12e+01	1.30e+05	6.30e+05
Nb-93m	3.31e+05	1.09e+05	2.73e+04	0.00e+00	1.27e+05	4.29e+05	2.02e+04
Nb-95	1.86e+04	1.03e+04	5.66e+03	0.00e+00	1.00e+04	7.51e+05	9.68e+04
Nb-97	3.14e-01	7.78e-02	2.84e-02	0.00e+00	9.12e-02	3.93e+03	2.17e+03
Mo-93	0.00e+00	1.33e+04	3.62e+02	0.00e+00	4.05e+03	7.05e+05	3.19e+04
Mo-99	0.00e+00	1.69e+02	3.22e+01	0.00e+00	4.11e+02	1.54e+05	2.69e+05
Tc-101	5.92e-05	8.40e-05	8.24e-04	0.00e+00	1.52e-03	6.67e+02	8.72e-07
Tc-99	3.58e+02	5.26e+02	1.43e+02	0.00e+00	6.68e+03	1.39e+06	6.39e+04
Tc-99m	1.38e-03	3.86e-03	4.99e-02	0.00e+00	5.76e-02	1.15e+03	6.13e+03
Ru-103	2.10e+03	0.00e+00	8.96e+02	0.00e+00	7.43e+03	7.83e+05	1.09e+05
Ru-105	1.12e+00	0.00e+00	4.34e-01	0.00e+00	1.41e+00	1.82e+04	9.04e+04
Ru-106	9.84e+04	0.00e+00	1.24e+04	0.00e+00	1.90e+05	1.61e+07	9.60e+05
Rh-105	1.06e+01	7.58e+00	4.99e+00	0.00e+00	3.23e+01	3.27e+04	9.84e+04
Pd-107	0.00e+00	9.36e+02	6.71e+01	0.00e+00	7.51e+03	1.30e+05	5.99e+03
Pd-109	0.00e+00	5.25e+00	1.33e+00	0.00e+00	2.69e+01	2.55e+04	1.57e+05

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	1.38e+04	1.31e+04	7.99e+03	0.00e+00	2.50e+04	6.75e+06	2.73e+05
Ag-111	4.86e+02	2.02e+02	1.01e+02	0.00e+00	6.54e+02	3.20e+05	2.40e+05
Cd-113m	0.00e+00	1.74e+06	5.68e+04	0.00e+00	1.94e+06	2.87e+06	1.34e+05
Cd-115m	0.00e+00	2.78e+05	9.12e+03	0.00e+00	2.26e+05	2.42e+06	4.08e+05
Sn-123	3.45e+05	7.55e+03	1.12e+04	6.04e+03	0.00e+00	3.97e+06	3.33e+05
Sn-125	1.33e+04	3.54e+02	7.99e+02	2.76e+02	0.00e+00	1.01e+06	5.83e+05
Sn-126	1.74e+06	4.31e+04	6.59e+04	1.14e+04	0.00e+00	1.38e+07	1.34e+05
Sb-124	4.30e+04	7.94e+02	1.68e+04	9.76e+01	0.00e+00	3.85e+06	3.98e+05
Sb-125	7.38e+04	8.08e+02	1.72e+04	7.04e+01	0.00e+00	2.74e+06	9.92e+04
Sb-126	4.95e+03	1.02e+02	1.78e+03	2.80e+01	0.00e+00	1.24e+06	4.81e+05
Sb-127	3.71e+02	7.94e+00	1.40e+02	4.17e+00	0.00e+00	2.65e+05	3.15e+05
Te-125m	4.88e+03	2.24e+03	6.67e+02	1.40e+03	0.00e+00	5.36e+05	7.50e+04
Te-127	2.01e+00	9.12e-01	4.42e-01	1.42e+00	7.28e+00	1.12e+04	8.08e+04
Te-127m	1.80e+04	8.16e+03	2.18e+03	4.38e+03	6.54e+04	1.66e+06	1.59e+05
Te-129	7.10e-02	3.38e-02	1.76e-02	5.18e-02	2.66e-01	3.30e+03	1.62e+03
Te-129m	1.39e+04	6.58e+03	2.25e+03	4.58e+03	5.19e+04	1.98e+06	4.05e+05
Te-131	1.58e-02	8.32e-03	5.04e-03	1.24e-02	6.18e-02	2.34e+03	1.51e+01
Te-131m	9.84e+01	6.01e+01	4.02e+01	7.25e+01	4.39e+02	2.38e+05	6.21e+05
Te-132	3.60e+02	2.90e+02	2.19e+02	2.46e+02	1.95e+03	4.49e+05	4.63e+05
Te-133m	8.08e-02	5.86e-02	4.57e-02	6.54e-02	4.06e-01	6.97e+03	9.84e+02
Te-134	4.25e-02	3.48e-02	2.91e-02	3.57e-02	2.33e-01	5.40e+03	1.10e+01
I-129	2.82e+04	2.35e+04	3.92e+04	2.93e+07	4.21e+04	0.00e+00	1.83e+03
I-130	6.24e+03	1.79e+04	7.17e+03	1.49e+06	2.75e+04	0.00e+00	9.12e+03
I-131	3.54e+04	4.91e+04	2.64e+04	1.46e+07	8.40e+04	0.00e+00	6.49e+03
I-132	1.59e+03	4.38e+03	1.58e+03	1.51e+05	6.92e+03	0.00e+00	1.27e+03
I-133	1.22e+04	2.05e+04	6.22e+03	2.92e+06	3.59e+04	0.00e+00	1.03e+04
I-134	8.88e+02	2.32e+03	8.40e+02	3.95e+04	3.66e+03	0.00e+00	2.04e+01
I-135	3.70e+03	9.44e+03	3.49e+03	6.21e+05	1.49e+04	0.00e+00	6.95e+03
Cs-134	5.02e+05	1.13e+06	5.49e+05	0.00e+00	3.75e+05	1.46e+05	9.76e+03
Cs-134m	1.76e+02	3.48e+02	1.88e+02	0.00e+00	2.03e+02	3.65e+01	1.62e+02

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	1.66e+05	1.46e+05	3.58e+04	0.00e+00	5.84e+04	2.16e+04	1.78e+03
Cs-136	5.15e+04	1.94e+05	1.37e+05	0.00e+00	1.10e+05	1.78e+04	1.09e+04
Cs-137	6.70e+05	8.48e+05	3.11e+05	0.00e+00	3.04e+05	1.21e+05	8.48e+03
Cs-138	4.66e+02	8.56e+02	4.46e+02	0.00e+00	6.62e+02	7.87e+01	2.70e-01
Cs-139	2.92e+02	4.10e+02	1.58e+02	0.00e+00	3.47e+02	3.89e+01	1.33e-13
Ba-139	1.34e+00	9.44e-04	3.90e-02	0.00e+00	8.88e-04	6.46e+03	6.45e+03
Ba-140	5.47e+04	6.70e+01	3.52e+03	0.00e+00	2.28e+01	2.03e+06	2.29e+05
Ba-141	1.42e-01	1.06e-04	4.74e-03	0.00e+00	9.84e-05	3.29e+03	7.46e-04
Ba-142	3.70e-02	3.70e-05	2.27e-03	0.00e+00	3.14e-05	1.91e+03	4.79e-10
La-140	4.79e+02	2.36e+02	6.26e+01	0.00e+00	0.00e+00	2.14e+05	4.87e+05
La-141	6.10e+00	1.88e+00	3.10e-01	0.00e+00	0.00e+00	1.85e+04	1.23e+05
La-142	9.60e-01	4.25e-01	1.06e-01	0.00e+00	0.00e+00	1.02e+04	1.20e+04
Ce-141	2.84e+04	1.90e+04	2.17e+03	0.00e+00	8.88e+03	6.14e+05	1.26e+05
Ce-143	2.66e+02	1.94e+02	2.16e+01	0.00e+00	8.64e+01	1.30e+05	2.55e+05
Ce-144	4.89e+06	2.02e+06	2.62e+05	0.00e+00	1.21e+06	1.34e+07	8.64e+05
Pr-143	1.34e+04	5.31e+03	6.62e+02	0.00e+00	3.09e+03	4.83e+05	2.14e+05
Pr-144	4.30e-02	1.76e-02	2.18e-03	0.00e+00	1.01e-02	1.75e+03	2.35e-04
Nd-147	7.86e+03	8.56e+03	5.13e+02	0.00e+00	5.02e+03	3.72e+05	1.82e+05
Pm-147	9.20e+05	8.80e+04	3.60e+04	0.00e+00	1.68e+05	9.12e+05	4.70e+04
Pm-148	4.35e+03	7.10e+02	3.58e+02	0.00e+00	1.28e+03	5.22e+05	4.91e+05
Pm-148m	1.06e+05	2.68e+04	2.10e+04	0.00e+00	4.06e+04	2.56e+06	3.28e+05
Pm-149	3.93e+02	5.51e+01	2.27e+01	0.00e+00	1.05e+02	9.92e+04	2.23e+05
Pm-151	9.60e+01	1.59e+01	8.08e+00	0.00e+00	2.86e+01	5.25e+04	1.82e+05
Sm-151	8.56e+05	1.68e+05	3.89e+04	0.00e+00	1.82e+05	6.14e+05	2.82e+04
Sm-153	1.94e+02	1.61e+02	1.18e+01	0.00e+00	5.25e+01	5.69e+04	1.42e+05
Eu-152	2.37e+06	5.75e+05	5.04e+05	0.00e+00	2.67e+06	4.01e+06	1.08e+05
Eu-154	7.54e+06	9.84e+05	6.88e+05	0.00e+00	4.35e+06	7.30e+06	2.67e+05
Eu-155	1.60e+06	1.57e+05	9.68e+04	0.00e+00	6.12e+05	1.21e+07	4.78e+05
Eu-156	2.16e+04	1.62e+04	2.64e+03	0.00e+00	1.09e+04	1.10e+06	3.65e+05
Tb-160	2.43e+05	0.00e+00	3.03e+04	0.00e+00	9.60e+04	2.38e+06	2.08e+05

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	3.52e+06	1.09e+06	7.90e+05	0.00e+00	1.60e+06	4.99e+06	1.34e+05
W-181	7.12e+01	2.30e+01	2.41e+00	0.00e+00	0.00e+00	2.36e+04	2.15e+03
W-185	2.22e+03	7.34e+02	7.78e+01	0.00e+00	0.00e+00	7.68e+05	9.12e+04
W-187	1.20e+01	9.76e+00	3.43e+00	0.00e+00	0.00e+00	4.74e+04	1.77e+05
Pb-210	2.47e+08	6.62e+07	8.56e+06	0.00e+00	2.36e+08	3.62e+08	1.28e+04
Bi-210	2.64e+03	1.81e+04	1.51e+03	0.00e+00	2.19e+05	1.53e+07	2.55e+05
Po-210	4.54e+06	9.76e+06	1.10e+06	0.00e+00	3.37e+07	4.33e+08	3.56e+05
Ra-223	2.06e+06	3.14e+03	4.11e+05	0.00e+00	8.96e+04	3.51e+08	2.43e+06
Ra-224	2.26e+05	5.42e+02	4.52e+04	0.00e+00	1.54e+04	1.21e+08	2.63e+06
Ra-225	3.42e+06	4.03e+03	6.85e+05	0.00e+00	1.15e+05	4.03e+08	2.31e+06
Ra-226	1.06e+09	2.70e+04	7.90e+08	0.00e+00	7.74e+05	1.62e+09	2.49e+06
Ra-228	4.27e+08	1.39e+04	4.70e+08	0.00e+00	3.98e+05	2.22e+09	4.24e+05
Ac-225	4.83e+06	6.60e+06	3.25e+05	0.00e+00	7.58e+05	3.05e+08	2.16e+06
Ac-227	1.99e+10	2.95e+09	1.18e+09	0.00e+00	8.56e+08	3.33e+09	4.30e+05
Th-227	2.47e+06	4.45e+04	7.14e+04	0.00e+00	2.54e+05	5.20e+08	2.86e+06
Th-228	2.08e+09	3.50e+07	7.02e+07	0.00e+00	1.96e+08	1.35e+10	2.96e+06
Th-229	1.23e+11	3.55e+09	2.05e+09	0.00e+00	1.74e+10	4.19e+10	4.10e+05
Th-230	1.87e+10	1.07e+09	5.19e+08	0.00e+00	5.24e+09	7.18e+09	3.16e+05
Th-232	2.09e+10	9.12e+08	7.37e+06	0.00e+00	4.48e+09	6.88e+09	2.69e+05
Th-234	1.86e+04	1.08e+03	5.37e+02	0.00e+00	6.18e+03	2.61e+06	5.99e+05
Pa-231	4.26e+10	1.60e+09	1.66e+09	0.00e+00	8.96e+09	7.93e+08	3.77e+05
Pa-233	1.34e+04	2.59e+03	2.31e+03	0.00e+00	9.76e+03	4.31e+05	8.00e+04
U-232	5.85e+08	0.00e+00	4.18e+07	0.00e+00	6.35e+07	3.07e+09	3.57e+05
U-233	1.24e+08	0.00e+00	7.54e+06	0.00e+00	2.90e+07	7.34e+08	3.30e+05
U-234	1.18e+08	0.00e+00	7.38e+06	0.00e+00	2.84e+07	7.19e+08	3.23e+05
U-235	1.14e+08	0.00e+00	6.94e+06	0.00e+00	2.67e+07	6.75e+08	4.10e+05
U-236	1.14e+08	0.00e+00	7.09e+06	0.00e+00	2.73e+07	6.90e+08	3.03e+05
U-237	4.20e+02	0.00e+00	1.12e+02	0.00e+00	1.73e+03	1.41e+05	1.03e+05
U-238	1.09e+08	0.00e+00	6.48e+06	0.00e+00	2.50e+07	6.31e+08	2.90e+05
Np-237	1.31e+10	8.48e+09	5.77e+08	0.00e+00	4.28e+09	7.19e+08	4.18e+05

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	3.38e+03	8.16e+02	5.27e+01	0.00e+00	3.10e+02	1.40e+05	1.90e+05
Np-239	3.38e+02	2.88e+02	1.77e+01	0.00e+00	1.00e+02	6.49e+04	1.32e+05
Pu-238	1.20e+10	8.24e+09	5.78e+08	0.00e+00	2.48e+09	2.50e+09	3.83e+05
Pu-239	1.38e+10	8.96e+09	6.44e+08	0.00e+00	2.75e+09	2.34e+09	3.50e+05
Pu-240	1.38e+10	8.96e+09	6.43e+08	0.00e+00	2.74e+09	2.34e+09	3.57e+05
Pu-241	2.99e+08	7.65e+07	1.12e+07	0.00e+00	5.18e+07	2.08e+06	7.34e+03
Pu-242	1.28e+10	8.64e+09	6.20e+08	0.00e+00	2.65e+09	2.26e+09	3.43e+05
Pu-244	1.50e+10	9.92e+09	7.10e+08	0.00e+00	3.03e+09	2.58e+09	5.11e+05
Am-241	1.42e+10	9.60e+09	5.68e+08	0.00e+00	4.26e+09	8.40e+08	3.90e+05
Am-242m	1.43e+10	9.04e+09	5.72e+08	0.00e+00	4.24e+09	3.37e+08	4.91e+05
Am-243	1.42e+10	9.36e+09	5.56e+08	0.00e+00	4.17e+09	7.93e+08	4.58e+05
Cm-242	2.54e+08	2.01e+08	1.13e+07	0.00e+00	5.12e+07	5.41e+08	4.17e+05
Cm-243	9.52e+09	6.64e+09	4.00e+08	0.00e+00	1.87e+09	8.72e+08	4.10e+05
Cm-244	7.35e+09	5.22e+09	3.10e+08	0.00e+00	1.45e+09	8.40e+08	3.97e+05
Cm-245	1.46e+10	9.76e+09	6.02e+08	0.00e+00	2.82e+09	8.08e+08	3.70e+05
Cm-246	1.45e+10	9.76e+09	6.02e+08	0.00e+00	2.81e+09	8.24e+08	3.63e+05
Cm-247	1.42e+10	9.52e+09	5.93e+08	0.00e+00	2.77e+09	8.08e+08	4.78e+05
Cm-248	1.18e+11	7.86e+10	4.89e+09	0.00e+00	2.28e+10	6.66e+09	7.70e+06
Cf-252	5.73e+09	0.00e+00	2.46e+08	0.00e+00	0.00e+00	2.74e+09	1.51e+06

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	6.40e+02	6.40e+02	6.40e+02	6.40e+02	6.40e+02	6.40e+02
Be-10	3.12e+06	3.64e+05	7.84e+04	0.00e+00	0.00e+00	2.74e+06	6.36e+04
C-14	3.59e+04	6.73e+03	6.73e+03	6.73e+03	6.73e+03	6.73e+03	6.73e+03
N-13	8.62e+01	8.62e+01	8.62e+01	8.62e+01	8.62e+01	8.62e+01	8.62e+01
F-18	6.96e+03	0.00e+00	6.84e+02	0.00e+00	0.00e+00	0.00e+00	1.25e+03
Na-22	1.63e+05	1.63e+05	1.63e+05	1.63e+05	1.63e+05	1.63e+05	1.63e+05
Na-24	1.61e+04	1.61e+04	1.61e+04	1.61e+04	1.61e+04	1.61e+04	1.61e+04
P-32	2.60e+06	1.14e+05	9.88e+04	0.00e+00	0.00e+00	0.00e+00	4.22e+04
Ca-41	2.61e+05	0.00e+00	2.85e+04	0.00e+00	0.00e+00	2.67e+08	1.09e+03
Sc-46	7.29e+05	9.99e+05	3.85e+05	0.00e+00	8.84e+05	0.00e+00	9.06e+04
Cr-51	0.00e+00	0.00e+00	1.54e+02	8.55e+01	2.43e+01	1.70e+04	1.08e+03
Mn-54	0.00e+00	4.29e+04	9.51e+03	0.00e+00	1.00e+04	1.58e+06	2.29e+04
Mn-56	0.00e+00	1.66e+00	3.12e-01	0.00e+00	1.67e+00	1.31e+04	1.23e+05
Fe-55	4.74e+04	2.52e+04	7.77e+03	0.00e+00	0.00e+00	1.11e+05	2.87e+03
Fe-59	2.07e+04	3.34e+04	1.67e+04	0.00e+00	0.00e+00	1.27e+06	7.07e+04
Co-57	0.00e+00	9.03e+02	1.07e+03	0.00e+00	0.00e+00	5.07e+05	1.32e+04
Co-58	0.00e+00	1.77e+03	3.16e+03	0.00e+00	0.00e+00	1.11e+06	3.44e+04
Co-60	0.00e+00	1.31e+04	2.26e+04	0.00e+00	0.00e+00	7.07e+06	9.62e+04
Ni-59	6.14e+04	1.73e+04	1.05e+04	0.00e+00	0.00e+00	1.01e+05	2.33e+03
Ni-63	8.21e+05	4.62e+04	2.80e+04	0.00e+00	0.00e+00	2.75e+05	6.33e+03
Ni-65	2.99e+00	2.96e-01	1.64e-01	0.00e+00	0.00e+00	8.18e+03	8.40e+04
Cu-64	0.00e+00	1.99e+00	1.07e+00	0.00e+00	6.03e+00	9.58e+03	3.67e+04
Zn-65	4.26e+04	1.13e+05	7.03e+04	0.00e+00	7.14e+04	9.95e+05	1.63e+04
Zn-69	6.70e-02	9.66e-02	8.92e-03	0.00e+00	5.85e-02	1.42e+03	1.02e+04
Zn-69m	1.58e+01	2.69e+01	3.18e+00	0.00e+00	1.56e+01	2.72e+04	1.00e+05
Se-79	0.00e+00	4.55e+03	9.62e+02	0.00e+00	6.33e+03	5.51e+05	1.27e+04
Br-82	0.00e+00	0.00e+00	2.09e+04	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-83	0.00e+00	0.00e+00	4.74e+02	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-84	0.00e+00	0.00e+00	5.48e+02	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-85	0.00e+00	0.00e+00	2.53e+01	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Rclcase Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	1.98e+05	1.14e+05	0.00e+00	0.00e+00	0.00e+00	7.99e+03
Rb-87	0.00e+00	1.17e+05	5.07e+04	0.00e+00	0.00e+00	0.00e+00	1.10e+03
Rb-88	0.00e+00	5.62e+02	3.66e+02	0.00e+00	0.00e+00	0.00e+00	1.72e+01
Rb-89	0.00e+00	3.45e+02	2.90e+02	0.00e+00	0.00e+00	0.00e+00	1.89e+00
Sr-89	5.99e+05	0.00e+00	1.72e+04	0.00e+00	0.00e+00	2.16e+06	1.67e+05
Sr-90	3.85e+07	0.00e+00	7.66e+05	0.00e+00	0.00e+00	1.48e+07	3.43e+05
Sr-91	1.21e+02	0.00e+00	4.59e+00	0.00e+00	0.00e+00	5.33e+04	1.74e+05
Sr-92	1.31e+01	0.00e+00	5.25e-01	0.00e+00	0.00e+00	2.40e+04	2.42e+05
Y-90	4.11e+03	0.00e+00	1.11e+02	0.00e+00	0.00e+00	2.62e+05	2.68e+05
Y-91	9.14e+05	0.00e+00	2.44e+04	0.00e+00	0.00e+00	2.63e+06	1.84e+05
Y-91m	5.07e-01	0.00e+00	1.84e-02	0.00e+00	0.00e+00	2.81e+03	1.72e+03
Y-92	2.03e+01	0.00e+00	5.81e-01	0.00e+00	0.00e+00	2.39e+04	2.39e+05
Y-93	1.86e+02	0.00e+00	5.11e+00	0.00e+00	0.00e+00	7.44e+04	3.88e+05
Zr-93	7.66e+05	2.89e+04	2.05e+04	0.00e+00	1.11e+05	2.63e+05	5.44e+03
Zr-95	1.90e+05	4.18e+04	3.70e+04	0.00e+00	5.96e+04	2.23e+06	6.11e+04
Zr-97	1.88e+02	2.72e+01	1.60e+01	0.00e+00	3.88e+01	1.13e+05	3.51e+05
Nb-93m	4.70e+05	1.17e+05	3.85e+04	0.00e+00	1.27e+05	3.85e+05	9.06e+03
Nb-95	2.35e+04	9.18e+03	6.55e+03	0.00e+00	8.62e+03	6.14e+05	3.70e+04
Nb-97	4.29e-01	7.70e-02	3.60e-02	0.00e+00	8.55e-02	3.42e+03	2.78e+04
Mo-93	0.00e+00	1.39e+04	5.00e+02	0.00e+00	3.92e+03	6.29e+05	1.40e+04
Mo-99	0.00e+00	1.72e+02	4.26e+01	0.00e+00	3.92e+02	1.35e+05	1.27e+05
Tc-101	8.10e-05	8.51e-05	1.08e-03	0.00e+00	1.45e-03	5.85e+02	1.63e+01
Tc-99	4.96e+02	5.51e+02	1.98e+02	0.00e+00	6.48e+03	1.25e+06	2.87e+04
Tc-99m	1.78e-03	3.48e-03	5.77e-02	0.00e+00	5.07e-02	9.51e+02	4.81e+03
Ru-103	2.79e+03	0.00e+00	1.07e+03	0.00e+00	7.03e+03	6.62e+05	4.48e+04
Ru-105	1.53e+00	0.00e+00	5.55e-01	0.00e+00	1.34e+00	1.59e+04	9.95e+04
Ru-106	1.36e+05	0.00e+00	1.69e+04	0.00e+00	1.84e+05	1.43e+07	4.29e+05
Rh-105	1.45e+01	7.77e+00	6.62e+00	0.00e+00	3.10e+01	2.89e+04	4.92e+04
Pd-107	0.00e+00	9.80e+02	9.29e+01	0.00e+00	7.29e+03	1.17e+05	2.69e+03
Pd-109	0.00e+00	5.48e+00	1.83e+00	0.00e+00	2.61e+01	2.28e+04	9.58e+04

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	1.69e+04	1.14e+04	9.14e+03	0.00e+00	2.12e+04	5.48e+06	1.00e+05
Ag-111	6.70e+02	2.10e+02	1.39e+02	0.00e+00	6.33e+02	2.86e+05	1.10e+05
Cd-113m	0.00e+00	1.82e+06	7.84e+04	0.00e+00	1.90e+06	2.57e+06	6.03e+04
Cd-115m	0.00e+00	2.92e+05	1.25e+04	0.00e+00	2.19e+05	2.17e+06	1.84e+05
Sn-123	4.77e+05	7.92e+03	1.55e+04	8.40e+03	0.00e+00	3.55e+06	1.50e+05
Sn-125	1.83e+04	3.68e+02	1.09e+03	3.81e+02	0.00e+00	8.99e+05	2.65e+05
Sn-126	2.31e+06	3.85e+04	8.73e+04	1.05e+04	0.00e+00	1.12e+07	6.03e+04
Sb-124	5.74e+04	7.40e+02	2.00e+04	1.26e+02	0.00e+00	3.24e+06	1.64e+05
Sb-125	9.84e+04	7.58e+02	2.07e+04	9.10e+01	0.00e+00	2.32e+06	4.03e+04
Sb-126	6.36e+03	9.69e+01	2.28e+03	3.70e+01	0.00e+00	1.06e+06	2.10e+05
Sb-127	5.03e+02	7.73e+00	1.74e+02	5.59e+00	0.00e+00	2.28e+05	1.41e+05
Te-125m	6.73e+03	2.33e+03	9.14e+02	1.92e+03	0.00e+00	4.77e+05	3.38e+04
Te-127	2.77e+00	9.51e-01	6.10e-01	1.96e+00	7.07e+00	1.00e+04	5.62e+04
Te-127m	2.49e+04	8.55e+03	3.02e+03	6.07e+03	6.36e+04	1.48e+06	7.14e+04
Te-129	9.77e-02	3.50e-02	2.38e-02	7.14e-02	2.57e-01	2.93e+03	2.55e+04
Te-129m	1.92e+04	6.84e+03	3.04e+03	6.33e+03	5.03e+04	1.76e+06	1.82e+05
Te-131	2.17e-02	8.44e-03	6.59e-03	1.70e-02	5.88e-02	2.05e+03	1.33e+03
Te-131m	1.34e+02	5.92e+01	5.07e+01	9.77e+01	4.00e+02	2.06e+05	3.08e+05
Te-132	4.81e+02	2.72e+02	2.63e+02	3.17e+02	1.77e+03	3.77e+05	1.38e+05
Te-133m	1.08e-01	5.59e-02	5.55e-02	8.58e-02	3.74e-01	5.92e+03	1.76e+04
Te-134	5.66e-02	3.26e-02	3.48e-02	4.59e-02	2.11e-01	4.55e+03	1.80e+03
I-129	3.88e+04	2.37e+04	2.11e+04	1.58e+07	4.00e+04	0.00e+00	7.96e+02
I-130	8.18e+03	1.64e+04	8.44e+03	1.85e+06	2.45e+04	0.00e+00	5.11e+03
I-131	4.81e+04	4.81e+04	2.73e+04	1.62e+07	7.88e+04	0.00e+00	2.84e+03
I-132	2.12e+03	4.07e+03	1.88e+03	1.94e+05	6.25e+03	0.00e+00	3.20e+03
I-133	1.66e+04	2.03e+04	7.70e+03	3.85e+06	3.38e+04	0.00e+00	5.48e+03
I-134	1.17e+03	2.16e+03	9.95e+02	5.07e+04	3.30e+03	0.00e+00	9.55e+02
I-135	4.92e+03	8.73e+03	4.14e+03	7.92e+05	1.34e+04	0.00e+00	4.44e+03
Cs-134	6.51e+05	1.01e+06	2.25e+05	0.00e+00	3.30e+05	1.21e+05	3.85e+03
Cs-134m	2.34e+02	3.30e+02	2.26e+02	0.00e+00	1.83e+02	3.09e+01	2.93e+02

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	2.31e+05	1.53e+05	1.65e+04	0.00e+00	5.66e+04	1.93e+04	8.03e+02
Cs-136	6.51e+04	1.71e+05	1.16e+05	0.00e+00	9.55e+04	1.45e+04	4.18e+03
Cs-137	9.06e+05	8.25e+05	1.28e+05	0.00e+00	2.82e+05	1.04e+05	3.62e+03
Cs-138	6.33e+02	8.40e+02	5.55e+02	0.00e+00	6.22e+02	6.81e+01	2.70e+02
Cs-139	4.03e+02	4.26e+02	2.15e+02	0.00e+00	3.36e+02	3.46e+01	2.68e-02
Ba-139	1.84e+00	9.84e-04	5.36e-02	0.00e+00	8.62e-04	5.77e+03	5.77e+04
Ba-140	7.40e+04	6.48e+01	4.33e+03	0.00e+00	2.11e+01	1.74e+06	1.02e+05
Ba-141	1.96e-01	1.09e-04	6.36e-03	0.00e+00	9.47e-05	2.92e+03	2.75e+02
Ba-142	5.00e-02	3.60e-05	2.79e-03	0.00e+00	2.91e-05	1.64e+03	2.74e+00
La-140	6.44e+02	2.25e+02	7.55e+01	0.00e+00	0.00e+00	1.83e+05	2.26e+05
La-141	8.44e+00	1.96e+00	4.26e-01	0.00e+00	0.00e+00	1.66e+04	1.62e+05
La-142	1.30e+00	4.11e-01	1.29e-01	0.00e+00	0.00e+00	8.70e+03	7.58e+04
Ce-141	3.92e+04	1.95e+04	2.90e+03	0.00e+00	8.55e+03	5.44e+05	5.66e+04
Ce-143	3.66e+02	1.99e+02	2.87e+01	0.00e+00	8.36e+01	1.15e+05	1.27e+05
Ce-144	6.77e+06	2.12e+06	3.61e+05	0.00e+00	1.17e+06	1.20e+07	3.88e+05
Pr-143	1.85e+04	5.55e+03	9.14e+02	0.00e+00	3.00e+03	4.33e+05	9.73e+04
Pr-144	5.96e-02	1.85e-02	3.00e-03	0.00e+00	9.77e-03	1.57e+03	1.97e+02
Nd-147	1.08e+04	8.73e+03	6.81e+02	0.00e+00	4.81e+03	3.28e+05	8.21e+04
Pm-147	1.30e+06	9.32e+04	5.03e+04	0.00e+00	1.65e+05	8.14e+05	2.11e+04
Pm-148	5.96e+03	7.18e+02	4.62e+02	0.00e+00	1.22e+03	4.59e+05	2.22e+05
Pm-148m	1.22e+05	2.42e+04	2.42e+04	0.00e+00	3.60e+04	2.12e+06	1.32e+05
Pm-149	5.44e+02	5.77e+01	3.13e+01	0.00e+00	1.02e+02	8.88e+04	1.08e+05
Pm-151	1.32e+02	1.60e+01	1.04e+01	0.00e+00	2.72e+01	4.59e+04	9.25e+04
Sm-151	1.16e+06	1.76e+05	5.51e+04	0.00e+00	1.81e+05	5.48e+05	1.27e+04
Sm-153	2.68e+02	1.67e+02	1.61e+01	0.00e+00	5.07e+01	5.07e+04	6.92e+04
Eu-152	2.75e+06	5.07e+05	5.96e+05	0.00e+00	2.12e+06	3.33e+06	4.22e+04
Eu-154	1.01e+07	9.21e+05	8.40e+05	0.00e+00	4.03e+06	6.14e+06	1.10e+05
Eu-155	2.07e+06	1.50e+05	1.18e+05	0.00e+00	5.59e+05	1.03e+06	1.99e+05
Eu-156	2.92e+04	1.57e+04	3.24e+03	0.00e+00	1.01e+04	9.40e+05	1.57e+05
Tb-160	2.88e+05	0.00e+00	3.58e+04	0.00e+00	8.58e+04	1.98e+06	8.44e+04

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INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	4.96e+06	1.04e+06	8.77e+05	0.00e+00	1.48e+06	4.18e+06	6.03e+04
W-181	9.84e+01	2.41e+01	3.33e+00	0.00e+00	0.00e+00	2.11e+04	9.66e+02
W-185	3.07e+03	7.70e+02	1.08e+02	0.00e+00	0.00e+00	6.88e+05	4.11e+04
W-187	1.63e+01	9.66e+00	4.33e+00	0.00e+00	0.00e+00	4.11e+04	9.10e+04
Pb-210	2.97e+08	6.84e+07	1.18e+07	0.00e+00	2.33e+08	3.23e+08	5.74e+03
Bi-210	3.64e+03	1.89e+04	2.09e+03	0.00e+00	2.13e+05	1.37e+07	1.19e+05
Po-210	6.29e+06	1.02e+07	1.51e+06	0.00e+00	3.27e+07	3.88e+08	1.60e+05
Ra-223	2.85e+06	3.29e+03	5.70e+05	0.00e+00	8.73e+04	3.14e+08	1.11e+06
Ra-224	3.12e+05	5.66e+02	6.25e+04	0.00e+00	1.50e+04	1.08e+08	1.24e+06
Ra-225	4.74e+06	4.22e+03	9.47e+05	0.00e+00	1.12e+05	3.60e+08	1.05e+06
Ra-226	8.66e+08	2.83e+04	7.10e+08	0.00e+00	7.51e+05	1.44e+09	1.12e+06
Ra-228	5.51e+08	1.46e+04	6.22e+08	0.00e+00	3.85e+05	1.99e+09	1.90e+05
Ac-225	6.70e+06	6.92e+06	4.48e+05	0.00e+00	7.36e+05	2.73e+08	9.88e+05
Ac-227	1.84e+10	2.98e+09	1.14e+09	0.00e+00	6.55e+08	2.97e+09	1.93e+05
Th-227	3.42e+06	4.66e+04	9.88e+04	0.00e+00	2.47e+05	4.66e+08	1.29e+06
Th-228	2.98e+09	3.85e+07	1.01e+08	0.00e+00	2.00e+08	1.24e+10	1.33e+06
Th-229	8.07e+10	2.12e+09	1.34e+09	0.00e+00	1.05e+10	4.00e+10	1.85e+05
Th-230	1.22e+10	6.40e+08	3.40e+08	0.00e+00	3.15e+09	6.84e+09	1.42e+05
Th-232	1.36e+10	5.44e+08	4.74e+06	0.00e+00	2.69e+09	6.55e+09	1.21e+05
Th-234	2.57e+04	1.14e+03	7.40e+02	0.00e+00	5.99e+03	2.33e+06	2.71e+05
Pa-231	3.19e+10	1.06e+09	1.27e+09	0.00e+00	5.77e+09	7.10e+08	1.69e+05
Pa-233	1.53e+04	2.40e+03	2.68e+03	0.00e+00	8.81e+03	3.61e+05	3.31e+04
U-232	8.10e+08	0.00e+00	5.77e+07	0.00e+00	6.18e+07	2.75e+09	1.60e+05
U-233	1.72e+08	0.00e+00	1.04e+07	0.00e+00	2.82e+07	6.55e+08	1.48e+05
U-234	1.65e+08	0.00e+00	1.02e+07	0.00e+00	2.76e+07	6.44e+08	1.45e+05
U-235	1.58e+08	0.00e+00	9.58e+06	0.00e+00	2.59e+07	6.03e+08	1.84e+05
U-236	1.58e+08	0.00e+00	9.80e+06	0.00e+00	2.65e+07	6.18e+08	1.36e+05
U-237	5.81e+02	0.00e+00	1.54e+02	0.00e+00	1.68e+03	1.26e+05	4.77e+04
U-238	1.51e+08	0.00e+00	8.95e+06	0.00e+00	2.42e+07	5.66e+08	1.30e+05
Np-237	1.01e+10	5.99e+09	4.40e+08	0.00e+00	2.74e+09	6.44e+08	1.87e+05

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	4.66c+03	8.51e+02	7.29e+01	0.00e+00	3.02e+02	1.25e+05	9.25e+04
Np-239	4.66e+02	3.01e+02	2.35e+01	0.00e+00	9.73e+01	5.81e+04	6.40e+04
Pu-238	9.44e+09	5.92e+09	4.48e+08	0.00e+00	1.65e+09	2.25e+09	1.72e+05
Pu-239	1.03e+10	6.22e+09	4.74e+08	0.00e+00	1.77e+09	2.12e+09	1.57e+05
Pu-240	1.03e+10	6.22e+09	4.70e+08	0.00e+00	1.76e+09	2.11e+09	1.60e+05
Pu-241	2.94e+08	6.48e+07	1.08e+07	0.00e+00	4.07e+07	1.87e+06	3.29e+03
Pu-242	9.58e+09	5.99e+09	4.55e+08	0.00e+00	1.70e+09	2.04e+09	1.54e+05
Pu-244	1.12e+10	6.84e+09	5.22e+08	0.00e+00	1.95e+09	2.33e+09	2.29e+05
Am-241	1.10e+10	6.81e+09	4.59e+08	0.00e+00	2.82e+09	7.47e+08	1.75e+05
Am-242m	1.14e+10	6.51e+09	4.70e+08	0.00e+00	2.85e+09	3.01e+08	2.21e+05
Am-243	1.09e+10	6.59e+09	4.44e+08	0.00e+00	2.75e+09	7.10e+08	2.05e+05
Cm-242	3.51e+08	2.10e+08	1.55e+07	0.00e+00	4.96e+07	4.85e+08	1.87e+05
Cm-243	8.58e+09	5.25e+09	3.68c+08	0.00e+00	1.38e+09	7.77e+08	1.84e+05
Cm-244	7.18e+09	4.37e+09	3.07e+08	0.00e+00	1.13e+09	7.47e+08	1.78e+05
Cm-245	1.13e+10	6.81e+09	4.74e+08	0.00e+00	1.86e+09	7.22e+08	1.66e+05
Cm-246	1.12e+10	6.81e+09	4.74e+08	0.00e+00	1.86e+09	7.36e+08	1.63e+05
Cm-247	1.09e+10	6.73e+09	4.66e+08	0.00e+00	1.83e+09	7.22e+08	2.15e+05
Cm-248	9.06e+10	5.55e+10	3.85e+09	0.00e+00	1.51e+10	5.96e+09	3.46e+06
Cf-252	8.07e+09	0.00e+00	3.45e+08	0.00e+00	0.00e+00	2.45e+09	6.81e+05

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_j

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	3.68e+02	3.68e+02	3.68e+02	3.68e+02	3.68e+02	3.68e+02
Be-10	1.33e+06	1.75e+05	3.71e+04	0.00e+00	0.00e+00	2.09e+06	2.42e+04
C-14	2.65e+04	5.31e+03	5.31e+03	5.31e+03	5.31e+03	5.31e+03	5.31e+03
N-13	6.15e+01	6.15e+01	6.15e+01	6.15e+01	6.15e+01	6.15e+01	6.15e+01
F-18	5.49e+03	0.00e+00	4.66e+02	0.00e+00	0.00e+00	0.00e+00	8.54e+02
Na-22	1.03e+05	1.03e+05	1.03e+05	1.03e+05	1.03e+05	1.03e+05	1.03e+05
Na-24	1.06e+04	1.06e+04	1.06e+04	1.06e+04	1.06e+04	1.06e+04	1.06e+04
P-32	2.03e+06	1.12e+05	7.74e+04	0.00e+00	0.00e+00	0.00e+00	1.61e+04
Ca-41	1.05e+05	0.00e+00	1.14e+04	0.00e+00	0.00e+00	9.72e+07	4.14e+02
Sc-46	5.25e+05	7.57e+05	2.37e+05	0.00e+00	4.98e+05	0.00e+00	3.07e+04
Cr-51	0.00e+00	0.00e+00	8.95e+01	5.75e+01	1.32e+01	1.28e+04	3.57e+02
Mn-54	0.00e+00	2.53e+04	4.98e+03	0.00e+00	4.98e+03	1.00e+06	7.06e+03
Mn-56	0.00e+00	1.54e+00	2.21e-01	0.00e+00	1.10e+00	1.25e+04	7.17e+04
Fe-55	1.97e+04	1.17e+04	3.33e+03	0.00e+00	0.00e+00	8.69e+04	1.09e+03
Fe-59	1.36e+04	2.35e+04	9.48e+03	0.00e+00	0.00e+00	1.01e+06	2.48e+04
Co-57	0.00e+00	6.51e+02	6.41e+02	0.00e+00	0.00e+00	3.79e+05	4.86e+03
Co-58	0.00e+00	1.22e+03	1.82e+03	0.00e+00	0.00e+00	7.77e+05	1.11e+04
Co-60	0.00e+00	8.02e+03	1.18e+04	0.00e+00	0.00e+00	4.51e+06	3.19e+04
Ni-59	2.53e+04	7.62e+03	4.34e+03	0.00e+00	0.00e+00	7.67e+04	8.88e+02
Ni-63	3.39e+05	2.04e+04	1.16e+04	0.00e+00	0.00e+00	2.09e+05	2.42e+03
Ni-65	2.39e+00	2.84e-01	1.23e-01	0.00e+00	0.00e+00	8.12e+03	5.01e+04
Cu-64	0.00e+00	1.88e+00	7.74e-01	0.00e+00	3.98e+00	9.30e+03	1.50e+04
Zn-65	1.93e+04	6.26e+04	3.11e+04	0.00e+00	3.25e+04	6.47e+05	5.14e+04
Zn-69	5.39e-02	9.67e-02	7.18e-03	0.00e+00	4.02e-02	1.47e+03	1.32e+04
Zn-69m	1.26e+01	2.58e+01	2.34e+00	0.00e+00	1.04e+01	2.67e+04	4.09e+04
Se-79	0.00e+00	3.15e+03	5.88e+02	0.00e+00	3.46e+03	4.19e+05	4.84e+03
Br-82	0.00e+00	0.00e+00	1.33e+04	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-83	0.00e+00	0.00e+00	3.81e+02	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-84	0.00e+00	0.00e+00	4.00e+02	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-85	0.00e+00	0.00e+00	2.04e+01	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
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Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	1.90e+05	8.82e+04	0.00e+00	0.00e+00	0.00e+00	3.04e+03
Rb-87	0.00e+00	9.95e+04	3.70e+04	0.00e+00	0.00e+00	0.00e+00	4.19e+02
Rb-88	0.00e+00	5.57e+02	2.87e+02	0.00e+00	0.00e+00	0.00e+00	3.39e+02
Rb-89	0.00e+00	3.21e+02	2.06e+02	0.00e+00	0.00e+00	0.00e+00	6.82e+01
Sr-89	3.98e+05	0.00e+00	1.14e+04	0.00e+00	0.00e+00	2.03e+06	6.40e+04
Sr-90	1.55e+07	0.00e+00	3.12e+05	0.00e+00	0.00e+00	1.12e+07	1.31e+05
Sr-91	9.56e+01	0.00e+00	3.46e+00	0.00e+00	0.00e+00	5.26e+04	7.34e+04
Sr-92	1.05e+01	0.00e+00	3.91e-01	0.00e+00	0.00e+00	2.38e+04	1.40e+05
Y-90	3.29e+03	0.00e+00	8.82e+01	0.00e+00	0.00e+00	2.69e+05	1.04e+05
Y-91	5.88e+05	0.00e+00	1.57e+04	0.00e+00	0.00e+00	2.45e+06	7.03e+04
Y-91m	4.07e-01	0.00e+00	1.39e-02	0.00e+00	0.00e+00	2.79e+03	2.35e+03
Y-92	1.64e+01	0.00e+00	4.61e-01	0.00e+00	0.00e+00	2.45e+04	1.27e+05
Y-93	1.50e+02	0.00e+00	4.07e+00	0.00e+00	0.00e+00	7.64e+04	1.67e+05
Zr-93	3.14e+05	1.33e+04	8.65e+03	0.00e+00	4.47e+04	1.92e+05	2.07e+03
Zr-95	1.15e+05	2.79e+04	2.03e+04	0.00e+00	3.11e+04	1.75e+06	2.17e+04
Zr-97	1.50e+02	2.56e+01	1.17e+01	0.00e+00	2.59e+01	1.10e+05	1.40e+05
Nb-93m	1.93e+05	5.03e+04	1.61e+04	0.00e+00	5.15e+04	2.93e+05	3.46e+03
Nb-95	1.57e+04	6.43e+03	3.78e+03	0.00e+00	4.72e+03	4.79e+05	1.27e+04
Nb-97	3.42e-01	7.29e-02	2.63e-02	0.00e+00	5.70e-02	3.32e+03	2.69e+04
Mo-93	0.00e+00	9.04e+03	3.11e+02	0.00e+00	2.16e+03	4.76e+05	5.26e+03
Mo-99	0.00e+00	1.65e+02	3.23e+01	0.00e+00	2.65e+02	1.35e+05	4.87e+04
Tc-101	6.51e-05	8.23e-05	8.12e-04	0.00e+00	9.79e-04	5.84e+02	8.44e+02
Tc-99	2.93e+02	3.75e+02	1.24e+02	0.00e+00	3.49e+03	9.48e+05	1.09e+04
Tc-99m	1.40e-03	2.88e-03	3.72e-02	0.00e+00	3.11e-02	8.11e+02	2.03e+03
Ru-103	2.02e+03	0.00e+00	6.79e+02	0.00e+00	4.24e+03	5.52e+05	1.61e+04
Ru-105	1.22e+00	0.00e+00	4.10e-01	0.00e+00	8.99e-01	1.57e+04	4.84e+04
Ru-106	8.68e+04	0.00e+00	1.09e+04	0.00e+00	1.07e+05	1.16e+07	1.64e+05
Rh-105	1.16e+01	7.57e+00	5.08e+00	0.00e+00	2.10e+01	2.91e+04	1.92e+04
Pd-107	0.00e+00	6.89e+02	5.75e+01	0.00e+00	3.85e+03	8.88e+04	1.03e+03
Pd-109	0.00e+00	5.49e+00	1.47e+00	0.00e+00	1.79e+01	2.35e+04	3.99e+04

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	9.98e+03	7.22e+03	5.00e+03	0.00e+00	1.09e+04	3.67e+06	3.30e+04
Ag-111	5.25e+02	2.03e+02	1.08e+02	0.00e+00	4.27e+02	2.88e+05	4.23e+04
Cd-113m	0.00e+00	9.34e+05	3.70e+04	0.00e+00	8.12e+05	1.96e+06	2.31e+04
Cd-115m	0.00e+00	2.42e+05	8.67e+03	0.00e+00	1.32e+05	2.06e+06	7.03e+04
Sn-123	2.93e+05	5.89e+03	1.02e+04	5.98e+03	0.00e+00	3.11e+06	5.71e+04
Sn-125	1.41e+04	3.51e+02	8.40e+02	3.46e+02	0.00e+00	9.00e+05	1.02e+05
Sn-126	1.16e+06	2.02e+04	4.93e+04	5.38e+03	0.00e+00	6.90e+06	2.31e+04
Sb-124	3.79e+04	5.56e+02	1.20e+04	1.01e+02	0.00e+00	2.65e+06	5.91e+04
Sb-125	5.17e+04	4.77e+02	1.09e+04	6.23e+01	0.00e+00	1.64e+06	1.47e+04
Sb-126	4.31e+03	8.41e+01	1.55e+03	3.29e+01	0.00e+00	9.63e+05	7.46e+04
Sb-127	3.95e+02	7.06e+00	1.23e+02	5.04e+00	0.00e+00	2.16e+05	5.29e+04
Te-125m	4.76e+03	1.99e+03	6.58e+02	1.62e+03	0.00e+00	4.47e+05	1.29e+04
Te-127	2.23e+00	9.53e-01	4.89e-01	1.85e+00	4.86e+00	1.03e+04	2.44e+04
Te-127m	1.67e+04	6.90e+03	2.07e+03	4.87e+03	3.75e+04	1.31e+06	2.73e+04
Te-129	7.88e-02	3.47e-02	1.88e-02	6.75e-02	1.75e-01	3.00e+03	2.63e+04
Te-129m	1.41e+04	6.09e+03	2.23e+03	5.47e+03	3.18e+04	1.68e+06	6.90e+04
Te-131	1.74e-02	8.22e-03	5.00e-03	1.58e-02	3.99e-02	2.06e+03	8.22e+03
Te-131m	1.07e+02	5.50e+01	3.63e+01	8.93e+01	2.65e+02	1.99e+05	1.19e+05
Te-132	3.72e+02	2.37e+02	1.76e+02	2.79e+02	1.03e+03	3.40e+05	4.41e+04
Te-133m	8.58e-02	5.03e-02	3.84e-02	7.73e-02	2.41e-01	5.49e+03	2.23e+04
Te-134	4.45e-02	2.86e-02	2.35e-02	4.07e-02	1.34e-01	4.10e+03	3.54e+03
I-129	3.02e+04	2.23e+04	1.62e+04	1.46e+07	2.63e+04	0.00e+00	2.97e+02
I-130	6.36e+03	1.39e+04	5.57e+03	1.60e+06	1.53e+04	0.00e+00	1.99e+03
I-131	3.79e+04	4.44e+04	1.96e+04	1.48e+07	5.18e+04	0.00e+00	1.06e+03
I-132	1.69e+03	3.54e+03	1.26e+03	1.69e+05	3.95e+03	0.00e+00	1.90e+03
I-133	1.32e+04	1.92e+04	5.60e+03	3.56e+06	2.24e+04	0.00e+00	2.16e+03
I-134	9.21e+02	1.88e+03	6.65e+02	4.45e+04	2.09e+03	0.00e+00	1.29e+03
I-135	3.86e+03	7.60e+03	2.77e+03	6.96e+05	8.47e+03	0.00e+00	1.83e+03
Cs-134	3.96e+05	7.03e+05	7.45e+04	0.00e+00	1.90e+05	7.97e+04	1.33e+03
Cs-134m	1.85e+02	2.94e+02	1.55e+02	0.00e+00	1.19e+02	2.80e+01	1.62e+02

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	1.40e+05	1.21e+05	6.62e+03	0.00e+00	3.61e+04	1.41e+04	3.05e+02
Cs-136	4.83e+04	1.35e+05	5.29e+04	0.00e+00	5.64e+04	1.18e+04	1.43e+03
Cs-137	5.49e+05	6.12e+05	4.55e+04	0.00e+00	1.72e+05	7.13e+04	1.33e+03
Cs-138	5.05e+02	7.81e+02	3.98e+02	0.00e+00	4.10e+02	6.54e+01	8.76e+02
Cs-139	3.25e+02	4.24e+02	1.71e+02	0.00e+00	2.31e+02	3.54e+01	1.86e+01
Ba-139	1.48e+00	9.84e-04	4.30e-02	0.00e+00	5.92e-04	5.95e+03	5.10e+04
Ba-140	5.60e+04	5.60e+01	2.90e+03	0.00e+00	1.34e+01	1.60e+06	3.84e+04
Ba-141	1.57e-01	1.08e-04	4.97e-03	0.00e+00	6.50e-05	2.97e+03	4.75e+03
Ba-142	3.98e-02	3.30e-05	1.96e-03	0.00e+00	1.90e-05	1.55e+03	6.93e+02
La-140	5.05e+02	2.00e+02	5.15e+01	0.00e+00	0.00e+00	1.68e+05	8.48e+04
La-141	6.79e+00	1.96e+00	3.43e-01	0.00e+00	0.00e+00	1.71e+04	8.34e+04
La-142	1.03e+00	3.77e-01	9.04e-02	0.00e+00	0.00e+00	8.22e+03	5.95e+04
Ce-141	2.77e+04	1.67e+04	1.99e+03	0.00e+00	5.25e+03	5.17e+05	2.16e+04
Ce-143	2.93e+02	1.93e+02	2.21e+01	0.00e+00	5.64e+01	1.16e+05	4.97e+04
Ce-144	3.19e+06	1.21e+06	1.76e+05	0.00e+00	5.38e+05	9.84e+06	1.48e+05
Pr-143	1.40e+04	5.24e+03	6.99e+02	0.00e+00	1.97e+03	4.33e+05	3.72e+04
Pr-144	4.79e-02	1.85e-02	2.41e-03	0.00e+00	6.72e-03	1.61e+03	4.28e+03
Nd-147	7.94e+03	8.13e+03	5.00e+02	0.00e+00	3.15e+03	3.22e+05	3.12e+04
Pm-147	5.47e+05	4.30e+04	2.18e+04	0.00e+00	6.90e+04	6.37e+05	8.05e+03
Pm-148	4.68e+03	6.75e+02	3.42e+02	0.00e+00	8.06e+02	4.48e+05	8.46e+04
Pm-148m	7.00e+04	1.74e+04	1.39e+04	0.00e+00	2.03e+04	1.71e+06	4.72e+04
Pm-149	4.34e+02	5.71e+01	2.49e+01	0.00e+00	6.94e+01	9.10e+04	4.21e+04
Pm-151	1.05e+02	1.54e+01	7.77e+00	0.00e+00	1.82e+01	4.55e+04	3.61e+04
Sm-151	4.73e+05	9.03e+04	2.28e+04	0.00e+00	7.34e+04	4.17e+05	4.84e+03
Sm-153	2.14e+02	1.65e+02	1.27e+01	0.00e+00	3.46e+01	5.18e+04	2.70e+04
Eu-152	1.10e+06	2.48e+05	2.41e+05	0.00e+00	8.32e+05	2.07e+06	1.38e+04
Eu-154	4.14e+06	4.84e+05	3.43e+05	0.00e+00	1.60e+06	4.27e+06	3.98e+04
Eu-155	8.36e+05	8.01e+04	4.84e+04	0.00e+00	2.21e+05	7.28e+05	7.27e+04
Eu-156	2.18e+04	1.34e+04	2.16e+03	0.00e+00	6.27e+03	8.57e+05	5.80e+04
Tb-160	1.57e+05	0.00e+00	1.96e+04	0.00e+00	4.48e+04	1.55e+06	3.00e+04

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	2.03e+06	4.30e+05	3.51e+05	0.00e+00	5.91e+05	2.87e+06	2.31e+04
W-181	6.80e+01	2.04e+01	2.34e+00	0.00e+00	0.00e+00	1.86e+04	3.68e+02
W-185	2.20e+03	6.76e+02	7.81e+01	0.00e+00	0.00e+00	6.27e+05	1.57e+04
W-187	1.30e+01	9.02e+00	3.12e+00	0.00e+00	0.00e+00	3.96e+04	3.56e+04
Pb-210	1.21e+08	2.83e+07	4.80e+06	0.00e+00	9.59e+07	2.46e+08	2.20e+03
Bi-210	2.88e+03	1.86e+04	1.65e+03	0.00e+00	1.44e+05	1.39e+07	4.58e+04
Po-210	4.17e+06	7.88e+06	9.97e+05	0.00e+00	1.82e+07	3.36e+08	6.10e+04
Ra-223	2.18e+06	3.16e+03	4.37e+05	0.00e+00	5.82e+04	3.15e+08	4.26e+05
Ra-224	2.48e+05	5.60e+02	4.96e+04	0.00e+00	1.02e+04	1.11e+08	4.79e+05
Ra-225	3.60e+06	4.03e+03	7.18e+05	0.00e+00	7.43e+04	3.60e+08	4.02e+05
Ra-226	3.47e+08	2.04e+04	2.87e+08	0.00e+00	4.12e+05	1.10e+09	4.27e+05
Ra-228	2.24e+08	1.07e+04	2.52e+08	0.00e+00	2.14e+05	1.53e+09	7.27e+04
Ac-225	5.17e+06	6.61e+06	3.47e+05	0.00e+00	4.89e+05	2.74e+08	3.79e+05
Ac-227	7.41e+09	1.23e+09	4.59e+08	0.00e+00	2.60e+08	2.27e+09	7.38e+04
Th-227	2.55e+06	4.24e+04	7.34e+04	0.00e+00	1.58e+05	4.58e+08	4.94e+05
Th-228	1.18e+09	1.54e+07	4.00e+07	0.00e+00	7.85e+07	6.51e+09	5.07e+05
Th-229	3.19e+10	8.32e+08	5.33e+08	0.00e+00	1.30e+09	1.78e+10	7.03e+04
Th-230	4.84e+09	2.51e+08	1.35e+08	0.00e+00	1.23e+09	3.05e+09	5.42e+04
Th-232	5.40e+09	2.14e+08	3.21e+06	0.00e+00	1.06e+09	2.93e+09	4.61e+04
Th-234	1.86e+04	1.00e+03	5.38e+02	0.00e+00	3.78e+03	2.27e+06	1.04e+05
Pa-231	1.27e+10	4.20e+08	5.07e+08	0.00e+00	2.27e+09	5.39e+08	6.45e+04
Pa-233	9.58e+03	1.85e+03	1.67e+03	0.00e+00	5.15e+03	3.07e+05	1.27e+04
U-232	3.60e+08	0.00e+00	2.98e+07	0.00e+00	3.36e+07	2.09e+09	6.10e+04
U-233	7.62e+07	0.00e+00	5.36e+06	0.00e+00	1.53e+07	4.98e+08	5.64e+04
U-234	7.31e+07	0.00e+00	5.25e+06	0.00e+00	1.50e+07	4.89e+08	5.53e+04
U-235	7.01e+07	0.00e+00	4.93e+06	0.00e+00	1.41e+07	4.59e+08	7.03e+04
U-236	7.01e+07	0.00e+00	5.04e+06	0.00e+00	1.44e+07	4.69e+08	5.19e+04
U-237	4.55e+02	0.00e+00	1.21e+02	0.00e+00	1.13e+03	1.28e+05	1.83e+04
U-238	6.71e+07	0.00e+00	4.61e+06	0.00e+00	1.32e+07	4.28e+08	4.96e+04
Np-237	4.03e+09	2.39e+09	1.76e+08	0.00e+00	1.08e+09	4.89e+08	7.14e+04

Conversion factors are in units of mrem/yr per uCi/cubic meter.

INHALATION PATHWAY DOSES DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Inhalation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	3.74e+03	8.47e+02	5.82e+01	0.00e+00	2.06e+02	1.29e+05	3.61e+04
Np-239	3.71e+02	2.98e+02	1.88e+01	0.00e+00	6.62e+01	5.95e+04	2.49e+04
Pu-238	3.77e+09	2.35e+09	1.78e+08	0.00e+00	6.50e+08	1.26e+09	6.57e+04
Pu-239	4.10e+09	2.46e+09	1.88e+08	0.00e+00	6.93e+08	1.19e+09	5.99e+04
Pu-240	4.10e+09	2.45e+09	1.88e+08	0.00e+00	6.92e+08	1.19e+09	6.10e+04
Pu-241	1.18e+08	2.59e+07	4.35e+06	0.00e+00	1.61e+07	1.07e+06	1.26e+03
Pu-242	3.81e+09	2.37e+09	1.81e+08	0.00e+00	6.68e+08	1.14e+09	5.88e+04
Pu-244	4.44e+09	2.72e+09	2.07e+08	0.00e+00	7.64e+08	1.31e+09	8.76e+04
Am-241	4.41e+09	2.73e+09	1.83e+08	0.00e+00	1.11e+09	5.68e+08	6.69e+04
Am-242m	4.55e+09	2.60e+09	1.89e+08	0.00e+00	1.12e+09	2.30e+08	8.41e+04
Am-243	4.34e+09	2.63e+09	1.78e+08	0.00e+00	1.08e+09	5.39e+08	7.84e+04
Cm-242	1.79e+08	1.21e+08	7.98e+06	0.00e+00	2.37e+07	4.16e+08	7.14e+04
Cm-243	3.46e+09	2.13e+09	1.48e+08	0.00e+00	5.47e+08	5.94e+08	7.03e+04
Cm-244	2.90e+09	1.78e+09	1.24e+08	0.00e+00	4.49e+08	5.71e+08	6.80e+04
Cm-245	4.51e+09	2.74e+09	1.90e+08	0.00e+00	7.32e+08	5.49e+08	6.34e+04
Cm-246	4.48e+09	2.74e+09	1.90e+08	0.00e+00	7.32e+08	5.59e+08	6.23e+04
Cm-247	4.35e+09	2.70e+09	1.86e+08	0.00e+00	7.21e+08	5.49e+08	8.19e+04
Cm-248	3.61e+10	2.23e+10	1.54e+09	0.00e+00	5.94e+09	4.52e+09	1.32e+06
Cf-252	3.32e+09	0.00e+00	1.41e+08	0.00e+00	0.00e+00	1.92e+09	2.59e+05

Conversion factors are in units of mrem/yr per uCi/cubic meter.

GROUND - PLANE DEPOSITION PATHWAY
DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for all age groups by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Ground Plane Exposure Pathway Ri

Nuclide	Organ Dose Conversion Factors	
	T. Body	Skin
H-3	0.00e+00	0.00e+00
Be-10	0.00e+00	0.00e+00
C-14	0.00e+00	0.00e+00
N-13	4.02e+04	4.66e+04
F-18	3.96e+05	4.66e+05
Na-22	1.14e+10	1.28e+10
Na-24	1.19e+07	1.39e+07
P-32	0.00e+00	0.00e+00
Ca-41	9.89e+09	1.16e+10
Sc-46	8.33e+08	9.61e+08
Cr-51	4.66e+06	5.51e+06
Mn-54	1.39e+09	1.63e+09
Mn-56	9.02e+05	1.07e+06
Fe-55	0.00e+00	0.00e+00
Fe-59	2.73e+08	3.21e+08
Co-57	1.88e+08	2.06e+08
Co-58	3.79e+08	4.44e+08
Co-60	2.15e+10	2.53e+10
Ni-59	0.00e+00	0.00e+00
Ni-63	0.00e+00	0.00e+00
Ni-65	2.97e+05	3.45e+05
Cu-64	6.07e+05	6.88e+05
Zn-65	7.47e+08	8.59e+08
Zn-69	0.00e+00	0.00e+00
Zn-69m	1.27e+06	1.49e+06
Se-79	0.00e+00	0.00e+00
Br-82	2.13e+07	2.47e+07
Br-83	4.87e+03	7.08e+03
Br-84	2.03e+05	2.36e+05
Br-85	0.00e+00	0.00e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec.

GROUND - PLANE DEPOSITION PATHWAY
DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for all age groups by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Ground Plane Exposure Pathway Ri

Nuclide	Organ Dose Conversion Factors	
	T. Body	Skin
Rb-86	8.99e+06	1.03e+07
Rb-87	0.00e+00	0.00e+00
Rb-88	3.31e+04	3.78e+04
Rb-89	1.23e+05	1.48e+05
Sr-89	2.16e+04	2.51e+04
Sr-90	0.00e+00	0.00e+00
Sr-91	2.15e+06	2.51e+06
Sr-92	7.77e+05	8.63e+05
Y-90	4.49e+03	5.31e+03
Y-91	1.07e+06	1.21e+06
Y-91m	1.00e+05	1.16e+05
Y-92	1.80e+05	2.14e+05
Y-93	1.83e+05	2.51e+05
Zr-93	0.00e+00	0.00e+00
Zr-95	2.45e+08	2.84e+08
Zr-97	2.96e+06	3.44e+06
Nb-93m	1.66e+06	2.03e+08
Nb-95	1.37e+08	1.61e+08
Nb-97	1.80e+05	2.12e+05
Mo-93	6.63e+07	2.70e+09
Mo-99	3.99e+06	4.63e+06
Tc-101	2.04e+04	2.26e+04
Tc-99	0.00e+00	0.00e+00
Tc-99m	1.84e+05	2.11e+05
Ru-103	1.08e+08	1.26e+08
Ru-105	6.36e+05	7.21e+05
Ru-106	4.22e+08	5.07e+08
Rh-105	7.42e+05	8.65e+05
Pd-107	0.00e+00	0.00e+00
Pd-109	1.50e+04	1.72e+04

Conversion factors are in units of square meter-mrem/yr per uCi/sec.

GROUND - PLANE DEPOSITION PATHWAY
DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for all age groups by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Ground Plane Exposure Pathway Ri

Nuclide	Organ Dose Conversion Factors	
	T. Body	Skin
Ag-110m	3.44e+09	4.01e+09
Ag-111	1.02e+06	1.20e+06
Cd-113m	4.77e+06	5.39e+06
Cd-115m	0.00e+00	0.00e+00
Sn-123	0.00e+00	6.37e+09
Sn-125	4.19e+06	4.85e+06
Sn-126	2.61e+10	2.90e+10
Sb-124	5.98e+08	6.90e+08
Sb-125	2.34e+09	2.64e+09
Sb-126	8.50e+07	9.55e+07
Sb-127	1.69e+07	1.95e+07
Te-125m	1.55e+06	2.13e+06
Te-127	2.98e+03	3.28e+03
Te-127m	9.16e+04	1.08e+05
Te-129	2.62e+04	3.10e+04
Te-129m	1.98e+07	2.31e+07
Te-131	2.92e+04	3.45e+07
Te-131m	8.03e+06	9.46e+06
Te-132	4.23e+06	4.98e+06
Te-133m	4.41e+05	5.00e+05
Te-134	2.22e+04	2.66e+04
I-129	1.31e+09	2.18e+09
I-130	5.51e+06	6.69e+06
I-131	1.72e+07	2.09e+07
I-132	1.25e+06	1.46e+06
I-133	2.45e+06	2.98e+06
I-134	4.47e+05	5.30e+05
I-135	2.53e+06	2.95e+06
Cs-134	6.86e+09	8.00e+09
Cs-134m	5.73e+04	6.74e+04

Conversion factors are in units of square meter-mrem/yr per uCi/sec.

GROUND - PLANE DEPOSITION PATHWAY
DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for all age groups by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Ground Plane Exposure Pathway Ri

Nuclide	Organ Dose Conversion Factors	
	T. Body	Skin
Cs-135	0.00e+00	0.00e+00
Cs-136	1.51e+08	1.71e+08
Cs-137	1.03e+10	1.20e+10
Cs-138	3.59e+05	4.10e+05
Cs-139	3.14e+04	3.59e+04
Ba-139	1.06e+05	1.19e+05
Ba-140	2.05e+07	2.35e+07
Ba-141	4.17e+04	4.75e+04
Ba-142	4.49e+04	5.11e+04
La-140	1.92e+07	2.18e+07
La-141	3.13e+04	3.50e+04
La-142	7.60e+05	9.11e+05
Ce-141	1.37e+07	1.54e+07
Ce-143	2.31e+06	2.63e+06
Ce-144	6.95e+07	8.04e+07
Pr-143	0.00e+00	0.00e+00
Pr-144	1.83e+03	2.11e+03
Nd-147	8.39e+06	1.01e+07
Pm-147	0.00e+00	0.00e+00
Pm-148	1.89e+07	2.18e+07
Pm-148m	4.45e+08	2.58e+09
Pm-149	4.22e+04	4.90e+04
Pm-151	1.98e+06	2.07e+06
Sm-151	1.32e+08	5.76e+08
Sm-153	4.02e+05	4.47e+05
Eu-152	1.46e+10	1.69e+10
Eu-154	2.19e+10	2.53e+10
Eu-155	1.91e+08	2.17e+08
Eu-156	8.83e+07	1.01e+08
Tb-160	4.74e+08	5.51e+08

Conversion factors are in units of square meter-mrem/yr per uCi/sec.

GROUND - PLANE DEPOSITION PATHWAY
DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for all age groups by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Ground Plane Exposure Pathway Ri

Nuclide	Organ Dose Conversion Factors	
	T. Body	Skin
Ho-166m	2.57e+10	2.89e+10
W-181	1.94e+05	2.59e+05
W-185	0.00e+00	0.00e+00
W-187	2.35e+06	2.73e+06
Pb-210	2.95e+07	3.86e+07
Bi-210	0.00e+00	0.00e+00
Po-210	5.70e+03	6.54e+03
Ra-223	1.31e+07	1.57e+07
Ra-224	2.49e+07	2.80e+07
Ra-225	9.50e+05	1.36e+06
Ra-226	1.85e+10	2.14e+10
Ra-228	1.61e+10	1.88e+10
Ac-225	1.22e+07	1.38e+07
Ac-227	4.61e+09	5.54e+09
Th-227	7.21e+06	8.91e+06
Th-228	4.72e+09	5.31e+09
Th-229	6.38e+09	7.83e+09
Th-230	1.89e+10	2.18e+10
Th-232	8.70e+09	1.16e+10
Th-234	2.03e+06	2.39e+06
Pa-231	6.38e+09	7.83e+09
Pa-233	2.72e+07	3.14e+07
U-232	7.00e+06	7.27e+07
U-233	6.67e+09	8.12e+09
U-234	1.83e+06	4.61e+08
U-235	9.28e+09	1.16e+10
U-236	6.09e+04	5.22e+07
U-237	5.16e+06	6.71e+06
U-238	3.19e+08	4.35e+08
Np-237	4.06e+09	4.64e+09

Conversion factors are in units of square meter-mrem/yr per uCi/sec.

GROUND - PLANE DEPOSITION PATHWAY
DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for all age groups by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Ground Plane Exposure Pathway Ri

Nuclide	Organ Dose Conversion Factors	
	T. Body	Skin
Np-238	4.54e+06	5.19e+06
Np-239	1.71e+06	1.98e+06
Pu-238	3.56e+06	4.92e+07
Pu-239	2.29e+06	2.23e+07
Pu-240	3.77e+06	5.22e+07
Pu-241	9.66e+06	1.43e+07
Pu-242	3.19e+06	4.64e+07
Pu-244	2.60e+09	2.79e+09
Am-241	1.98e+08	2.86e+08
Am-242m	7.29e+07	5.05e+08
Am-243	3.77e+09	4.35e+09
Cm-242	6.85e+05	2.87e+06
Cm-243	5.59e+09	7.05e+09
Cm-244	6.40e+06	3.97e+07
Cm-245	2.75e+09	3.48e+09
Cm-246	2.90e+06	4.35e+07
Cm-247	6.38e+09	7.54e+09
Cm-248	1.98e+10	1.52e+10
Cf-252	4.46e+10	4.87e+10

Conversion factors are in units of square meter-mrem/yr per uCi/sec.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	4.35e+02	4.35e+02	4.35e+02	4.35e+02	4.35e+02	4.35e+02
Be-10	2.46e+06	3.79e+05	6.14e+04	0.00e+00	2.87e+05	0.00e+00	2.07e+07
C-14	2.63e+08	5.27e+07	5.27e+07	5.27e+07	5.27e+07	5.27e+07	5.27e+07
N-13	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F-18	4.65e-03	0.00e+00	5.15e-04	0.00e+00	0.00e+00	0.00e+00	1.38e-04
Na-22	5.29e+09	5.29e+09	5.29e+09	5.29e+09	5.29e+09	5.29e+09	5.29e+09
Na-24	2.44e+06	2.44e+06	2.44e+06	2.44e+06	2.44e+06	2.44e+06	2.44e+06
P-32	1.71e+10	1.06e+09	6.61e+08	0.00e+00	0.00e+00	0.00e+00	1.92e+09
Ca-41	1.14e+10	0.00e+00	1.24e+09	0.00e+00	0.00e+00	0.00e+00	1.14e+07
Sc-46	1.79e+02	3.48e+02	1.01e+02	0.00e+00	3.25e+02	0.00e+00	1.70e+06
Cr-51	0.00e+00	0.00e+00	2.86e+04	1.71e+04	6.30e+03	3.79e+04	7.19e+06
Mn-54	0.00e+00	8.41e+06	1.61e+06	0.00e+00	2.50e+06	0.00e+00	2.58e+07
Mn-56	0.00e+00	4.15e-03	7.37e-04	0.00e+00	5.27e-03	0.00e+00	1.33e-01
Fe-55	2.51e+07	1.73e+07	4.05e+06	0.00e+00	0.00e+00	9.68e+06	9.95e+06
Fe-59	2.97e+07	6.98e+07	2.68e+07	0.00e+00	0.00e+00	1.95e+07	2.33e+08
Co-57	0.00e+00	1.28e+06	2.13e+06	0.00e+00	0.00e+00	0.00e+00	3.25e+07
Co-58	0.00e+00	4.71e+06	1.06e+07	0.00e+00	0.00e+00	0.00e+00	9.55e+07
Co-60	0.00e+00	1.64e+07	3.62e+07	0.00e+00	0.00e+00	0.00e+00	3.08e+08
Ni-59	5.05e+08	1.73e+08	8.44e+07	0.00e+00	0.00e+00	0.00e+00	3.57e+07
Ni-63	6.73e+09	4.66e+08	2.26e+08	0.00e+00	0.00e+00	0.00e+00	9.73e+07
Ni-65	3.76e-01	4.88e-02	2.23e-02	0.00e+00	0.00e+00	0.00e+00	1.24e+00
Cu-64	0.00e+00	2.39e+04	1.12e+04	0.00e+00	6.03e+04	0.00e+00	2.04e+06
Zn-65	1.37e+09	4.37e+09	1.97e+09	0.00e+00	2.92e+09	0.00e+00	2.75e+09
Zn-69	2.18e-12	4.17e-12	2.90e-13	0.00e+00	2.71e-12	0.00e+00	6.26e-13
Zn-69m	1.81e+05	4.35e+05	3.98e+04	0.00e+00	2.64e+05	0.00e+00	2.66e+07
Se-79	0.00e+00	9.15e+08	1.53e+08	0.00e+00	1.58e+09	0.00e+00	1.87e+08
Br-82	0.00e+00	0.00e+00	3.23e+07	0.00e+00	0.00e+00	0.00e+00	3.70e+07
Br-83	0.00e+00	0.00e+00	9.87e-02	0.00e+00	0.00e+00	0.00e+00	1.42e-01
Br-84	0.00e+00	0.00e+00	1.73e-23	0.00e+00	0.00e+00	0.00e+00	1.36e-28
Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	2.59e+09	1.21e+09	0.00e+00	0.00e+00	0.00e+00	5.12e+08
Rb-87	0.00e+00	2.85e+09	9.92e+08	0.00e+00	0.00e+00	0.00e+00	1.34e+08
Rb-88	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rb-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-89	1.45e+09	0.00e+00	4.16e+07	0.00e+00	0.00e+00	0.00e+00	2.33e+08
Sr-90	5.38e+10	0.00e+00	1.08e+09	0.00e+00	0.00e+00	0.00e+00	1.35e+09
Sr-91	2.90e+04	0.00e+00	1.17e+03	0.00e+00	0.00e+00	0.00e+00	1.38e+05
Sr-92	4.95e-01	0.00e+00	2.14e-02	0.00e+00	0.00e+00	0.00e+00	9.81e+00
Y-90	7.09e+01	0.00e+00	1.90e+00	0.00e+00	0.00e+00	0.00e+00	7.52e+05
Y-91	8.59e+03	0.00e+00	2.30e+02	0.00e+00	0.00e+00	0.00e+00	4.73e+06
Y-91m	6.27e-20	0.00e+00	2.43e-21	0.00e+00	0.00e+00	0.00e+00	1.84e-19
Y-92	5.64e-05	0.00e+00	1.65e-06	0.00e+00	0.00e+00	0.00e+00	9.88e-01
Y-93	2.24e-01	0.00e+00	6.19e-03	0.00e+00	0.00e+00	0.00e+00	7.11e+03
Zr-93	1.62e+03	9.04e+01	4.21e+01	0.00e+00	3.43e+02	0.00e+00	9.39e+04
Zr-95	9.43e+02	3.03e+02	2.05e+02	0.00e+00	4.75e+02	0.00e+00	9.59e+05
Zr-97	4.34e-01	8.76e-02	4.01e-02	0.00e+00	1.32e-01	0.00e+00	2.71e+04
Nb-93m	4.91e+05	1.60e+05	3.95e+04	0.00e+00	1.84e+05	0.00e+00	7.40e+07
Nb-95	8.26e+04	4.59e+04	2.47e+04	0.00e+00	4.54e+04	0.00e+00	2.79e+08
Nb-97	6.58e-12	1.66e-12	6.07e-13	0.00e+00	1.94e-12	0.00e+00	6.14e-09
Mo-93	0.00e+00	4.35e+08	1.18e+07	0.00e+00	1.23e+08	0.00e+00	7.07e+07
Mo-99	0.00e+00	2.48e+07	4.72e+06	0.00e+00	5.61e+07	0.00e+00	5.74e+07
Tc-101	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tc-99	2.42e+07	3.59e+07	9.70e+06	0.00e+00	4.52e+08	3.05e+06	1.17e+09
Tc-99m	3.34e+00	9.44e+00	1.20e+02	0.00e+00	1.43e+02	4.63e+00	5.59e+03
Ru-103	1.02e+03	0.00e+00	4.39e+02	0.00e+00	3.89e+03	0.00e+00	1.19e+05
Ru-105	8.64e-04	0.00e+00	3.41e-04	0.00e+00	1.12e-02	0.00e+00	5.29e-01
Ru-106	2.04e+04	0.00e+00	2.58e+03	0.00e+00	3.94e+04	0.00e+00	1.32e+06
Rh-105	3.46e+05	2.53e+05	1.67e+05	0.00e+00	1.08e+06	0.00e+00	4.03e+07
Pd-107	0.00e+00	1.14e+07	7.26e+05	0.00e+00	1.02e+08	0.00e+00	7.04e+07
Pd-109	0.00e+00	4.49e+04	1.01e+04	0.00e+00	2.56e+05	0.00e+00	4.98e+06

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	5.82e+07	5.39e+07	3.20e+07	0.00e+00	1.06e+08	0.00e+00	2.20e+10
Ag-111	6.47e+06	2.71e+06	1.35e+06	0.00e+00	8.74e+06	0.00e+00	4.97e+09
Cd-113m	0.00e+00	2.94e+06	9.43e+04	0.00e+00	3.24e+06	0.00e+00	2.37e+07
Cd-115m	0.00e+00	1.26e+06	4.02e+04	0.00e+00	9.99e+05	0.00e+00	5.30e+07
Sn-123	5.36e+08	8.88e+06	1.31e+07	7.55e+06	0.00e+00	0.00e+00	1.09e+09
Sn-125	5.68e+07	1.14e+06	2.58e+06	9.47e+05	0.00e+00	0.00e+00	7.09e+08
Sn-126	1.63e+09	3.23e+07	4.64e+07	9.51e+06	0.00e+00	0.00e+00	4.69e+08
Sb-124	2.57e+07	4.86e+05	1.02e+07	6.24e+04	0.00e+00	2.00e+07	7.31e+08
Sb-125	2.04e+07	2.28e+05	4.86e+06	2.08c+04	0.00e+00	1.58e+07	2.25e+08
Sb-126	5.63e+06	1.15e+05	2.03e+06	3.45e+04	0.00e+00	3.45e+06	4.60e+08
Sb-127	4.53e+05	9.93e+03	1.74e+05	5.45e+03	0.00e+00	2.69e+05	1.04e+08
Te-125m	1.63e+07	5.90e+06	2.18e+06	4.90e+06	6.63e+07	0.00e+00	6.50e+07
Te-127	6.56e+02	2.35e+02	1.42e+02	4.86e+02	2.67e+03	0.00e+00	5.17e+04
Te-127m	4.58e+07	1.64e+07	5.58e+06	1.17e+07	1.86e+08	0.00e+00	1.53e+08
Te-129	2.92e-10	1.10e-10	7.11e-11	2.24e-10	1.23e-09	0.00e+00	2.20e-10
Te-129m	6.02e+07	2.25e+07	9.53e+06	2.07e+07	2.51e+08	0.00e+00	3.03e+08
Te-131	3.95e-33	1.65e-33	1.25e-33	3.25e-33	1.73e-32	0.00e+00	5.60e-34
Te-131m	3.62e+05	1.77e+05	1.47e+05	2.80e+05	1.79e+06	0.00e+00	1.76e+07
Te-132	2.40e+06	1.55e+06	1.46e+06	1.72e+06	1.50e+07	0.00e+00	7.35e+07
Te-133m	2.19e-13	1.28e-13	1.24e-13	1.86e-13	1.27e-12	0.00e+00	4.40e-14
Te-134	9.41e-19	6.16e-19	3.78e-19	8.22e-19	5.95e-18	0.00e+00	1.04e-21
I-129	7.58e+08	6.51e+08	2.14e+09	1.68e+12	1.40e+09	0.00e+00	1.03e+08
I-130	4.21e+05	1.24e+06	4.90e+05	1.05e+08	1.94e+06	0.00e+00	1.07e+06
I-131	2.96e+08	4.24e+08	2.43e+08	1.39e+11	7.26e+08	0.00e+00	1.12e+08
I-132	1.67e-01	4.47e-01	1.56e-01	1.56e+01	7.12e-01	0.00e+00	8.39e-02
I-133	3.88e+06	6.74e+06	2.06e+06	9.91e+08	1.18e+07	0.00e+00	6.06e+06
I-134	2.11e-12	5.72e-12	2.05e-12	9.92e-11	9.10e-12	0.00e+00	4.99e-15
I-135	1.29e+04	3.38e+04	1.25e+04	2.23e+06	5.42e+04	0.00e+00	3.82e+04
Cs-134	5.65e+09	1.34e+10	1.10e+10	0.00e+00	4.35e+09	1.44e+09	2.35e+08
Cs-134m	1.76e-01	3.70e-01	1.89e-01	0.00e+00	2.01e-01	3.16e-02	1.31e-01

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Caseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	1.81e+09	1.67e+09	7.41e+08	0.00e+00	6.32e+08	1.89e+08	3.90e+07
Cs-136	2.63e+08	1.04e+09	7.48e+08	0.00e+00	5.78e+08	7.93e+07	1.18e+08
Cs-137	7.38e+09	1.01e+10	6.61e+09	0.00e+00	3.43e+09	1.14e+09	1.95e+08
Cs-138	9.72e-24	1.92e-23	9.50e-24	0.00e+00	1.41e-23	1.39e-24	8.18e-29
Cs-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-139	4.54e-08	3.24e-11	1.33e-09	0.00e+00	3.03e-11	1.84e-11	8.06e-08
Ba-140	2.69e+07	3.38e+04	1.76e+06	0.00e+00	1.15e+04	1.93e+04	5.54e+07
Ba-141	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-140	4.52e+00	2.28e+00	6.01e-01	0.00e+00	0.00e+00	0.00e+00	1.67e+05
La-141	3.00e-05	9.31e-06	1.52e-06	0.00e+00	0.00e+00	0.00e+00	1.11e+00
La-142	1.90e-11	8.66e-12	2.16e-12	0.00e+00	0.00e+00	0.00e+00	6.32e-08
Ce-141	4.84e+03	3.28e+03	3.72e+02	0.00e+00	1.52e+03	0.00e+00	1.25e+07
Ce-143	4.16e+01	3.08e+04	3.40e+00	0.00e+00	1.35e+01	0.00e+00	1.15e+06
Ce-144	3.58e+05	1.50e+05	1.92e+04	0.00e+00	8.87e+04	0.00e+00	1.21e+08
Pr-143	1.58e+02	6.33e+01	7.83e+00	0.00e+00	3.66e+01	0.00e+00	6.92e+05
Pr-144	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nd-147	9.42e+01	1.09e+02	6.51e+00	0.00e+00	6.36e+01	0.00e+00	5.22e+05
Pm-147	2.87e+03	2.70e+02	1.09e+02	0.00e+00	5.10e+02	0.00e+00	3.40e+05
Pm-148	5.93e+01	9.85e+00	4.96e+00	0.00e+00	1.86e+01	0.00e+00	7.74e+05
Pm-148m	8.57e+02	2.22e+02	1.70e+02	0.00e+00	3.35e+02	0.00e+00	1.88e+06
Pm-149	4.28e+00	6.05e-01	2.47e-01	0.00e+00	1.14e+00	0.00e+00	1.13e+05
Pm-151	6.47e-01	1.09e-01	5.48e-02	0.00e+00	1.94e-01	0.00e+00	2.99e+04
Sm-151	2.67e+03	4.60e+02	1.10e+02	0.00e+00	5.14e+02	0.00e+00	2.03e+05
Sm-153	1.99e+00	1.66e+00	1.21e-01	0.00e+00	5.36e-01	0.00e+00	5.92e+04
Eu-152	7.51e+03	1.71e+03	1.50e+03	0.00e+00	1.06e+04	0.00e+00	9.86e+05
Eu-154	2.38e+04	2.92e+03	2.08e+03	0.00e+00	1.40e+04	0.00e+00	2.12e+06
Eu-155	3.25e+03	4.61e+02	2.97e+02	0.00e+00	2.13e+03	0.00e+00	3.62e+05
Eu-156	2.52e+02	1.95e+02	3.14e+01	0.00e+00	1.30e+02	0.00e+00	1.33e+06
Tb-160	1.49e+03	0.00e+00	1.86e+02	0.00e+00	6.16e+02	0.00e+00	1.37e+06

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	1.04e+04	3.26e+03	2.47e+03	0.00e+00	4.87e+03	0.00e+00	9.89e+05
W-181	3.39e+04	1.11e+04	1.18e+03	0.00e+00	0.00e+00	0.00e+00	1.26e+06
W-185	1.29e+06	4.32e+05	4.54e+04	0.00e+00	0.00e+00	0.00e+00	4.99e+07
W-187	6.52e+03	5.45e+03	1.91e+03	0.00e+00	0.00e+00	0.00e+00	1.79e+06
Pb-210	7.32e+10	2.09e+10	2.60e+09	0.00e+00	5.88e+10	0.00e+00	1.07e+07
Bi-210	3.56e+05	2.46e+06	2.04e+05	0.00e+00	2.96e+07	0.00e+00	3.67e+07
Po-210	7.42e+08	1.58e+09	1.79e+08	0.00e+00	5.25e+09	0.00e+00	1.33e+08
Ra-223	1.22e+11	1.88e+08	2.44e+10	0.00e+00	5.33e+09	0.00e+00	7.89e+09
Ra-224	1.41e+10	3.42e+07	2.83e+09	0.00e+00	9.65e+08	0.00e+00	2.98e+09
Ra-225	1.90e+11	2.25e+08	3.79e+10	0.00e+00	6.39e+09	0.00e+00	8.85e+09
Ra-226	1.87e+13	3.55e+08	1.36e+13	0.00e+00	1.01e+10	0.00e+00	2.05e+10
Ra-228	6.87e+12	1.91e+08	7.43e+12	0.00e+00	5.42e+09	0.00e+00	3.46e+09
Ac-225	6.17e+04	8.49e+04	4.15e+03	0.00e+00	9.67e+03	0.00e+00	5.70e+06
Ac-227	7.21e+07	9.56e+06	4.28e+06	0.00e+00	3.09e+06	0.00e+00	3.16e+06
Th-227	2.80e+05	5.06e+03	8.06e+03	0.00e+00	2.88e+04	0.00e+00	1.10e+07
Th-228	1.88e+07	3.18e+05	6.35e+05	0.00e+00	1.77e+06	0.00e+00	2.13e+07
Th-229	5.26e+08	1.50e+07	8.69e+06	0.00e+00	7.26e+07	0.00e+00	3.02e+06
Th-230	7.96e+07	4.52e+06	2.20e+06	0.00e+00	2.18e+07	0.00e+00	2.33e+06
Th-232	8.89e+07	3.86e+06	5.80e+04	0.00e+00	1.86e+07	0.00e+00	1.98e+06
Th-234	1.85e+03	1.09e+02	5.33e+01	0.00e+00	6.16e+02	0.00e+00	2.61e+06
Pa-231	1.58e+08	5.95e+06	6.14e+06	0.00e+00	3.34e+07	0.00e+00	2.77e+06
Pa-233	1.28e+02	2.58e+01	2.22e+01	0.00e+00	9.70e+01	0.00e+00	3.99e+05
U-232	1.59e+10	0.00e+00	1.14e+09	0.00e+00	1.73e+09	0.00e+00	2.62e+08
U-233	3.37e+09	0.00e+00	2.04e+08	0.00e+00	7.84e+08	0.00e+00	2.42e+08
U-234	3.23e+09	0.00e+00	2.00e+08	0.00e+00	7.69e+08	0.00e+00	2.37e+08
U-235	3.10e+09	0.00e+00	1.88e+08	0.00e+00	7.23e+08	0.00e+00	3.02e+08
U-236	3.10e+09	0.00e+00	1.92e+08	0.00e+00	7.38e+08	0.00e+00	2.23e+08
U-237	5.65e+04	0.00e+00	1.50e+04	0.00e+00	2.32e+05	0.00e+00	1.99e+07
U-238	2.96e+09	0.00e+00	1.75e+08	0.00e+00	6.76e+08	0.00e+00	2.13e+08
Np-237	4.87e+07	3.46e+06	2.14e+06	0.00e+00	1.59e+07	0.00e+00	3.07e+06

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	3.62e+01	9.75e-01	5.63e-01	0.00e+00	3.30e+00	0.00e+00	9.06e+04
Np-239	3.68e+00	3.61e-01	1.99e-01	0.00e+00	1.13e+00	0.00e+00	7.41e+04
Pu-238	9.73e+06	1.23e+06	2.64e+05	0.00e+00	1.13e+06	0.00e+00	1.13e+06
Pu-239	1.12e+07	1.35e+06	2.95e+05	0.00e+00	1.25e+06	0.00e+00	1.03e+06
Pu-240	1.12e+07	1.34e+06	2.95e+05	0.00e+00	1.25e+06	0.00e+00	1.05e+06
Pu-241	2.42e+05	1.15e+04	5.12e+03	0.00e+00	2.36e+04	0.00e+00	2.16e+04
Pu-242	1.04e+07	1.30e+06	2.84e+05	0.00e+00	1.21e+06	0.00e+00	1.01e+06
Pu-244	1.21e+07	1.49e+06	3.26e+05	0.00e+00	1.38e+06	0.00e+00	1.50e+06
Am-241	2.89e+07	2.70e+07	2.07e+06	0.00e+00	1.56e+07	0.00e+00	2.84e+06
Am-242m	2.94e+07	2.56e+07	2.10e+06	0.00e+00	1.56e+07	0.00e+00	3.61e+06
Am-243	2.91e+07	2.67e+07	2.05e+06	0.00e+00	1.54e+07	0.00e+00	3.36e+06
Cm-242	7.27e+05	7.73e+05	4.83e+04	0.00e+00	2.19e+05	0.00e+00	2.79e+06
Cm-243	2.31e+07	2.12e+07	1.45e+06	0.00e+00	6.75e+06	0.00e+00	3.01e+06
Cm-244	1.76e+07	1.65e+07	1.11e+06	0.00e+00	5.17e+06	0.00e+00	2.91e+06
Cm-245	3.62e+07	3.16e+07	2.23e+06	0.00e+00	1.04e+07	0.00e+00	2.72e+06
Cm-246	3.59e+07	3.15e+07	2.22e+06	0.00e+00	1.04e+07	0.00e+00	2.67e+06
Cm-247	3.50e+07	3.11e+07	2.19e+06	0.00e+00	1.02e+07	0.00e+00	3.51e+06
Cm-248	2.91e+08	2.56e+08	1.80e+07	0.00e+00	8.42e+07	0.00e+00	5.68e+07
Cf-252	9.92e+06	0.00e+00	2.39e+05	0.00e+00	0.00e+00	0.00e+00	1.09e+07

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COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	5.66e+02	5.66e+02	5.66e+02	5.66e+02	5.66e+02	5.66e+02
Be-10	4.47e+06	6.92e+05	1.13e+05	0.00e+00	5.29e+05	0.00e+00	2.83e+07
C-14	4.86e+08	9.72e+07	9.72e+07	9.72e+07	9.72e+07	9.72e+07	9.72e+07
N-13	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F-18	8.30e-03	0.00e+00	9.10e-04	0.00e+00	0.00e+00	0.00e+00	7.48e-04
Na-22	9.18e+09	9.18e+09	9.18e+09	9.18e+09	9.18e+09	9.18e+09	9.18e+09
Na-24	4.27e+06	4.27e+06	4.27e+06	4.27e+06	4.27e+06	4.27e+06	4.27e+06
P-32	3.15e+10	1.95e+09	1.22e+09	0.00e+00	0.00e+00	0.00e+00	2.65e+09
Ca-41	1.57e+10	0.00e+00	1.70e+09	0.00e+00	0.00e+00	0.00e+00	1.56e+07
Sc-46	3.04e+02	5.92e+02	1.76e+02	0.00e+00	5.67e+02	0.00e+00	2.02e+06
Cr-51	0.00e+00	0.00e+00	4.99e+04	2.77e+04	1.09e+04	7.13e+04	8.39e+06
Mn-54	0.00e+00	1.40e+07	2.78e+06	0.00e+00	4.18e+06	0.00e+00	2.87e+07
Mn-56	0.00e+00	7.36e-03	1.31e-03	0.00e+00	9.32e-03	0.00e+00	4.85e-01
Fe-55	4.45e+07	3.16e+07	7.36e+06	0.00e+00	0.00e+00	2.00e+07	1.37e+07
Fe-59	5.18e+07	1.21e+08	4.67e+07	0.00e+00	0.00e+00	3.81e+07	2.86e+08
Co-57	0.00e+00	2.24e+06	3.76e+06	0.00e+00	0.00e+00	0.00e+00	4.19e+07
Co-58	0.00e+00	7.94e+06	1.83e+07	0.00e+00	0.00e+00	0.00e+00	1.09e+08
Co-60	0.00e+00	2.78e+07	6.26e+07	0.00e+00	0.00e+00	0.00e+00	3.62e+08
Ni-59	8.82e+08	3.11e+08	1.50e+08	0.00e+00	0.00e+00	0.00e+00	4.88e+07
Ni-63	1.18e+10	8.35e+08	4.01e+08	0.00e+00	0.00e+00	0.00e+00	1.33e+08
Ni-65	6.87e-01	8.78e-02	4.00e-02	0.00e+00	0.00e+00	0.00e+00	4.76e+00
Cu-64	0.00e+00	4.26e+04	2.00e+04	0.00e+00	1.08e+05	0.00e+00	3.30e+06
Zn-65	2.11e+09	7.32e+09	3.41e+09	0.00e+00	4.68e+09	0.00e+00	3.10e+09
Zn-69	4.01e-12	7.65e-12	5.35e-13	0.00e+00	5.00e-12	0.00e+00	1.41e-11
Zn-69m	3.30e+05	7.79e+05	7.15e+04	0.00e+00	4.74e+05	0.00e+00	4.28e+07
Se-79	0.00e+00	1.67e+09	2.81e+08	0.00e+00	2.92e+09	0.00e+00	2.56e+08
Br-82	0.00e+00	0.00e+00	5.61e+07	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-83	0.00e+00	0.00e+00	1.82e-01	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-84	0.00e+00	0.00e+00	3.09e-23	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	4.73e+09	2.22e+09	0.00e+00	0.00e+00	0.00e+00	7.00e+08
Rb-87	0.00e+00	5.24e+09	1.83e+09	0.00e+00	0.00e+00	0.00e+00	1.83e+08
Rb-88	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rb-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-89	2.67e+09	0.00e+00	7.66e+07	0.00e+00	0.00e+00	0.00e+00	3.19e+08
Sr-90	8.13e+10	0.00e+00	1.63e+09	0.00e+00	0.00e+00	0.00e+00	1.86e+09
Sr-91	5.33e+04	0.00e+00	2.12e+03	0.00e+00	0.00e+00	0.00e+00	2.42e+05
Sr-92	9.07e-01	0.00e+00	3.86e-02	0.00e+00	0.00e+00	0.00e+00	2.31e+01
Y-90	1.30e+02	0.00e+00	3.51e+00	0.00e+00	0.00e+00	0.00e+00	1.07e+06
Y-91	1.58e+04	0.00e+00	4.24e+02	0.00e+00	0.00e+00	0.00e+00	6.48e+06
Y-91m	1.15e-19	0.00e+00	4.39e-21	0.00e+00	0.00e+00	0.00e+00	5.42e-18
Y-92	1.04e-04	0.00e+00	3.01e-06	0.00e+00	0.00e+00	0.00e+00	2.86e+00
Y-93	4.13e-01	0.00e+00	1.13e-02	0.00e+00	0.00e+00	0.00e+00	1.26e+04
Zr-93	2.76e+03	1.36e+02	7.43e+01	0.00e+00	4.81e+02	0.00e+00	1.29e+05
Zr-95	1.65e+03	5.20e+02	3.58e+02	0.00e+00	7.65e+02	0.00e+00	1.20e+06
Zr-97	7.90e-01	1.56e-01	7.20e-02	0.00e+00	2.37e-01	0.00e+00	4.23e+04
Nb-93m	8.55e+05	2.81e+05	7.03e+04	0.00e+00	3.28e+05	0.00e+00	1.01e+08
Nb-95	1.41e+05	7.81e+04	4.30e+04	0.00e+00	7.57e+04	0.00e+00	3.34e+08
Nb-97	1.20e-11	2.98e-12	1.09e-12	0.00e+00	3.48e-12	0.00e+00	7.11e-08
Mo-93	0.00e+00	7.93e+08	2.17e+07	0.00e+00	2.27e+08	0.00e+00	9.65e+07
Mo-99	0.00e+00	4.47e+07	8.53e+06	0.00e+00	1.02e+08	0.00e+00	8.01e+07
Tc-101	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tc-99	4.46e+07	6.56e+07	1.79e+07	0.00e+00	8.33e+08	6.78e+06	1.61e+09
Tc-99m	5.80e+00	1.62e+01	2.10e+02	0.00e+00	2.41e+02	8.97e+00	1.06e+04
Ru-103	1.81e+03	0.00e+00	7.74e+02	0.00e+00	6.38e+03	0.00e+00	1.51e+05
Ru-105	1.58e-03	0.00e+00	6.13e-04	0.00e+00	1.99e-02	0.00e+00	1.27e+00
Ru-106	3.75e+04	0.00e+00	4.73e+03	0.00e+00	7.24e+04	0.00e+00	1.80e+06
Rh-105	6.38e+05	4.61e+05	3.03e+05	0.00e+00	1.96e+06	0.00e+00	5.87e+07
Pd-107	0.00e+00	2.07e+07	1.34e+06	0.00e+00	1.87e+08	0.00e+00	9.63e+07
Pd-109	0.00e+00	8.22e+04	1.87e+04	0.00e+00	4.75e+05	0.00e+00	8.29e+06

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	9.63e+07	9.11e+07	5.54e+07	0.00e+00	1.74e+08	0.00e+00	2.56e+10
Ag-111	1.19e+07	4.95e+06	2.49e+06	0.00e+00	1.61e+07	0.00e+00	6.90e+09
Cd-113m	0.00e+00	5.38e+06	1.73e+05	0.00e+00	5.95e+06	0.00e+00	3.23e+07
Cd-115m	0.00e+00	2.30e+06	7.41e+04	0.00e+00	1.84e+06	0.00e+00	7.27e+07
Sn-123	9.88e+08	1.62e+07	2.40e+07	1.30e+07	0.00e+00	0.00e+00	1.49e+09
Sn-125	1.05e+08	2.08e+06	4.72e+06	1.64e+06	0.00e+00	0.00e+00	9.85e+08
Sn-126	2.89e+09	5.38e+07	8.23e+07	1.42e+07	0.00e+00	0.00e+00	6.43e+08
Sb-124	4.59e+07	8.46e+05	1.79e+07	1.04e+05	0.00e+00	4.01e+07	9.25e+08
Sb-125	3.65e+07	3.99e+05	8.55e+06	3.49e+04	0.00e+00	3.21e+07	2.84e+08
Sb-126	1.00e+07	2.05e+05	3.61e+06	5.68e+04	0.00e+00	7.20e+06	5.94e+08
Sb-127	8.23e+05	1.76e+04	3.11e+05	9.25e+03	0.00e+00	5.60e+05	1.40e+08
Te-125m	3.00e+07	1.08e+07	4.02e+06	8.39e+06	0.00e+00	0.00e+00	8.86e+07
Te-127	1.22e+03	4.31e+02	2.61e+02	8.38e+02	4.92e+03	0.00e+00	9.38e+04
Te-127m	8.44e+07	2.99e+07	1.00e+07	2.01e+07	3.42e+08	0.00e+00	2.10e+08
Te-129	5.37e-10	2.00e-10	1.31e-10	3.84e-10	2.25e-09	0.00e+00	2.94e-09
Te-129m	1.10e+08	4.09e+07	1.74e+07	3.55e+07	4.61e+08	0.00e+00	4.13e+08
Te-131	7.22e-33	2.98e-33	2.26e-33	5.57e-33	3.16e-32	0.00e+00	5.93e-34
Te-131m	6.58e+05	3.15e+05	2.63e+05	4.75e+05	3.29e+06	0.00e+00	2.53e+07
Te-132	4.29e+06	2.72e+06	2.56e+06	2.87e+06	2.61e+07	0.00e+00	8.61e+07
Te-133m	3.95e-13	2.24e-13	2.18e-13	3.13e-13	2.22e-12	0.00e+00	9.07e-13
Te-134	1.68e-18	1.08e-18	1.12e-18	1.38e-18	1.03e-17	0.00e+00	6.22e-20
I-129	1.39e+09	1.17e+09	1.96e+09	1.43e+12	2.10e+09	0.00e+00	1.37e+08
I-130	7.41e+05	2.14e+06	8.56e+05	1.75e+08	3.30e+06	0.00e+00	1.65e+06
I-131	5.37e+08	7.52e+08	4.04e+08	2.20e+11	1.30e+09	0.00e+00	1.49e+08
I-132	2.96e-01	7.75e-01	2.78e-01	2.61e+01	1.22e+00	0.00e+00	3.38e-01
I-133	7.08e+06	1.20e+07	3.66e+06	1.68e+09	2.11e+07	0.00e+00	9.09e+06
I-134	3.74e-12	9.92e-12	3.56e-12	1.65e-10	1.56e-11	0.00e+00	1.31e-13
I-135	2.29e+04	5.90e+04	2.19e+04	3.80e+06	9.33e+04	0.00e+00	6.54e+04
Cs-134	9.81e+09	2.31e+10	1.07e+10	0.00e+00	7.34e+09	2.80e+09	2.87e+08
Cs-134m	3.13e-01	6.49e-01	3.34e-01	0.00e+00	3.61e-01	6.34e-02	4.32e-01

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COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	3.33e+09	3.05e+09	7.13e+08	0.00e+00	1.16e+09	4.21e+08	5.34e+07
Cs-136	4.48e+08	1.76e+09	1.18e+09	0.00e+00	9.60e+08	1.51e+08	1.42e+08
Cs-137	1.34e+10	1.78e+10	6.20e+09	0.00e+00	6.06e+09	2.35e+09	2.53e+08
Cs-138	1.76e-23	3.38e-23	1.69e-23	0.00e+00	2.50e-23	2.91e-24	1.54e-26
Cs-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-139	8.40e-08	5.91e-11	2.45e-09	0.00e+00	5.57e-11	4.07e-11	7.50e-07
Ba-140	4.85e+07	5.95e+04	3.13e+06	0.00e+00	2.02e+04	4.00e+04	7.48e+07
Ba-141	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-140	8.11e+00	3.99e+00	1.06e+00	0.00e+00	0.00e+00	0.00e+00	2.29e+05
La-141	5.52e-05	1.70e-05	2.80e-06	0.00e+00	0.00e+00	0.00e+00	3.01e+00
La-142	3.43e-11	1.53e-11	3.80e-12	0.00e+00	0.00e+00	0.00e+00	4.64e-07
Ce-141	8.88e+03	5.93e+03	6.81e+02	0.00e+00	2.79e+03	0.00e+00	1.70e+07
Ce-143	7.65e+01	5.56e+04	6.21e+00	0.00e+00	2.50e+01	0.00e+00	1.67e+06
Ce-144	6.58e+05	2.72e+05	3.54e+04	0.00e+00	1.63e+05	0.00e+00	1.66e+08
Pr-143	2.90e+02	1.16e+02	1.44e+01	0.00e+00	6.73e+01	0.00e+00	9.55e+05
Pr-144	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nd-147	1.81e+02	1.97e+02	1.18e+01	0.00e+00	1.16e+02	0.00e+00	7.11e+05
Pm-147	5.15e+03	4.89e+02	1.99e+02	0.00e+00	9.32e+02	0.00e+00	4.65e+05
Pm-148	1.09e+02	1.77e+01	8.93e+00	0.00e+00	3.20e+01	0.00e+00	1.06e+06
Pm-148m	1.49e+03	3.78e+02	2.96e+02	0.00e+00	5.73e+02	0.00e+00	2.38e+06
Pm-149	7.88e+00	1.11e+00	4.54e-01	0.00e+00	2.11e+00	0.00e+00	1.63e+05
Pm-151	1.18e+00	1.95e-01	9.88e-02	0.00e+00	3.51e-01	0.00e+00	4.38e+04
Sm-151	4.35e+03	8.37e+02	1.96e+02	0.00e+00	9.17e+02	0.00e+00	2.84e+05
Sm-153	3.65e+00	3.02e+00	2.22e-01	0.00e+00	9.88e-01	0.00e+00	8.53e+04
Eu-152	1.22e+04	2.93e+03	2.58e+03	0.00e+00	1.36e+04	0.00e+00	1.08e+06
Eu-154	3.94e+04	5.08e+03	3.58e+03	0.00e+00	2.27e+04	0.00e+00	2.69e+06
Eu-155	8.48e+03	8.18e+02	5.07e+02	0.00e+00	3.20e+03	0.00e+00	4.69e+06
Eu-156	4.55e+02	3.41e+02	5.57e+01	0.00e+00	2.30e+02	0.00e+00	1.74e+06
Tb-160	2.65e+03	0.00e+00	3.31e+02	0.00e+00	1.05e+03	0.00e+00	1.72e+06

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COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	1.78e+04	5.48e+03	3.97e+03	0.00e+00	8.03e+03	0.00e+00	1.35e+06
W-181	6.27e+04	2.02e+04	2.12e+03	0.00e+00	0.00e+00	0.00e+00	1.72e+06
W-185	2.39e+06	7.88e+05	8.33e+04	0.00e+00	0.00e+00	0.00e+00	6.81e+07
W-187	1.19e+04	9.73e+03	3.41e+03	0.00e+00	0.00e+00	0.00e+00	2.63e+06
Pb-210	1.12e+11	3.36e+10	4.33e+09	0.00e+00	1.06e+11	0.00e+00	1.46e+07
Bi-210	6.57e+05	4.49e+06	3.76e+05	0.00e+00	5.46e+07	0.00e+00	5.13e+07
Po-210	1.37e+09	2.88e+09	3.31e+08	0.00e+00	9.68e+09	0.00e+00	1.81e+08
Ra-223	2.25e+11	3.42e+08	4.50e+10	0.00e+00	9.83e+09	0.00e+00	1.09e+10
Ra-224	2.62e+10	6.25e+07	5.22e+09	0.00e+00	1.79e+09	0.00e+00	4.20e+09
Ra-225	3.50e+11	4.11e+08	6.98e+10	0.00e+00	1.18e+10	0.00e+00	1.22e+10
Ra-226	2.57e+13	6.49e+08	1.91e+13	0.00e+00	1.85e+10	0.00e+00	2.80e+10
Ra-228	1.08e+13	3.49e+08	1.20e+13	0.00e+00	9.98e+09	0.00e+00	4.74e+09
Ac-225	1.14e+05	1.55e+05	7.63e+03	0.00e+00	1.78e+04	0.00e+00	7.89e+06
Ac-227	1.02e+08	1.51e+07	6.07e+06	0.00e+00	4.38e+06	0.00e+00	4.32e+06
Th-227	5.16e+05	9.27e+03	1.49e+04	0.00e+00	5.29e+04	0.00e+00	1.51e+07
Th-228	3.32e+07	5.56e+05	1.12e+06	0.00e+00	3.13e+06	0.00e+00	2.91e+07
Th-229	7.13e+08	2.05e+07	1.18e+07	0.00e+00	9.92e+07	0.00e+00	4.13e+06
Th-230	1.08e+08	6.13e+06	2.99e+06	0.00e+00	2.99e+07	0.00e+00	3.18e+06
Th-232	1.21e+08	5.24e+06	8.13e+04	0.00e+00	2.55e+07	0.00e+00	2.71e+06
Th-234	3.39e+03	1.99e+02	9.86e+01	0.00e+00	1.13e+03	0.00e+00	3.60e+06
Pa-231	2.15e+08	8.08e+06	8.38e+06	0.00e+00	4.54e+07	0.00e+00	3.79e+06
Pa-233	2.30e+02	4.42e+01	3.95e+01	0.00e+00	1.67e+02	0.00e+00	5.05e+05
U-232	2.94e+10	0.00e+00	2.10e+09	0.00e+00	3.18e+09	0.00e+00	3.58e+08
U-233	6.18e+09	0.00e+00	3.76e+08	0.00e+00	1.45e+09	0.00e+00	3.32e+08
U-234	5.93e+09	0.00e+00	3.68e+08	0.00e+00	1.42e+09	0.00e+00	3.25e+08
U-235	5.68e+09	0.00e+00	3.46e+08	0.00e+00	1.33e+09	0.00e+00	4.13e+08
U-236	5.68e+09	0.00e+00	3.54e+08	0.00e+00	1.36e+09	0.00e+00	3.05e+08
U-237	1.04e+05	0.00e+00	2.77e+04	0.00e+00	4.28e+05	0.00e+00	2.76e+07
U-238	5.43e+09	0.00e+00	3.24e+08	0.00e+00	1.25e+09	0.00e+00	2.91e+08
Np-237	6.63e+07	4.76e+06	2.92e+06	0.00e+00	2.16e+07	0.00e+00	4.19e+06

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COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	6.65e+01	1.78e+00	1.04e+00	0.00e+00	6.10e+00	0.00e+00	1.31e+05
Np-239	7.01e+00	6.62e-01	3.67e-01	0.00e+00	2.08e+00	0.00e+00	1.06e+05
Pu-238	1.34e+07	1.71e+06	3.63e+05	0.00e+00	1.55e+06	0.00e+00	1.54e+06
Pu-239	1.53e+07	1.85e+06	4.01e+05	0.00e+00	1.71e+06	0.00e+00	1.41e+06
Pu-240	1.52e+07	1.85e+06	4.01e+05	0.00e+00	1.71e+06	0.00e+00	1.43e+06
Pu-241	3.48e+05	1.67e+04	7.34e+03	0.00e+00	3.40e+04	0.00e+00	2.94e+04
Pu-242	1.41e+07	1.78e+06	3.87e+05	0.00e+00	1.65e+06	0.00e+00	1.38e+06
Pu-244	1.65e+07	2.03e+06	4.43e+05	0.00e+00	1.88e+06	0.00e+00	2.05e+06
Am-241	3.94e+07	3.72e+07	2.84e+06	0.00e+00	2.13e+07	0.00e+00	3.89e+06
Am-242m	4.02e+07	3.54e+07	2.89e+06	0.00e+00	2.14e+07	0.00e+00	4.93e+06
Am-243	3.97e+07	3.66e+07	2.80e+06	0.00e+00	2.10e+07	0.00e+00	4.60e+06
Cm-242	1.34e+06	1.41e+06	8.88e+04	0.00e+00	4.05e+05	0.00e+00	3.82e+06
Cm-243	3.24e+07	3.00e+07	2.04e+06	0.00e+00	9.51e+06	0.00e+00	4.12e+06
Cm-244	2.51e+07	2.37e+07	1.59e+06	0.00e+00	7.41e+06	0.00e+00	3.98e+06
Cm-245	4.94e+07	4.34e+07	3.04e+06	0.00e+00	1.42e+07	0.00e+00	3.72e+06
Cm-246	4.90e+07	4.34e+07	3.04e+06	0.00e+00	1.42e+07	0.00e+00	3.65e+06
Cm-247	4.77e+07	4.27e+07	2.99e+06	0.00e+00	1.40e+07	0.00e+00	4.80e+06
Cm-248	3.96e+08	3.52e+08	2.47e+07	0.00e+00	1.15e+08	0.00e+00	7.73e+07
Cf-252	1.70e+07	0.00e+00	4.10e+05	0.00e+00	0.00e+00	0.00e+00	1.50e+07

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COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	8.97e+02	8.97e+02	8.97e+02	8.97e+02	8.97e+02	8.97e+02
Be-10	1.11e+07	1.29e+06	2.79e+05	0.00e+00	9.13e+05	0.00e+00	2.26e+07
C-14	1.19e+09	2.39e+08	2.39e+08	2.39e+08	2.39e+08	2.39e+08	2.39e+08
N-13	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F-18	1.97e-02	0.00e+00	1.96e-03	0.00e+00	0.00e+00	0.00e+00	5.34e-03
Na-22	1.90e+10	1.90e+10	1.90e+10	1.90e+10	1.90e+10	1.90e+10	1.90e+10
Na-24	8.88e+06	8.88e+06	8.88e+06	8.88e+06	8.88e+06	8.88e+06	8.88e+06
P-32	7.78e+10	3.64e+09	3.00e+09	0.00e+00	0.00e+00	0.00e+00	2.15e+09
Ca-41	2.28e+10	0.00e+00	2.49e+09	0.00e+00	0.00e+00	0.00e+00	1.25e+07
Sc-46	6.83e+02	9.36e+02	3.61e+02	0.00e+00	8.29e+02	0.00e+00	1.37e+06
Cr-51	0.00e+00	0.00e+00	1.02e+05	5.65e+04	1.54e+04	1.03e+05	5.40e+06
Mn-54	0.00e+00	2.10e+07	5.59e+06	0.00e+00	5.88e+06	0.00e+00	1.76e+07
Mn-56	0.00e+00	1.28e-02	2.90e-03	0.00e+00	1.55e-02	0.00e+00	1.86e+00
Fe-55	1.12e+08	5.93e+07	1.84e+07	0.00e+00	0.00e+00	3.35e+07	1.10e+07
Fe-59	1.20e+08	1.95e+08	9.69e+07	0.00e+00	0.00e+00	5.64e+07	2.03e+08
Co-57	0.00e+00	3.84e+06	7.77e+06	0.00e+00	0.00e+00	0.00e+00	3.14e+07
Co-58	0.00e+00	1.21e+07	3.71e+07	0.00e+00	0.00e+00	0.00e+00	7.07e+07
Co-60	0.00e+00	4.32e+07	1.27e+08	0.00e+00	0.00e+00	0.00e+00	2.39e+08
Ni-59	2.22e+09	5.90e+08	3.76e+08	0.00e+00	0.00e+00	0.00e+00	3.91e+07
Ni-63	2.96e+10	1.59e+09	1.01e+09	0.00e+00	0.00e+00	0.00e+00	1.07e+08
Ni-65	1.68e+00	1.58e-01	9.24e-02	0.00e+00	0.00e+00	0.00e+00	1.94e+01
Cu-64	0.00e+00	7.49e+04	4.52e+04	0.00e+00	1.81e+05	0.00e+00	3.51e+06
Zn-65	4.13e+09	1.10e+10	6.85e+09	0.00e+00	6.94e+09	0.00e+00	1.93e+09
Zn-69	9.87e-12	1.43e-11	1.32e-12	0.00e+00	8.65e-12	0.00e+00	8.99e-10
Zn-69m	8.06e+05	1.37e+06	1.62e+05	0.00e+00	7.98e+05	0.00e+00	4.47e+07
Se-79	0.00e+00	3.12e+09	6.92e+08	0.00e+00	5.07e+09	0.00e+00	2.05e+08
Br-82	0.00e+00	0.00e+00	1.15e+08	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-83	0.00e+00	0.00e+00	4.47e-01	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-84	0.00e+00	0.00e+00	7.00e-23	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	8.77e+09	5.39e+09	0.00e+00	0.00e+00	0.00e+00	5.64e+08
Rb-87	0.00e+00	9.75e+09	4.52e+09	0.00e+00	0.00e+00	0.00e+00	1.46e+08
Rb-88	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rb-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-89	6.62e+09	0.00e+00	1.89e+08	0.00e+00	0.00e+00	0.00e+00	2.56e+08
Sr-90	1.68e+11	0.00e+00	3.38e+09	0.00e+00	0.00e+00	0.00e+00	1.50e+09
Sr-91	1.31e+05	0.00e+00	4.94e+03	0.00e+00	0.00e+00	0.00e+00	2.89e+05
Sr-92	2.21e+00	0.00e+00	8.88e-02	0.00e+00	0.00e+00	0.00e+00	4.19e+01
Y-90	3.22e+02	0.00e+00	8.63e+00	0.00e+00	0.00e+00	0.00e+00	9.18e+05
Y-91	3.90e+04	0.00e+00	1.04e+03	0.00e+00	0.00e+00	0.00e+00	5.20e+06
Y-91m	2.80e-19	0.00e+00	1.02e-20	0.00e+00	0.00e+00	0.00e+00	5.49e-16
Y-92	2.56e-04	0.00e+00	7.32e-06	0.00e+00	0.00e+00	0.00e+00	7.39e+00
Y-93	1.02e+00	0.00e+00	2.79e-02	0.00e+00	0.00e+00	0.00e+00	1.51e+04
Zr-93	6.87e+03	2.57e+02	1.83e+02	0.00e+00	9.95e+02	0.00e+00	9.75e+04
Zr-95	3.83e+03	8.42e+02	7.50e+02	0.00e+00	1.21e+03	0.00e+00	8.79e+05
Zr-97	1.92e+00	2.78e-01	1.64e-01	0.00e+00	3.99e-01	0.00e+00	4.21e+04
Nb-93m	2.15e+06	5.37e+05	1.77e+05	0.00e+00	5.80e+05	0.00e+00	8.10e+07
Nb-95	3.18e+05	1.24e+05	8.84e+04	0.00e+00	1.16e+05	0.00e+00	2.29e+08
Nb-97	2.91e-11	5.26e-12	2.46e-12	0.00e+00	5.84e-12	0.00e+00	1.62e-06
Mo-93	0.00e+00	1.49e+09	5.34e+07	0.00e+00	3.92e+08	0.00e+00	7.53e+07
Mo-99	0.00e+00	8.14e+07	2.01e+07	0.00e+00	1.74e+08	0.00e+00	6.73e+07
Tc-101	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tc-99	1.10e+08	1.23e+08	4.40e+07	0.00e+00	1.44e+09	1.08e+07	1.29e+09
Tc-99m	1.33e+01	2.61e+01	4.32e+02	0.00e+00	3.79e+02	1.32e+01	1.48e+04
Ru-103	4.28e+03	0.00e+00	1.65e+03	0.00e+00	1.08e+04	0.00e+00	1.11e+05
Ru-105	3.85e-03	0.00e+00	1.40e-03	0.00e+00	3.39e-02	0.00e+00	2.51e+00
Ru-106	9.24e+04	0.00e+00	1.15e+04	0.00e+00	1.25e+05	0.00e+00	1.44e+06
Rh-105	1.56e+06	8.40e+05	7.18e+05	0.00e+00	3.35e+06	0.00e+00	5.21e+07
Pd-107	0.00e+00	3.88e+07	3.30e+06	0.00e+00	3.25e+08	0.00e+00	7.71e+07
Pd-109	0.00e+00	1.53e+05	4.59e+04	0.00e+00	8.22e+05	0.00e+00	9.05e+06

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COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	2.09e+08	1.41e+08	1.13e+08	0.00e+00	2.63e+08	0.00e+00	1.68e+10
Ag-111	2.94e+07	9.20e+06	6.07e+06	0.00e+00	2.78e+07	0.00e+00	5.63e+09
Cd-113m	0.00e+00	1.00e+07	4.27e+05	0.00e+00	1.03e+07	0.00e+00	2.59e+07
Cd-115m	0.00e+00	4.29e+06	1.83e+05	0.00e+00	3.19e+06	0.00e+00	5.83e+07
Sn-123	2.44e+09	3.03e+07	5.95e+07	3.21e+07	0.00e+00	0.00e+00	1.20e+09
Sn-125	2.57e+08	3.88e+06	1.15e+07	4.03e+06	0.00e+00	0.00e+00	7.98e+08
Sn-126	6.85e+09	8.54e+07	1.95e+08	2.34e+07	0.00e+00	0.00e+00	5.14e+08
Sb-124	1.09e+08	1.41e+06	3.81e+07	2.40e+05	0.00e+00	6.03e+07	6.79e+08
Sb-125	8.70e+07	6.71e+05	1.82e+07	8.06e+04	0.00e+00	4.85e+07	2.08e+08
Sb-126	2.29e+07	3.51e+05	8.23e+06	1.34e+05	0.00e+00	1.09e+07	4.62e+08
Sb-127	1.98e+06	3.07e+04	6.88e+05	2.21e+04	0.00e+00	8.60e+05	1.12e+08
Te-125m	7.38e+07	2.00e+07	9.84e+06	2.07e+07	0.00e+00	0.00e+00	7.12e+07
Te-127	2.99e+03	8.06e+02	6.41e+02	2.07e+03	8.50e+03	0.00e+00	1.17e+05
Te-127m	2.08e+08	5.60e+07	2.47e+07	4.97e+07	5.93e+08	0.00e+00	1.68e+08
Te-129	1.33e-09	3.70e-10	3.15e-10	9.46e-10	3.88e-09	0.00e+00	8.25e-08
Te-129m	2.71e+08	7.58e+07	4.21e+07	8.75e+07	7.97e+08	0.00e+00	3.31e+08
Te-131	1.77e-32	5.40e-33	5.27e-33	1.36e-32	5.36e-32	0.00e+00	9.31e-32
Te-131m	1.60e+06	5.54e+05	5.89e+05	1.14e+06	5.36e+06	0.00e+00	2.25e+07
Te-132	1.03e+07	4.54e+06	5.48e+06	6.61e+06	4.21e+07	0.00e+00	4.57e+07
Te-133m	9.46e-13	3.82e-13	4.74e-13	7.33e-13	3.63e-12	0.00e+00	2.92e-11
Te-134	3.99e-18	1.79e-18	2.39e-18	3.15e-18	1.66e-17	0.00e+00	1.82e-17
I-129	3.43e+09	2.11e+09	1.88e+09	1.38e+12	3.55e+09	0.00e+00	1.06e+08
I-130	1.73e+06	3.50e+06	1.80e+06	3.86e+08	5.23e+06	0.00e+00	1.64e+06
I-131	1.30e+09	1.31e+09	7.45e+08	4.33e+11	2.15e+09	0.00e+00	1.17e+08
I-132	7.01e-01	1.29e+00	5.92e-01	5.97e+01	1.97e+00	0.00e+00	1.52e+00
I-133	1.72e+07	2.13e+07	8.05e+06	3.95e+09	3.55e+07	0.00e+00	8.57e+06
I-134	8.87e-12	1.65e-11	7.57e-12	3.79e-10	2.52e-11	0.00e+00	1.09e-11
I-135	5.43e+04	9.77e+04	4.62e+04	8.66e+06	1.50e+05	0.00e+00	7.45e+04
Cs-134	2.26e+10	3.71e+10	7.84e+09	0.00e+00	1.15e+10	4.13e+09	2.00e+08
Cs-134m	7.42e-01	1.10e+00	7.18e-01	0.00e+00	5.80e-01	9.59e-02	1.39e+00

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COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	8.19e+09	5.71e+09	5.85e+08	0.00e+00	2.01e+09	6.72e+08	4.27e+07
Cs-136	1.01e+09	2.78e+09	1.80e+09	0.00e+00	1.48e+09	2.21e+08	9.77e+07
Cs-137	3.22e+10	3.09e+10	4.55e+09	0.00e+00	1.01e+10	3.62e+09	1.93e+08
Cs-138	4.27e-23	5.94e-23	3.77e-23	0.00e+00	4.18e-23	4.50e-24	2.74e 23
Cs-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-139	2.06e-07	1.10e-10	5.98e-09	0.00e+00	9.62e-11	6.48e-11	1.19e-05
Ba-140	1.17e+08	1.03e+05	6.84e+06	0.00e+00	3.34e+04	6.12e+04	5.93e+07
Ba-141	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-140	1.94e+01	6.79e+00	2.29e+00	0.00e+00	0.00e+00	0.00e+00	1.89e+05
La-141	1.36e-04	3.17e-05	6.89e-06	0.00e+00	0.00e+00	0.00e+00	7.06e+00
La-142	8.30e-11	2.64e-11	8.28e-12	0.00e+00	0.00e+00	0.00e+00	5.24e-06
Ce-141	2.19e+04	1.09e+04	1.62e+03	0.00e+00	4.78e+03	0.00e+00	1.36e+07
Ce-143	1.88e+02	1.02e+05	1.47e+01	0.00e+00	4.27e+01	0.00e+00	1.49e+06
Ce-144	1.62e+06	5.09e+05	8.66e+04	0.00e+00	2.82e+05	0.00e+00	1.33e+08
Pr-143	7.18e+02	2.16e+02	3.56e+01	0.00e+00	1.17e+02	0.00e+00	7.75e+05
Pr-144	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nd-147	4.45e+02	3.60e+02	2.79e+01	0.00e+00	1.98e+02	0.00e+00	5.71e+05
Pm-147	1.29e+04	9.19e+02	4.94e+02	0.00e+00	1.62e+03	0.00e+00	3.72e+05
Pm-148	2.66e+02	3.20e+01	2.07e+01	0.00e+00	5.44e+01	0.00e+00	8.54e+05
Pm-148m	3.06e+03	6.09e+02	6.09e+02	0.00e+00	9.03e+02	0.00e+00	1.72e+06
Pm-149	1.94e+01	2.07e+00	1.12e+00	0.00e+00	3.65e+00	0.00e+00	1.41e+05
Pm-151	2.88e+00	3.51e-01	2.28e-01	0.00e+00	5.95e-01	0.00e+00	3.98e+04
Sm-151	1.05e+04	1.57e+03	4.93e+02	0.00e+00	1.62e+03	0.00e+00	2.27e+05
Sm-153	9.02e+00	5.61e+00	5.41e-01	0.00e+00	1.71e+00	0.00e+00	7.46e+04
Eu-152	2.52e+04	4.59e+03	5.45e+03	0.00e+00	1.94e+04	0.00e+00	7.54e+05
Eu-154	9.46e+04	8.51e+03	7.77e+03	0.00e+00	3.74e+04	0.00e+00	1.98e+06
Eu-155	1.94e+04	1.39e+03	1.09e+03	0.00e+00	5.22e+03	0.00e+00	3.49e+06
Eu-156	1.10e+03	5.88e+02	1.22e+02	0.00e+00	3.79e+02	0.00e+00	1.33e+06
Tb-160	5.61e+03	0.00e+00	6.96e+02	0.00e+00	1.67e+03	0.00e+00	1.24e+06

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Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
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Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	4.44e+04	9.30e+03	7.86e+03	0.00e+00	1.32e+04	0.00e+00	1.08e+06
W-181	1.54e+05	3.79e+04	5.21e+03	0.00e+00	0.00e+00	0.00e+00	1.38e+06
W-185	5.89e+06	1.47e+06	2.06e+05	0.00e+00	0.00e+00	0.00e+00	5.48e+07
W-187	2.89e+04	1.71e+04	7.69e+03	0.00e+00	0.00e+00	0.00e+00	2.41e+06
Pb-210	2.42e+11	6.21e+10	1.06e+10	0.00e+00	1.87e+11	0.00e+00	1.17e+07
Bi-210	1.62e+06	8.38e+06	9.29e+05	0.00e+00	9.45e+07	0.00e+00	4.25e+07
Po-210	3.37e+09	5.39e+09	8.14e+08	0.00e+00	1.68e+10	0.00e+00	1.45e+08
Ra-223	5.55e+11	6.41e+08	1.11e+11	0.00e+00	1.70e+10	0.00e+00	8.84e+09
Ra-224	6.43e+10	1.17e+08	1.29e+10	0.00e+00	3.09e+09	0.00e+00	3.53e+09
Ra-225	8.62e+11	7.70e+08	1.72e+11	0.00e+00	2.04e+10	0.00e+00	9.89e+09
Ra-226	3.78e+13	1.21e+09	3.11e+13	0.00e+00	3.21e+10	0.00e+00	2.24e+10
Ra-228	2.52e+13	6.53e+08	2.82e+13	0.00e+00	1.73e+10	0.00e+00	3.80e+09
Ac-225	2.81e+05	2.89e+05	1.88e+04	0.00e+00	3.09e+04	0.00e+00	6.43e+06
Ac-227	1.69e+08	2.72e+07	1.05e+07	0.00e+00	5.99e+06	0.00e+00	3.46e+06
Th-227	1.27e+06	1.73e+04	3.67e+04	0.00e+00	9.17e+04	0.00e+00	1.22e+07
Th-228	8.33e+07	1.07e+06	2.82e+06	0.00e+00	5.55e+06	0.00e+00	2.33e+07
Th-229	9.67e+08	2.43e+07	1.61e+07	0.00e+00	1.19e+08	0.00e+00	3.31e+06
Th-230	1.46e+08	7.32e+06	4.08e+06	0.00e+00	3.57e+07	0.00e+00	2.55e+06
Th-232	1.63e+08	6.25e+06	1.24e+05	0.00e+00	3.05e+07	0.00e+00	2.17e+06
Th-234	8.40e+03	3.71e+02	2.43e+02	0.00e+00	1.97e+03	0.00e+00	2.90e+06
Pa-231	2.91e+08	9.63e+06	1.16e+07	0.00e+00	5.27e+07	0.00e+00	3.03e+06
Pa-233	4.68e+02	7.30e+01	8.18e+01	0.00e+00	2.69e+02	0.00e+00	3.73e+05
U-232	7.24e+10	0.00e+00	5.18e+09	0.00e+00	5.51e+09	0.00e+00	2.87e+08
U-233	1.53e+10	0.00e+00	9.26e+08	0.00e+00	2.51e+09	0.00e+00	2.65e+08
U-234	1.47e+10	0.00e+00	9.09e+08	0.00e+00	2.46e+09	0.00e+00	2.60e+08
U-235	1.41e+10	0.00e+00	8.51e+08	0.00e+00	2.31e+09	0.00e+00	3.30e+08
U-236	1.41e+10	0.00e+00	8.72e+08	0.00e+00	2.36e+09	0.00e+00	2.44e+08
U-237	2.57e+05	0.00e+00	6.83e+04	0.00e+00	7.42e+05	0.00e+00	2.27e+07
U-238	1.35e+10	0.00e+00	7.98e+08	0.00e+00	2.16e+09	0.00e+00	2.33e+08
Np-237	9.17e+07	6.05e+06	4.03e+06	0.00e+00	2.49e+07	0.00e+00	3.36e+06

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	1.64e+02	3.32e+00	2.55e+00	0.00e+00	1.06e+01	0.00e+00	1.14e+05
Np-239	1.73e+01	1.24e+00	8.71e-01	0.00e+00	3.58e+00	0.00e+00	9.17e+04
Pu-238	1.96e+07	2.27e+06	5.20e+05	0.00e+00	1.89e+06	0.00e+00	1.23e+06
Pu-239	2.12e+07	2.27e+06	5.45e+05	0.00e+00	2.01e+06	0.00e+00	1.13e+06
Pu-240	2.11e+07	2.35e+06	5.45e+05	0.00e+00	2.01e+06	0.00e+00	1.15e+06
Pu-241	6.35e+05	2.59e+04	1.32e+04	0.00e+00	4.86e+04	0.00e+00	2.36e+04
Pu-242	1.96e+07	2.27e+06	5.25e+05	0.00e+00	1.93e+06	0.00e+00	1.10e+06
Pu-244	2.29e+07	2.60e+07	6.01e+05	0.00e+00	2.22e+06	0.00e+00	1.65e+06
Am-241	5.54e+07	4.77e+07	4.16e+06	0.00e+00	2.54e+07	0.00e+00	3.11e+06
Am-242m	5.76e+07	4.61e+07	4.28e+06	0.00e+00	2.59e+07	0.00e+00	3.95e+06
Am-243	5.51e+07	4.65e+07	4.04e+06	0.00e+00	2.49e+07	0.00e+00	3.68e+06
Cm-242	3.30e+06	2.63e+06	2.19e+05	0.00e+00	7.02e+05	0.00e+00	3.06e+06
Cm-243	5.26e+07	4.27e+07	3.38e+06	0.00e+00	1.27e+07	0.00e+00	3.30e+06
Cm-244	4.43e+07	3.59e+07	2.84e+06	0.00e+00	1.04e+07	0.00e+00	3.19e+06
Cm-245	6.87e+07	5.51e+07	4.32e+06	0.00e+00	1.69e+07	0.00e+00	2.98e+06
Cm-246	6.79e+07	5.51e+07	4.32e+06	0.00e+00	1.69e+07	0.00e+00	2.92e+06
Cm-247	6.62e+07	5.43e+07	4.24e+06	0.00e+00	1.66e+07	0.00e+00	3.85e+06
Cm-248	5.51e+08	4.48e+08	3.50e+07	0.00e+00	1.37e+08	0.00e+00	6.21e+07
Cf-252	4.25e+07	0.00e+00	1.03e+06	0.00e+00	0.00e+00	0.00e+00	1.20e+07

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	1.36e+03	1.36e+03	1.36e+03	1.36e+03	1.36e+03	1.36e+03
Be-10	1.41e+07	2.05e+06	4.25e+05	0.00e+00	1.35e+06	0.00e+00	2.29e+07
C-14	2.34e+09	5.00e+08	5.00e+08	5.00e+08	5.00e+08	5.00e+08	5.00e+08
N-13	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F-18	4.12e-02	0.00e+00	3.51e-03	0.00e+00	0.00e+00	0.00e+00	9.67e-03
Na-22	3.18e+10	3.18e+10	3.18e+10	3.18e+10	3.18e+10	3.18e+10	3.18e+10
Na-24	1.55e+07	1.55e+07	1.55e+07	1.55e+07	1.55e+07	1.55e+07	1.55e+07
P-32	1.60e+11	9.43e+09	6.21e+09	0.00e+00	0.00e+00	0.00e+00	2.17e+09
Ca-41	2.46e+10	0.00e+00	2.69e+09	0.00e+00	0.00e+00	0.00e+00	1.26e+07
Sc-46	1.30e+03	1.88e+03	5.86e+02	0.00e+00	1.23e+03	0.00e+00	1.22e+06
Cr-51	0.00e+00	0.00e+00	1.61e+05	1.05e+05	2.30e+04	2.05e+05	4.70e+06
Mn-54	0.00e+00	3.90e+07	8.84e+06	0.00e+00	8.64e+06	0.00e+00	1.43e+07
Mn-56	0.00e+00	3.14e-02	5.42e-03	0.00e+00	2.70e-02	0.00e+00	2.86e+00
Fe-55	1.35e+08	8.73e+07	2.33e+07	0.00e+00	0.00e+00	4.27e+07	1.11e+07
Fe-59	2.24e+08	3.92e+08	1.54e+08	0.00e+00	0.00e+00	1.16e+08	1.87e+08
Co-57	0.00e+00	8.95e+06	1.46e+07	0.00e+00	0.00e+00	0.00e+00	3.05e+07
Co-58	0.00e+00	2.42e+07	6.05e+07	0.00e+00	0.00e+00	0.00e+00	6.04e+07
Co-60	0.00e+00	8.81e+07	2.08e+08	0.00e+00	0.00e+00	0.00e+00	2.10e+08
Ni-59	2.61e+09	7.99e+08	4.50e+08	0.00e+00	0.00e+00	0.00e+00	3.95e+07
Ni-63	3.49e+10	2.16e+09	1.21e+09	0.00e+00	0.00e+00	0.00e+00	1.07e+08
Ni-65	3.56e+00	4.03e-01	1.83e-01	0.00e+00	0.00e+00	0.00e+00	3.07e+01
Cu-64	0.00e+00	1.86e+05	8.62e+04	0.00e+00	3.15e+05	0.00e+00	3.82e+06
Zn-65	5.55e+09	1.90e+10	8.78e+09	0.00e+00	9.23e+09	0.00e+00	1.61e+10
Zn-69	2.10e-11	3.79e-11	2.82e-12	0.00e+00	1.57e-11	0.00e+00	3.09e-09
Zn-69m	1.70e+06	3.48e+06	3.17e+05	0.00e+00	1.41e+06	0.00e+00	4.82e+07
Se-79	0.00e+00	7.77e+09	1.44e+09	0.00e+00	9.00e+09	0.00e+00	2.07e+08
Br-82	0.00e+00	0.00e+00	1.93e+08	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-83	0.00e+00	0.00e+00	9.49e-01	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-84	0.00e+00	0.00e+00	1.35e-22	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	2.23e+10	1.10e+10	0.00e+00	0.00e+00	0.00e+00	5.69e+08
Rb-87	0.00e+00	2.19e+10	8.69e+09	0.00e+00	0.00e+00	0.00e+00	1.48e+08
Rb-88	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rb-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-89	1.26e+10	0.00e+00	3.61e+08	0.00e+00	0.00e+00	0.00e+00	2.59e+08
Sr-90	1.86e+11	0.00e+00	3.77e+09	0.00e+00	0.00e+00	0.00e+00	1.52e+09
Sr-91	2.73e+05	0.00e+00	9.87e+03	0.00e+00	0.00e+00	0.00e+00	3.23e+05
Sr-92	4.71e+00	0.00e+00	1.75e-01	0.00e+00	0.00e+00	0.00e+00	5.08e+01
Y-90	6.82e+02	0.00e+00	1.83e+01	0.00e+00	0.00e+00	0.00e+00	9.41e+05
Y-91	7.33e+04	0.00e+00	1.95e+03	0.00e+00	0.00e+00	0.00e+00	5.25e+06
Y-91m	5.94e-19	0.00e+00	2.03e-20	0.00e+00	0.00e+00	0.00e+00	1.98e-15
Y-92	5.44e-04	0.00e+00	1.53e-05	0.00e+00	0.00e+00	0.00e+00	1.04e+01
Y-93	2.16e+00	0.00e+00	5.90e-02	0.00e+00	0.00e+00	0.00e+00	1.71e+04
Zr-93	7.94e+03	3.78e+02	2.28e+02	0.00e+00	1.11e+03	0.00e+00	9.83e+04
Zr-95	6.80e+03	1.66e+03	1.18e+03	0.00e+00	1.79e+03	0.00e+00	8.26e+05
Zr-97	4.07e+00	6.99e-01	3.19e-01	0.00e+00	7.04e-01	0.00e+00	4.46e+04
Nb-93m	2.52e+06	6.83e+05	2.13e+05	0.00e+00	6.66e+05	0.00e+00	8.16e+07
Nb-95	5.93e+05	2.44e+05	1.41e+05	0.00e+00	1.75e+05	0.00e+00	2.06e+08
Nb-97	6.16e-11	1.31e-11	4.74e-12	0.00e+00	1.03e-11	0.00e+00	4.15e-06
Mo-93	0.00e+00	3.49e+09	1.12e+08	0.00e+00	6.97e+08	0.00e+00	7.47e+07
Mo-99	0.00e+00	2.08e+08	4.06e+07	0.00e+00	3.11e+08	0.00e+00	6.86e+07
Tc-101	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tc-99	2.22e+08	3.00e+08	9.36e+07	0.00e+00	2.53e+09	2.92e+07	1.30e+09
Tc-99m	2.77e+01	5.70e+01	7.35e+02	0.00e+00	6.14e+02	2.98e+01	1.66e+04
Ru-103	8.67e+03	0.00e+00	2.90e+03	0.00e+00	1.80e+04	0.00e+00	1.05e+05
Ru-105	8.12e-03	0.00e+00	2.74e-03	0.00e+00	5.97e-02	0.00e+00	3.23e+00
Ru-106	1.90e+05	0.00e+00	2.38e+04	0.00e+00	2.25e+05	0.00e+00	1.44e+06
Rh-105	3.32e+06	2.17e+06	1.46e+06	0.00e+00	6.03e+06	0.00e+00	5.39e+07
Pd-107	0.00e+00	9.79e+07	6.95e+06	0.00e+00	5.59e+08	0.00e+00	7.78e+07
Pd-109	0.00e+00	4.05e+05	9.78e+04	0.00e+00	1.49e+06	0.00e+00	9.95e+06

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	3.86e+08	2.82e+08	1.86e+08	0.00e+00	4.03e+08	0.00e+00	1.46e+10
Ag-111	6.17e+07	2.40e+07	1.27e+07	0.00e+00	5.01e+07	0.00e+00	5.72e+09
Cd-113m	0.00e+00	1.74e+07	6.42e+05	0.00e+00	1.32e+07	0.00e+00	2.62e+07
Cd-115m	0.00e+00	1.03e+07	3.59e+05	0.00e+00	5.40e+06	0.00e+00	5.89e+07
Sn-123	4.57e+09	7.14e+07	1.19e+08	7.18e+07	0.00e+00	0.00e+00	1.21e+09
Sn-125	5.37e+08	1.00e+07	2.39e+07	9.86e+06	0.00e+00	0.00e+00	8.05e+08
Sn-126	1.14e+10	1.49e+08	3.70e+08	3.93e+07	0.00e+00	0.00e+00	5.18e+08
Sb-124	2.09e+08	3.08e+06	6.49e+07	5.56e+05	0.00e+00	1.31e+08	6.46e+08
Sb-125	1.50e+08	1.45e+06	3.08e+07	1.87e+05	0.00e+00	8.65e+07	1.99e+08
Sb-126	4.20e+07	8.23e+05	1.52e+07	3.22e+05	0.00e+00	2.64e+07	4.35e+08
Sb-127	4.17e+06	7.44e+04	1.29e+06	5.31e+04	0.00e+00	2.15e+06	1.11e+08
Te-125m	1.51e+08	5.04e+07	2.04e+07	5.07e+07	0.00e+00	0.00e+00	7.18e+07
Te-127	6.34e+03	2.13e+03	1.36e+03	5.16e+03	1.55e+04	0.00e+00	1.33e+05
Te-127m	4.21e+08	1.40e+08	5.10e+07	1.22e+08	1.04e+09	0.00e+00	1.70e+08
Te-129	2.81e-09	9.69e-10	6.56e-10	2.36e-09	7.00e-09	0.00e+00	2.25e-07
Te-129m	5.57e+08	1.91e+08	8.58e+07	2.14e+08	1.39e+09	0.00e+00	3.33e+08
Te-131	3.76e-32	1.39e-32	1.05e-32	3.35e-32	9.61e-32	0.00e+00	1.52e-30
Te-131m	3.38e+06	1.36e+06	1.12e+06	2.76e+06	9.36e+06	0.00e+00	2.29e+07
Te-132	2.11e+07	1.05e+07	9.75e+06	1.54e+07	6.54e+07	0.00e+00	3.87e+07
Te-133m	1.98e-12	9.05e-13	8.65e-13	1.74e-12	6.17e-12	0.00e+00	9.76e-11
Te-134	8.25e-18	4.14e-18	4.27e-18	7.39e-18	2.79e-17	0.00e+00	9.46e-17
I-129	7.06e+09	5.23e+09	3.83e+09	3.36e+12	6.19e+09	0.00e+00	1.05e+08
I-130	3.56e+06	7.83e+06	3.14e+06	8.78e+08	8.60e+06	0.00e+00	1.68e+06
I-131	2.72e+09	3.21e+09	1.41e+09	1.05e+12	3.74e+09	0.00e+00	1.14e+08
I-132	1.45e+00	2.95e+00	1.05e+00	1.38e+02	3.29e+00	0.00e+00	2.39e+00
I-133	3.63e+07	5.29e+07	1.55e+07	9.62e+09	6.22e+07	0.00e+00	8.95e+06
I-134	1.84e-11	3.77e-11	1.34e-11	8.78e-10	4.21e-11	0.00e+00	3.89e-11
I-135	1.13e+05	2.25e+05	8.19e+04	2.01e+07	2.50e+05	0.00e+00	8.13e+04
Cs-134	3.65e+10	6.80e+10	6.87e+09	0.00e+00	1.75e+10	7.18e+09	1.85e+08
Cs-134m	1.55e+00	2.58e+00	1.30e+00	0.00e+00	9.94e-01	2.29e-01	2.04e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	1.31e+10	1.19e+10	6.22e+08	0.00e+00	3.40e+09	1.29e+09	4.31e+07
Cs-136	1.98e+09	5.81e+09	2.17e+09	0.00e+00	2.32e+09	4.74e+08	8.83e+07
Cs-137	5.15e+10	6.02e+10	4.27e+09	0.00e+00	1.62e+10	6.55e+09	1.88e+08
Cs-138	9.01e-23	1.47e-22	7.10e-23	0.00e+00	7.31e-23	1.14e-23	2.34e-22
Cs-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-139	4.39e-07	2.91e-10	1.27e-08	0.00e+00	1.75e-10	1.77e-10	2.78e-05
Ba-140	2.41e+08	2.41e+05	1.24e+07	0.00e+00	5.72e+04	1.48e+05	5.92e+07
Ba-141	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-140	4.06e+01	1.60e+01	4.11e+00	0.00e+00	0.00e+00	0.00e+00	1.88e+05
La-141	2.89e-04	8.39e-05	1.46e-05	0.00e+00	0.00e+00	0.00e+00	9.62e+00
La-142	1.74e-10	6.40e-11	1.53e-11	0.00e+00	0.00e+00	0.00e+00	1.09e-05
Ce-141	4.34e+04	2.64e+04	3.11e+03	0.00e+00	8.15e+03	0.00e+00	1.37e+07
Ce-143	3.97e+02	2.64e+05	3.01e+01	0.00e+00	7.68e+01	0.00e+00	1.54e+06
Ce-144	2.33e+06	9.52e+05	1.30e+05	0.00e+00	3.85e+05	0.00e+00	1.33e+08
Pr-143	1.49e+03	5.55e+02	7.36e+01	0.00e+00	2.06e+02	0.00e+00	7.84e+05
Pr-144	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nd-147	8.81e+02	9.05e+02	5.55e+01	0.00e+00	3.49e+02	0.00e+00	5.74e+05
Pm-147	1.57e+04	1.32e+03	6.44e+02	0.00e+00	1.98e+03	0.00e+00	3.75e+05
Pm-148	5.57e+02	8.04e+01	4.05e+01	0.00e+00	9.60e+01	0.00e+00	8.58e+05
Pm-148m	4.90e+03	1.24e+03	9.74e+02	0.00e+00	1.43e+03	0.00e+00	1.62e+06
Pm-149	4.13e+01	5.42e+00	2.37e+00	0.00e+00	6.59e+00	0.00e+00	1.46e+05
Pm-151	6.10e+00	8.90e-01	4.50e-01	0.00e+00	1.06e+00	0.00e+00	4.12e+04
Sm-151	1.19e+04	2.74e+03	5.92e+02	0.00e+00	1.86e+03	0.00e+00	2.29e+05
Sm-153	1.91e+01	1.47e+01	1.13e+00	0.00e+00	3.09e+00	0.00e+00	7.71e+04
Eu-152	2.76e+04	7.34e+03	6.19e+03	0.00e+00	2.06e+04	0.00e+00	6.52e+05
Eu-154	1.09e+05	1.51e+04	9.05e+03	0.00e+00	4.09e+04	0.00e+00	1.88e+06
Eu-155	2.18e+04	2.51e+03	1.30e+03	0.00e+00	5.63e+03	0.00e+00	3.36e+06
Eu-156	2.23e+03	1.38e+03	2.19e+02	0.00e+00	6.37e+02	0.00e+00	1.30e+06
Tb-160	8.75e+03	0.00e+00	1.09e+03	0.00e+00	2.49e+03	0.00e+00	1.17e+06

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	5.14e+04	1.11e+04	8.76e+03	0.00e+00	1.47e+04	0.00e+00	1.09e+06
W-181	3.23e+05	9.91e+04	1.11e+04	0.00e+00	0.00e+00	0.00e+00	1.39e+06
W-185	1.23e+07	3.85e+06	4.39e+05	0.00e+00	0.00e+00	0.00e+00	5.51e+07
W-187	6.09e+04	4.23e+04	1.46e+04	0.00e+00	0.00e+00	0.00e+00	2.49e+06
Pb-210	2.69e+11	7.23e+10	1.21e+10	0.00e+00	2.20e+11	0.00e+00	1.18e+07
Bi-210	3.42e+06	2.20e+07	1.96e+06	0.00e+00	1.71e+08	0.00e+00	4.33e+07
Po-210	6.88e+09	1.32e+10	1.64e+09	0.00e+00	2.80e+10	0.00e+00	1.47e+08
Ra-223	1.15e+12	1.68e+09	2.31e+11	0.00e+00	3.06e+10	0.00e+00	8.97e+09
Ra-224	1.36e+11	3.07e+08	2.72e+10	0.00e+00	5.60e+09	0.00e+00	3.60e+09
Ra-225	1.78e+12	2.01e+09	3.54e+11	0.00e+00	3.66e+10	0.00e+00	9.98e+09
Ra-226	4.08e+13	3.13e+09	3.38e+13	0.00e+00	5.73e+10	0.00e+00	2.26e+10
Ra-228	2.82e+13	1.69e+09	3.18e+13	0.00e+00	3.09e+10	0.00e+00	3.83e+09
Ac-225	5.85e+05	7.51e+05	3.92e+04	0.00e+00	5.51e+04	0.00e+00	6.51e+06
Ac-227	1.84e+08	3.15e+07	1.15e+07	0.00e+00	6.40e+06	0.00e+00	3.49e+06
Th-227	2.61e+06	4.37e+04	7.49e+04	0.00e+00	1.61e+05	0.00e+00	1.24e+07
Th-228	9.94e+07	1.36e+06	3.36e+06	0.00e+00	6.36e+06	0.00e+00	2.35e+07
Th-229	1.04e+09	2.60e+07	1.73e+07	0.00e+00	1.25e+08	0.00e+00	3.33e+06
Th-230	1.56e+08	7.82e+06	4.36e+06	0.00e+00	3.75e+07	0.00e+00	2.57e+06
Th-232	1.74e+08	6.70e+06	6.79e+04	0.00e+00	3.20e+07	0.00e+00	2.18e+06
Th-234	1.70e+04	9.26e+02	4.91e+02	0.00e+00	3.41e+03	0.00e+00	2.92e+06
Pa-231	3.11e+08	1.03e+07	1.24e+07	0.00e+00	5.51e+07	0.00e+00	3.06e+06
Pa-233	8.05e+02	1.58e+02	1.41e+02	0.00e+00	4.32e+02	0.00e+00	3.78e+05
U-232	9.95e+10	0.00e+00	8.88e+09	0.00e+00	9.74e+09	0.00e+00	2.89e+08
U-233	2.09e+10	0.00e+00	1.59e+09	0.00e+00	4.44e+09	0.00e+00	2.68e+08
U-234	2.01e+10	0.00e+00	1.56e+09	0.00e+00	4.36e+09	0.00e+00	2.62e+08
U-235	1.92e+10	0.00e+00	1.46e+09	0.00e+00	4.08e+09	0.00e+00	3.33e+08
U-236	1.92e+10	0.00e+00	1.50e+09	0.00e+00	4.15e+09	0.00e+00	2.46e+08
U-237	5.39e+05	0.00e+00	1.44e+05	0.00e+00	1.34e+06	0.00e+00	2.30e+07
U-238	1.84e+10	0.00e+00	1.37e+09	0.00e+00	3.82e+09	0.00e+00	2.35e+08
Np-237	9.87e+07	6.54e+06	4.32e+06	0.00e+00	2.61e+07	0.00e+00	3.39e+06

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

COW'S MILK PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Cow's Milk Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	3.49e+02	8.78e+00	5.40e+00	0.00e+00	1.92e+01	0.00e+00	1.17e+05
Np-239	3.65e+01	3.26e+00	1.84e+00	0.00e+00	6.51e+00	0.00e+00	9.44e+04
Pu-238	2.11e+07	2.47e+06	5.59e+05	0.00e+00	1.99e+06	0.00e+00	1.24e+06
Pu-239	2.27e+07	2.55e+06	5.82e+05	0.00e+00	2.11e+06	0.00e+00	1.14e+06
Pu-240	2.27e+07	2.55e+06	5.82e+05	0.00e+00	2.11e+06	0.00e+00	1.16e+06
Pu-241	6.97e+05	2.89e+04	1.45e+04	0.00e+00	5.20e+04	0.00e+00	2.38e+04
Pu-242	2.11e+07	2.45e+06	5.61e+05	0.00e+00	2.02e+06	0.00e+00	1.11e+06
Pu-244	2.45e+07	2.81e+06	6.43e+05	0.00e+00	2.32e+06	0.00e+00	1.66e+06
Am-241	5.95e+07	5.17e+07	4.44e+06	0.00e+00	2.67e+07	0.00e+00	3.14e+06
Am-242m	6.21e+07	5.02e+07	4.65e+06	0.00e+00	2.73e+07	0.00e+00	3.98e+06
Am-243	5.92e+07	5.06e+07	4.36e+06	0.00e+00	2.62e+07	0.00e+00	3.71e+06
Cm-242	5.15e+06	4.77e+06	3.42e+05	0.00e+00	9.84e+05	0.00e+00	3.09e+06
Cm-243	5.75e+07	4.72e+07	3.69e+06	0.00e+00	1.34e+07	0.00e+00	3.33e+06
Cm-244	4.84e+07	3.98e+07	3.11e+06	0.00e+00	1.11e+07	0.00e+00	3.22e+06
Cm-245	7.36e+07	5.96e+07	4.65e+06	0.00e+00	1.78e+07	0.00e+00	3.00e+06
Cm-246	7.28e+07	5.96e+07	4.65e+06	0.00e+00	1.77e+07	0.00e+00	2.95e+06
Cm-247	7.12e+07	5.88e+07	4.57e+06	0.00e+00	1.74e+07	0.00e+00	3.88e+06
Cm-248	5.88e+08	4.85e+08	3.77e+07	0.00e+00	1.44e+08	0.00e+00	6.25e+07
Cf-252	4.93e+07	0.00e+00	1.19e+06	0.00e+00	0.00e+00	0.00e+00	1.21e+07

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	1.85e+02	1.85e+02	1.85e+02	1.85e+02	1.85e+02	1.85e+02
Be-10	8.72e+06	1.35e+06	2.18e+05	0.00e+00	1.02e+06	0.00e+00	7.35e+07
C-14	2.41e+08	4.83e+07	4.83e+07	4.83e+07	4.83e+07	4.83e+07	4.83e+07
N-13	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F-18	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Na-22	1.39e+09	1.39e+09	1.39e+09	1.39e+09	1.39e+09	1.39e+09	1.39e+09
Na-24	1.39e-03	1.39e-03	1.39e-03	1.39e-03	1.39e-03	1.39e-03	1.39e-03
P-32	4.66e+09	2.90e+08	1.80e+08	0.00e+00	0.00e+00	0.00e+00	5.24e+08
Ca-41	2.03e+09	0.00e+00	2.19e+08	0.00e+00	0.00e+00	0.00e+00	2.02e+06
Sc-46	1.76e+05	3.41e+05	9.91e+04	0.00e+00	3.18e+05	0.00e+00	1.66e+09
Cr-51	0.00e+00	0.00e+00	7.05e+03	4.21e+03	1.55e+03	9.36e+03	1.77e+06
Mn-54	0.00e+00	9.18e+06	1.75e+06	0.00e+00	2.73e+06	0.00e+00	2.81e+07
Mn-56	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Fe-55	2.93e+08	2.03e+08	4.72e+07	0.00e+00	0.00e+00	1.13e+08	1.16e+08
Fe-59	2.66e+08	6.24e+08	2.39e+08	0.00e+00	0.00e+00	1.74e+08	2.08e+09
Co-57	0.00e+00	5.63e+06	9.37e+06	0.00e+00	0.00e+00	0.00e+00	1.43e+08
Co-58	0.00e+00	1.82e+07	4.09e+07	0.00e+00	0.00e+00	0.00e+00	3.70e+08
Co-60	0.00e+00	7.52e+07	1.66e+08	0.00e+00	0.00e+00	0.00e+00	1.41e+09
Ni-59	1.42e+08	4.87e+07	2.37e+07	0.00e+00	0.00e+00	0.00e+00	1.00e+07
Ni-63	1.89e+09	1.31e+08	6.33e+07	0.00e+00	0.00e+00	0.00e+00	2.73e+07
Ni-65	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cu-64	0.00e+00	2.80e-07	1.31e-07	0.00e+00	7.05e-07	0.00e+00	2.38e-05
Zn-65	3.56e+08	1.13e+09	5.12e+08	0.00e+00	7.57e+08	0.00e+00	7.13e+08
Zn-69	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zn-69m	1.87e-05	4.48e-05	4.10e-06	0.00e+00	2.71e-05	0.00e+00	2.73e-03
Se-79	0.00e+00	1.08e+08	1.81e+07	0.00e+00	1.87e+08	0.00e+00	2.21e+07
Br-82	0.00e+00	0.00e+00	1.23e+03	0.00e+00	0.00e+00	0.00e+00	1.41e+03
Br-83	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-84	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	4.88e+08	2.27e+08	0.00e+00	0.00e+00	0.00e+00	9.61e+07
Rb-87	0.00e+00	1.05e+09	3.64e+08	0.00e+00	0.00e+00	0.00e+00	4.90e+07
Rb-88	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rb-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-89	3.02e+08	0.00e+00	8.66e+06	0.00e+00	0.00e+00	0.00e+00	4.84e+07
Sr-90	1.43e+10	0.00e+00	2.87e+08	0.00e+00	0.00e+00	0.00e+00	3.59e+08
Sr-91	1.58e-10	0.00e+00	6.39e-12	0.00e+00	0.00e+00	0.00e+00	7.53e-10
Sr-92	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-90	1.08e+02	0.00e+00	2.90e+00	0.00e+00	0.00e+00	0.00e+00	1.15e+06
Y-91	1.13e+06	0.00e+00	3.03e+04	0.00e+00	0.00e+00	0.00e+00	6.23e+08
Y-91m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-92	1.69e-39	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.96e-35
Y-93	4.87e-12	0.00e+00	1.35e-13	0.00e+00	0.00e+00	0.00e+00	1.55e-07
Zr-93	3.90e+06	2.18e+05	1.02e+05	0.00e+00	8.27e+05	0.00e+00	2.27e+08
Zr-95	1.87e+06	6.01e+05	4.07e+05	0.00e+00	9.43e+05	0.00e+00	1.90e+09
Zr-97	2.11e-05	4.27e-06	1.95e-06	0.00e+00	6.44e-06	0.00e+00	1.32e+00
Nb-93m	1.95e+07	6.35e+06	1.57e+06	0.00e+00	7.31e+06	0.00e+00	2.93e+09
Nb-95	2.30e+06	1.28e+06	6.87e+05	0.00e+00	1.26e+06	0.00e+00	7.76e+09
Nb-97	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Mo-93	0.00e+00	1.65e+08	4.45e+06	0.00e+00	4.67e+07	0.00e+00	2.68e+07
Mo-99	0.00e+00	1.01e+05	1.91e+04	0.00e+00	2.28e+05	0.00e+00	2.33e+05
Tc-101	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tc-99	1.37e+08	2.04e+08	5.51e+07	0.00e+00	2.57e+09	1.73e+07	6.67e+09
Tc-99m	4.74e-21	1.34e-20	1.71e-19	0.00e+00	2.04e-19	6.57e-21	7.93e-18
Ru-103	1.05e+08	0.00e+00	4.53e+07	0.00e+00	4.02e+08	0.00e+00	1.23e+10
Ru-105	6.30e-28	0.00e+00	2.49e-28	0.00e+00	8.14e-27	0.00e+00	3.85e-25
Ru-106	2.80e+09	0.00e+00	3.54e+08	0.00e+00	5.40e+09	0.00e+00	1.81e+11
Rh-105	3.79e+00	2.78e+00	1.83e+00	0.00e+00	1.18e+01	0.00e+00	4.42e+02
Pd-107	0.00e+00	1.61e+06	1.03e+05	0.00e+00	1.45e+07	0.00e+00	9.99e+06
Pd-109	0.00e+00	1.49e-06	3.35e-07	0.00e+00	8.47e-06	0.00e+00	1.64e-04

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	6.68e+06	6.18e+06	3.67e+06	0.00e+00	1.22e+07	0.00e+00	2.52e+09
Ag-111	1.46e+05	6.12e+04	3.05e+04	0.00e+00	1.97e+05	0.00e+00	1.12e+08
Cd-113m	0.00e+00	4.60e+06	1.47e+05	0.00e+00	5.06e+06	0.00e+00	3.70e+07
Cd-115m	0.00e+00	1.49e+06	4.76e+04	0.00e+00	1.18e+06	0.00e+00	6.27e+07
Sn-123	5.53e+09	9.15e+07	1.35e+08	7.78e+07	0.00e+00	0.00e+00	1.13e+10
Sn-125	1.76e+08	3.55e+06	7.99e+06	2.94e+06	0.00e+00	0.00e+00	2.20e+09
Sn-126	1.85e+10	3.66e+08	5.27e+08	1.08e+08	0.00e+00	0.00e+00	5.33e+09
Sb-124	1.98e+07	3.74e+05	7.85e+06	4.80e+04	0.00e+00	1.54e+07	5.62e+08
Sb-125	1.91e+07	2.13e+05	4.55e+06	1.94e+04	0.00e+00	1.47e+07	2.10e+08
Sb-126	1.96e+06	3.99e+04	7.08e+05	1.20e+04	0.00e+00	1.20e+06	1.60e+08
Sb-127	1.71e+04	3.75e+02	6.58e+03	2.06e+02	0.00e+00	1.02e+04	3.92e+06
Te-125m	3.59e+08	1.30e+08	4.81e+07	1.08e+08	1.46e+09	0.00e+00	1.43e+09
Te-127	2.21e-10	7.94e-11	4.78e-11	1.64e-10	9.01e-10	0.00e+00	1.74e-08
Te-127m	1.12e+09	3.99e+08	1.36e+08	2.85e+08	4.53e+09	0.00e+00	3.74e+09
Te-129	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-129m	1.13e+09	4.23e+08	1.80e+08	3.90e+08	4.74e+09	0.00e+00	5.71e+09
Te-131	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-131m	4.57e+02	2.23e+02	1.86e+02	3.54e+02	2.26e+03	0.00e+00	2.22e+04
Te-132	1.43e+06	9.23e+05	8.66e+05	1.02e+06	8.89e+06	0.00e+00	4.36e+07
Te-133m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-134	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-129	1.30e+08	1.12e+08	3.66e+08	2.87e+11	2.40e+08	0.00e+00	1.77e+07
I-130	2.18e-06	6.42e-06	2.53e-06	5.44e-04	1.00e-05	0.00e+00	5.52e-06
I-131	1.08e+07	1.54e+07	8.82e+06	5.04e+09	2.64e+07	0.00e+00	4.06e+06
I-132	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-133	3.72e-01	6.47e-01	1.97e-01	9.51e+01	1.13e+00	0.00e+00	5.82e-01
I-134	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-135	4.69e-17	1.23e-16	4.53e-17	8.10e-15	1.97e-16	0.00e+00	1.39e-16
Cs-134	6.58e+08	1.56e+09	1.28e+09	0.00e+00	5.06e+08	1.68e+08	2.74e+07
Cs-134m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	2.14e+08	1.97e+08	8.76e+07	0.00e+00	7.47e+07	2.24e+07	4.62e+06
Cs-136	1.21e+07	4.76e+07	3.43e+07	0.00e+00	2.65e+07	3.63e+06	5.41e+06
Cs-137	8.72e+08	1.19e+09	7.81e+08	0.00e+00	4.05e+08	1.35e+08	2.31e+07
Cs-138	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-140	2.88e+07	3.61e+04	1.88e+06	0.00e+00	1.23e+04	2.07e+04	5.92e+07
Ba-141	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-140	3.75e-02	1.89e-02	4.99e-03	0.00e+00	0.00e+00	0.00e+00	1.39e+03
La-141	3.46e-37	1.07e-37	1.76e-38	0.00e+00	0.00e+00	0.00e+00	1.28e-32
La-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ce-141	1.41e+04	9.50e+03	1.08e+03	0.00e+00	4.41e+03	0.00e+00	3.63e+07
Ce-143	2.03e-02	1.50e+01	1.66e-03	0.00e+00	6.61e-03	0.00e+00	5.61e+02
Ce-144	1.46e+06	6.09e+05	7.83e+04	0.00e+00	3.61e+05	0.00e+00	4.93e+08
Pr-143	2.10e+04	8.42e+03	1.04e+03	0.00e+00	4.86e+03	0.00e+00	9.19e+07
Pr-144	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nd-147	7.08e+03	8.18e+03	4.90e+02	0.00e+00	4.78e+03	0.00e+00	3.93e+07
Pm-147	9.64e+05	9.07e+04	3.67e+04	0.00e+00	1.71e+05	0.00e+00	1.14e+08
Pm-148	1.98e+03	3.29e+02	1.65e+02	0.00e+00	6.21e+02	0.00e+00	2.58e+07
Pm-148m	2.16e+05	5.59e+04	4.27e+04	0.00e+00	8.43e+04	0.00e+00	4.74e+08
Pm-149	5.15e+00	7.28e-01	2.97e-01	0.00e+00	1.37e+00	0.00e+00	1.36e+05
Pm-151	5.64e-03	9.46e-04	4.78e-04	0.00e+00	1.69e-03	0.00e+00	2.60e+02
Sm-151	9.45e+05	1.63e+05	3.90e+04	0.00e+00	1.82e+05	0.00e+00	7.19e+07
Sm-153	1.17e+00	9.80e-01	7.15e-02	0.00e+00	3.17e-01	0.00e+00	3.49e+04
Eu-152	2.55e+06	5.81e+05	5.10e+05	0.00e+00	3.60e+06	0.00e+00	3.35e+08
Eu-154	8.09e+06	9.95e+05	7.08e+05	0.00e+00	4.76e+06	0.00e+00	7.21e+08
Eu-155	1.09e+06	1.54e+05	9.93e+04	0.00e+00	7.10e+05	0.00e+00	1.21e+08
Eu-156	3.77e+04	2.92e+04	4.71e+03	0.00e+00	1.95e+04	0.00e+00	2.00e+08
Tb-160	3.92e+05	0.00e+00	4.89e+04	0.00e+00	1.62e+05	0.00e+00	3.61e+08

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MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	3.26e+06	1.02e+06	7.72e+05	0.00e+00	1.52e+06	0.00e+00	3.09e+08
W-181	3.02e+04	9.84e+03	1.05e+03	0.00e+00	0.00e+00	0.00e+00	1.12e+06
W-185	1.08e+06	3.61e+05	3.79e+04	0.00e+00	0.00e+00	0.00e+00	4.17e+07
W-187	2.25e-02	1.88e-02	6.56e-03	0.00e+00	0.00e+00	0.00e+00	6.15e+00
Pb-210	1.21e+10	3.46e+09	4.31e+08	0.00e+00	9.75e+09	0.00e+00	1.77e+06
Bi-210	2.72e+05	1.88e+06	1.56e+05	0.00e+00	2.26e+07	0.00e+00	2.80e+07
Po-210	9.62e+09	2.04e+10	2.32e+09	0.00e+00	6.81e+10	0.00e+00	1.72e+09
Ra-223	6.16e+10	9.49e+07	1.23e+10	0.00e+00	2.69e+09	0.00e+00	3.98e+09
Ra-224	7.05e+08	1.71e+06	1.41e+08	0.00e+00	4.81e+07	0.00e+00	1.49e+08
Ra-225	1.23e+11	1.46e+08	2.46e+10	0.00e+00	4.15e+09	0.00e+00	5.75e+09
Ra-226	2.82e+13	5.35e+08	2.05e+13	0.00e+00	1.52e+10	0.00e+00	3.10e+10
Ra-228	1.03e+13	2.87e+08	1.11e+13	0.00e+00	8.12e+09	0.00e+00	5.19e+09
Ac-225	7.54e+07	1.04e+08	5.07e+06	0.00e+00	1.18e+07	0.00e+00	6.98e+09
Ac-227	3.07e+11	4.07e+10	1.82e+10	0.00e+00	1.31e+10	0.00e+00	1.34e+10
Th-227	2.02e+06	3.66e+04	5.83e+04	0.00e+00	2.08e+05	0.00e+00	7.97e+07
Th-228	2.61e+08	4.43e+06	8.85e+06	0.00e+00	2.46e+07	0.00e+00	2.97e+08
Th-229	7.46e+09	2.13e+08	1.23e+08	0.00e+00	1.03e+09	0.00e+00	4.28e+07
Th-230	1.13e+09	6.42e+07	3.13e+07	0.00e+00	3.10e+08	0.00e+00	3.30e+07
Th-232	1.26e+09	5.48e+07	8.23e+05	0.00e+00	2.64e+08	0.00e+00	2.81e+07
Th-234	1.56e+04	9.19e+02	4.51e+02	0.00e+00	5.21e+03	0.00e+00	2.21e+07
Pa-231	8.99e+15	3.38e+14	3.49e+14	0.00e+00	1.90e+15	0.00e+00	1.57e+14
Pa-233	4.60e+09	9.28e+08	7.98e+08	0.00e+00	3.49e+09	0.00e+00	1.44e+13
U-232	3.85e+09	0.00e+00	2.75e+08	0.00e+00	4.16e+08	0.00e+00	6.31e+07
U-233	8.12e+08	0.00e+00	4.92e+07	0.00e+00	1.89e+08	0.00e+00	5.85e+07
U-234	7.79e+08	0.00e+00	4.82e+07	0.00e+00	1.86e+08	0.00e+00	5.72e+07
U-235	7.47e+08	0.00e+00	4.53e+07	0.00e+00	1.74e+08	0.00e+00	7.28e+07
U-236	7.47e+08	0.00e+00	4.62e+07	0.00e+00	1.78e+08	0.00e+00	5.37e+07
U-237	2.15e+03	0.00e+00	5.72e+02	0.00e+00	8.83e+03	0.00e+00	7.55e+05
U-238	7.15e+08	0.00e+00	4.23e+07	0.00e+00	1.63e+08	0.00e+00	5.13e+07
Np-237	6.91e+08	4.91e+07	3.04e+07	0.00e+00	2.26e+08	0.00e+00	4.35e+07

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MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	1.43e+00	3.85e-02	2.22e-02	0.00e+00	1.30e-01	0.00e+00	3.58e+03
Np-239	2.61e-01	2.57e-02	1.41e-02	0.00e+00	8.00e-02	0.00e+00	5.26e+03
Pu-238	2.42e+07	3.06e+06	6.56e+05	0.00e+00	2.81e+06	0.00e+00	2.80e+06
Pu-239	2.78e+07	3.34e+06	7.33e+05	0.00e+00	3.11e+06	0.00e+00	2.56e+06
Pu-240	2.78e+07	3.34e+06	7.33e+05	0.00e+00	3.11e+06	0.00e+00	2.60e+06
Pu-241	6.00e+05	2.85e+04	1.27e+04	0.00e+00	5.84e+04	0.00e+00	5.35e+04
Pu-242	2.58e+07	3.22e+06	7.06e+05	0.00e+00	3.00e+06	0.00e+00	2.51e+06
Pu-244	3.01e+07	3.69e+06	8.10e+05	0.00e+00	3.44e+06	0.00e+00	3.74e+06
Am-241	4.07e+08	3.80e+08	2.92e+07	0.00e+00	2.19e+08	0.00e+00	4.00e+07
Am-242m	4.17e+08	3.63e+08	2.98e+07	0.00e+00	2.22e+08	0.00e+00	5.12e+07
Am-243	4.14e+08	3.78e+08	2.91e+07	0.00e+00	2.19e+08	0.00e+00	4.77e+07
Cm-242	9.56e+06	1.02e+07	6.36e+05	0.00e+00	2.89e+06	0.00e+00	3.67e+07
Cm-243	3.28e+08	3.00e+08	2.05e+07	0.00e+00	9.57e+07	0.00e+00	4.27e+07
Cm-244	2.49e+08	2.33e+08	1.57e+07	0.00e+00	7.32e+07	0.00e+00	4.12e+07
Cm-245	5.14e+08	4.48e+08	3.16e+07	0.00e+00	1.48e+08	0.00e+00	3.86e+07
Cm-246	5.10e+08	4.48e+08	3.15e+07	0.00e+00	1.47e+08	0.00e+00	3.79e+07
Cm-247	4.97e+08	4.41e+08	3.11e+07	0.00e+00	1.45e+08	0.00e+00	4.99e+07
Cm-248	4.14e+09	3.64e+09	2.56e+08	0.00e+00	1.20e+09	0.00e+00	8.06e+08
Cf-252	1.39e+08	0.00e+00	3.34e+06	0.00e+00	0.00e+00	0.00e+00	1.53e+08

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MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
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Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	1.10e+02	1.10e+02	1.10e+02	1.10e+02	1.10e+02	1.10e+02
Be-10	7.26e+06	1.12e+06	1.83e+05	0.00e+00	8.59e+05	0.00e+00	4.60e+07
C-14	2.04e+08	4.08e+07	4.08e+07	4.08e+07	4.08e+07	4.08e+07	4.08e+07
N-13	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F-18	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Na-22	1.10e+09	1.10e+09	1.10e+09	1.10e+09	1.10e+09	1.10e+09	1.10e+09
Na-24	1.11e-03	1.11e-03	1.11e-03	1.11e-03	1.11e-03	1.11e-03	1.11e-03
P-32	3.94e+09	2.44e+08	1.53e+08	0.00e+00	0.00e+00	0.00e+00	3.31e+08
Ca-41	1.28e+09	0.00e+00	1.38e+08	0.00e+00	0.00e+00	0.00e+00	1.26e+06
Sc-46	1.36e+05	2.65e+05	7.87e+04	0.00e+00	2.54e+05	0.00e+00	9.04e+08
Cr-51	0.00e+00	0.00e+00	5.64e+03	3.13e+03	1.24e+03	8.05e+03	9.48e+05
Mn-54	0.00e+00	7.00e+06	1.39e+06	0.00e+00	2.09e+06	0.00e+00	1.44e+07
Mn-56	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Fe-55	2.38e+08	1.69e+08	3.94e+07	0.00e+00	0.00e+00	1.07e+08	7.31e+07
Fe-59	2.12e+08	4.95e+08	1.91e+08	0.00e+00	0.00e+00	1.56e+08	1.17e+09
Co-57	0.00e+00	4.53e+06	7.59e+06	0.00e+00	0.00e+00	0.00e+00	8.45e+07
Co-58	0.00e+00	1.41e+07	3.24e+07	0.00e+00	0.00e+00	0.00e+00	1.94e+08
Co-60	0.00e+00	5.83e+07	1.31e+08	0.00e+00	0.00e+00	0.00e+00	7.60e+08
Ni-59	1.13e+08	4.00e+07	1.92e+07	0.00e+00	0.00e+00	0.00e+00	6.28e+06
Ni-63	1.52e+09	1.07e+08	5.15e+07	0.00e+00	0.00e+00	0.00e+00	1.71e+07
Ni-65	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cu-64	0.00e+00	2.28e-07	1.07e-07	0.00e+00	5.77e-07	0.00e+00	1.77e-05
Zn-65	2.50e+08	8.69e+08	4.05e+08	0.00e+00	5.56e+08	0.00e+00	3.68e+08
Zn-69	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zn-69m	1.56e-05	3.67e-05	3.37e-06	0.00e+00	2.23e-05	0.00e+00	2.02e-03
Se-79	0.00e+00	9.07e+07	1.52e+07	0.00e+00	1.58e+08	0.00e+00	1.39e+07
Br-82	0.00e+00	0.00e+00	9.76e+02	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-83	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-84	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

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Ri factors for Teen age group by nuclide.
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Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	4.07e+08	1.91e+08	0.00e+00	0.00e+00	0.00e+00	6.02e+07
Rb-87	0.00e+00	8.79e+08	3.07e+08	0.00e+00	0.00e+00	0.00e+00	3.07e+07
Rb-88	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rb-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-89	2.55e+08	0.00e+00	7.29e+06	0.00e+00	0.00e+00	0.00e+00	3.03e+07
Sr-90	9.89e+09	0.00e+00	1.98e+08	0.00e+00	0.00e+00	0.00e+00	2.26e+08
Sr-91	1.33e-10	0.00e+00	5.29e-12	0.00e+00	0.00e+00	0.00e+00	6.03e-10
Sr-92	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-90	9.11e+01	0.00e+00	2.45e+00	0.00e+00	0.00e+00	0.00e+00	7.52e+05
Y-91	9.54e+05	0.00e+00	2.56e+04	0.00e+00	0.00e+00	0.00e+00	3.91e+08
Y-91m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-92	1.43e-39	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	3.93e-35
Y-93	4.11e-12	0.00e+00	1.13e-13	0.00e+00	0.00e+00	0.00e+00	1.26e-07
Zr-93	3.05e+06	1.50e+05	8.21e+04	0.00e+00	5.32e+05	0.00e+00	1.42e+08
Zr-95	1.50e+06	4.73e+05	3.25e+05	0.00e+00	6.95e+05	0.00e+00	1.09e+09
Zr-97	1.76e-05	3.49e-06	1.61e-06	0.00e+00	5.29e-06	0.00e+00	9.44e-01
Nb-93m	1.55e+07	5.10e+06	1.28e+06	0.00e+00	5.96e+06	0.00e+00	1.84e+09
Nb-95	1.79e+06	9.96e+05	5.48e+05	0.00e+00	9.65e+05	0.00e+00	4.26e+09
Nb-97	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Mo-93	0.00e+00	1.37e+08	3.76e+06	0.00e+00	3.94e+07	0.00e+00	1.67e+07
Mo-99	0.00e+00	8.31e+04	1.59e+04	0.00e+00	1.90e+05	0.00e+00	1.49e+05
Tc-101	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tc-99	1.16e+08	1.70e+08	4.65e+07	0.00e+00	2.16e+09	1.76e+07	4.17e+09
Tc-99m	3.77e-21	1.05e-20	1.36e-19	0.00e+00	1.57e-19	5.83e-21	6.90e-18
Ru-103	8.57e+07	0.00e+00	3.66e+07	0.00e+00	3.02e+08	0.00e+00	7.16e+09
Ru-105	5.27e-28	0.00e+00	2.04e-28	0.00e+00	6.65e-27	0.00e+00	4.25e-25
Ru-106	2.36e+09	0.00e+00	2.97e+08	0.00e+00	4.55e+09	0.00e+00	1.13e+11
Rh-105	3.21e+00	2.32e+00	1.52e+00	0.00e+00	9.84e+00	0.00e+00	2.95e+02
Pd-107	0.00e+00	1.35e+06	8.69e+04	0.00e+00	1.22e+07	0.00e+00	6.26e+06
Pd-109	0.00e+00	1.24e-06	2.83e-07	0.00e+00	7.19e-06	0.00e+00	1.25e-04

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	5.06c+06	4.79c+06	2.91c+06	0.00e+00	9.13e+06	0.00e+00	1.34e+09
Ag-111	1.23e+05	5.12e+04	2.57e+04	0.00e+00	1.67e+05	0.00e+00	7.14e+07
Cd-113m	0.00e+00	3.85e+06	1.24e+05	0.00e+00	4.26e+06	0.00e+00	2.32e+07
Cd-115m	0.00e+00	1.25e+06	4.02e+04	0.00e+00	9.96e+05	0.00e+00	3.94e+07
Sn-123	4.66e+09	7.66e+07	1.13e+08	6.13e+07	0.00e+00	0.00e+00	7.05e+09
Sn-125	1.49e+08	2.96e+06	6.71e+06	2.32e+06	0.00e+00	0.00e+00	1.40e+09
Sn-126	1.50e+10	2.80e+08	4.28e+08	7.38e+07	0.00e+00	0.00e+00	3.34e+09
Sb-124	1.62e+07	2.98e+05	6.31e+06	3.67e+04	0.00e+00	1.41e+07	3.26e+08
Sb-125	1.56e+07	1.71e+05	3.66e+06	1.49e+04	0.00e+00	1.37e+07	1.22e+08
Sb-126	1.60e+06	3.28e+04	5.76e+05	9.07e+03	0.00e+00	1.15e+06	9.49e+07
Sb-127	1.43e+04	3.05e+02	5.38e+03	1.60e+02	0.00e+00	9.70e+03	2.42e+06
Te-125m	3.03e+08	1.09e+08	4.05e+07	8.47e+07	0.00e+00	0.00e+00	8.94e+08
Te-127	1.88e-10	6.65e-11	4.04e-11	1.29e-10	7.60e-10	0.00e+00	1.45e-08
Te-127m	9.42e+08	3.34e+08	1.12e+08	2.24e+08	3.82e+09	0.00e+00	2.35e+09
Te-129	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-129m	9.50e+08	3.53e+08	1.50e+08	3.07e+08	3.98e+09	0.00e+00	3.57e+09
Te-131	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-131m	3.81e+02	1.83e+02	1.52e+02	2.75e+02	1.90e+03	0.00e+00	1.47e+04
Te-132	1.17e+06	7.39e+05	6.96e+05	7.79e+05	7.09e+06	0.00e+00	2.34e+07
Te-133m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-134	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-129	1.09e+08	9.21e+07	1.54e+08	1.12e+11	1.65e+08	0.00e+00	1.07e+07
I-130	1.75e-06	5.07e-06	2.02e-06	4.13e-04	7.80e-06	0.00e+00	3.89e-06
I-131	8.94e+06	1.25e+07	6.72e+06	3.65e+09	2.15e+07	0.00e+00	2.48e+06
I-132	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-133	3.11e-01	5.28e-01	1.61e-01	7.37e+01	9.26e-01	0.00e+00	3.99e-01
I-134	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-135	3.82e-17	9.82e-17	3.64e-17	6.32e-15	1.55e-16	0.00e+00	1.09e-16
Cs-134	5.23e+08	1.23e+09	5.71e+08	0.00e+00	3.91e+08	1.49e+08	1.53e+07
Cs-134m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

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MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	1.80e+08	1.65e+08	3.86e+07	0.00e+00	6.31e+07	2.28e+07	2.89e+06
Cs-136	9.41e+06	3.70e+07	2.49e+07	0.00e+00	2.02e+07	3.18e+06	2.98e+06
Cs-137	7.24e+08	9.63e+08	3.36e+08	0.00e+00	3.28e+08	1.27e+08	1.37e+07
Cs-138	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-140	2.38e+07	2.91e+04	1.53e+06	0.00e+00	9.88e+03	1.96e+04	3.67e+07
Ba-141	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-140	3.08e-02	1.51e-02	4.03e-03	0.00e+00	0.00e+00	0.00e+00	8.69e+02
La-141	2.92e-37	8.97e-38	1.48e-38	0.00e+00	0.00e+00	0.00e+00	1.59e-32
La-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ce-141	1.18e+04	7.88e+03	9.05e+02	0.00e+00	3.71e+03	0.00e+00	2.25e+07
Ce-143	1.71e-02	1.24e+01	1.39e-03	0.00e+00	5.58e-03	0.00e+00	3.74e+02
Ce-144	1.23e+06	5.08e+05	6.60e+04	0.00e+00	3.04e+05	0.00e+00	3.09e+08
Pr-143	1.77e+04	7.05e+03	8.79e+02	0.00e+00	4.10e+03	0.00e+00	5.81e+07
Pr-144	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nd-147	6.24e+03	6.78e+03	4.06e+02	0.00e+00	3.98e+03	0.00e+00	2.45e+07
Pm-147	7.93e+05	7.53e+04	3.07e+04	0.00e+00	1.44e+05	0.00e+00	7.16e+07
Pm-148	1.66e+03	2.71e+02	1.36e+02	0.00e+00	4.89e+02	0.00e+00	1.62e+07
Pm-148m	1.72e+05	4.36e+04	3.41e+04	0.00e+00	6.60e+04	0.00e+00	2.74e+08
Pm-149	4.34e+00	6.10e-01	2.50e-01	0.00e+00	1.16e+00	0.00e+00	8.98e+04
Pm-151	4.72e-03	7.79e-04	3.94e-04	0.00e+00	1.40e-03	0.00e+00	1.75e+02
Sm-151	7.07e+05	1.36e+05	3.19e+04	0.00e+00	1.49e+05	0.00e+00	4.61e+07
Sm-153	9.88e-01	8.18e-01	6.02e-02	0.00e+00	2.67e-01	0.00e+00	2.31e+04
Eu-152	1.89e+06	4.56e+05	4.02e+05	0.00e+00	2.12e+06	0.00e+00	1.68e+08
Eu-154	6.15e+06	7.93e+05	5.59e+05	0.00e+00	3.55e+06	0.00e+00	4.19e+08
Eu-155	1.30e+06	1.25e+05	7.76e+04	0.00e+00	4.90e+05	0.00e+00	7.18e+08
Eu-156	3.12e+04	2.34e+04	3.82e+03	0.00e+00	1.58e+04	0.00e+00	1.20e+08
Tb-160	3.19e+05	0.00e+00	3.98e+04	0.00e+00	1.26e+05	0.00e+00	2.06e+08

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MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	2.55e+06	7.84e+05	5.68e+05	0.00e+00	1.15e+06	0.00e+00	1.93e+08
W-181	2.56e+04	8.25e+03	8.62e+02	0.00e+00	0.00e+00	0.00e+00	7.02e+05
W-185	9.14e+05	3.01e+05	3.19e+04	0.00e+00	0.00e+00	0.00e+00	2.60e+07
W-187	1.88e-02	1.53e-02	5.37e-03	0.00e+00	0.00e+00	0.00e+00	4.15e+00
Pb-210	8.47e+09	2.55e+09	3.28e+08	0.00e+00	8.05e+09	0.00e+00	1.11e+06
Bi-210	2.30e+05	1.57e+06	1.32e+05	0.00e+00	1.91e+07	0.00e+00	1.80e+07
Po-210	8.13e+09	1.71e+10	1.96e+09	0.00e+00	5.75e+10	0.00e+00	1.08e+09
Ra-223	5.21e+10	7.92e+07	1.04e+10	0.00e+00	2.27e+09	0.00e+00	2.51e+09
Ra-224	5.97e+08	1.43e+06	1.19e+08	0.00e+00	4.09e+07	0.00e+00	9.59e+07
Ra-225	1.04e+11	1.22e+08	2.08e+10	0.00e+00	3.50e+09	0.00e+00	3.63e+09
Ra-226	1.77e+13	4.48e+08	1.32e+13	0.00e+00	1.28e+10	0.00e+00	1.93e+10
Ra-228	7.45e+12	2.40e+08	8.21e+12	0.00e+00	6.85e+09	0.00e+00	3.25e+09
Ac-225	6.37e+07	8.70e+07	4.27e+06	0.00e+00	9.98e+06	0.00e+00	4.42e+09
Ac-227	1.99e+11	2.94e+10	1.18e+10	0.00e+00	8.54e+09	0.00e+00	8.41e+09
Th-227	1.71e+06	3.07e+04	4.93e+04	0.00e+00	1.75e+05	0.00e+00	5.01e+07
Th-228	2.12e+08	3.55e+06	7.16e+06	0.00e+00	2.00e+07	0.00e+00	1.86e+08
Th-229	4.63e+09	1.33e+08	7.68e+07	0.00e+00	6.45e+08	0.00e+00	2.68e+07
Th-230	7.00e+08	3.99e+07	1.94e+07	0.00e+00	1.94e+08	0.00e+00	2.07e+07
Th-232	7.84e+08	3.40e+07	5.28e+05	0.00e+00	1.66e+08	0.00e+00	1.76e+07
Th-234	1.31e+04	7.70e+02	3.82e+02	0.00e+00	4.39e+03	0.00e+00	1.40e+07
Pa-231	5.59e+15	2.10e+14	2.18e+14	0.00e+00	1.18e+15	0.00e+00	9.85e+13
Pa-233	3.79e+09	7.29e+08	6.52e+08	0.00e+00	2.75e+09	0.00e+00	8.33e+12
U-232	3.24e+09	0.00e+00	2.32e+08	0.00e+00	3.51e+08	0.00e+00	3.96e+07
U-233	6.83e+08	0.00e+00	4.15e+07	0.00e+00	1.60e+08	0.00e+00	3.66e+07
U-234	6.56e+08	0.00e+00	4.07e+07	0.00e+00	1.57e+08	0.00e+00	3.59e+07
U-235	6.28e+08	0.00e+00	3.82e+07	0.00e+00	1.47e+08	0.00e+00	4.56e+07
U-236	6.28e+08	0.00e+00	3.91e+07	0.00e+00	1.50e+08	0.00e+00	3.37e+07
U-237	1.81e+03	0.00e+00	4.83e+02	0.00e+00	7.45e+03	0.00e+00	4.80e+05
U-238	6.01e+08	0.00e+00	3.58e+07	0.00e+00	1.38e+08	0.00e+00	3.21e+07
Np-237	4.31e+08	3.10e+07	1.90e+07	0.00e+00	1.40e+08	0.00e+00	2.73e+07

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MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
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Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	1.20e+00	3.22e-02	1.87e-02	0.00e+00	1.10e-01	0.00e+00	2.36e+03
Np-239	2.28e-01	2.15e-02	1.19e-02	0.00e+00	6.75e-02	0.00e+00	3.46e+03
Pu-238	1.52e+07	1.94e+06	4.13e+05	0.00e+00	1.77e+06	0.00e+00	1.75e+06
Pu-239	1.74e+07	2.11e+06	4.56e+05	0.00e+00	1.94e+06	0.00e+00	1.60e+06
Pu-240	1.73e+07	2.10e+06	4.56e+05	0.00e+00	1.94e+06	0.00e+00	1.63e+06
Pu-241	3.95e+05	1.90e+04	8.33e+03	0.00e+00	3.86e+04	0.00e+00	3.34e+04
Pu-242	1.61e+07	2.03e+06	4.40e+05	0.00e+00	1.87e+06	0.00e+00	1.57e+06
Pu-244	1.88e+07	2.31e+06	5.04e+05	0.00e+00	2.14e+06	0.00e+00	2.34e+06
Am-241	2.54e+08	2.40e+08	1.83e+07	0.00e+00	1.37e+08	0.00e+00	2.51e+07
Am-242m	2.61e+08	2.30e+08	1.88e+07	0.00e+00	1.39e+08	0.00e+00	3.21e+07
Am-243	2.58e+08	2.38e+08	1.82e+07	0.00e+00	1.37e+08	0.00e+00	2.99e+07
Cm-242	8.06e+06	8.50e+06	5.35e+05	0.00e+00	2.44e+06	0.00e+00	2.30e+07
Cm-243	2.10e+08	1.95e+08	1.32e+07	0.00e+00	6.17e+07	0.00e+00	2.68e+07
Cm-244	1.63e+08	1.54e+08	1.03e+07	0.00e+00	4.81e+07	0.00e+00	2.58e+07
Cm-245	3.21e+08	2.82e+08	1.98e+07	0.00e+00	9.24e+07	0.00e+00	2.42e+07
Cm-246	3.18e+08	2.82e+08	1.97e+07	0.00e+00	9.20e+07	0.00e+00	2.38e+07
Cm-247	3.10e+08	2.78e+08	1.94e+07	0.00e+00	9.07e+07	0.00e+00	3.12e+07
Cm-248	2.58e+09	2.29e+09	1.60e+08	0.00e+00	7.49e+08	0.00e+00	5.02e+08
Cf-252	1.09e+08	0.00e+00	2.63e+06	0.00e+00	0.00e+00	0.00e+00	9.58e+07

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Ri factors for Child age group by nuclide.
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Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	1.34e+02	1.34e+02	1.34e+02	1.34e+02	1.34e+02	1.34e+02
Be-10	1.38e+07	1.60e+06	3.46e+05	0.00e+00	1.13e+06	0.00e+00	2.81e+07
C-14	3.83e+08	7.67e+07	7.67e+07	7.67e+07	7.67e+07	7.67e+07	7.67e+07
N-13	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F-18	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Na-22	1.75e+09	1.75e+09	1.75e+09	1.75e+09	1.75e+09	1.75e+09	1.75e+09
Na-24	1.77e-03	1.77e-03	1.77e-03	1.77e-03	1.77e-03	1.77e-03	1.77e-03
P-32	7.43e+09	3.47e+08	2.86e+08	0.00e+00	0.00e+00	0.00e+00	2.05e+08
Ca-41	1.42e+09	0.00e+00	1.55e+08	0.00e+00	0.00e+00	0.00e+00	7.77e+05
Sc-46	2.34e+05	3.21e+05	1.24e+05	0.00e+00	2.84e+05	0.00e+00	4.69e+08
Cr-51	0.00e+00	0.00e+00	8.79e+03	4.88e+03	1.33e+03	8.91e+03	4.66e+05
Mn-54	0.00e+00	8.01e+06	2.13e+06	0.00e+00	2.25e+06	0.00e+00	6.72e+06
Mn-56	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Fe-55	4.57e+08	2.42e+08	7.51e+07	0.00e+00	0.00e+00	1.37e+08	4.49e+07
Fe-59	3.76e+08	6.09e+08	3.03e+08	0.00e+00	0.00e+00	1.77e+08	6.34e+08
Co-57	0.00e+00	5.92e+06	1.20e+07	0.00e+00	0.00e+00	0.00e+00	4.85e+07
Co-58	0.00e+00	1.64e+07	5.03e+07	0.00e+00	0.00e+00	0.00e+00	9.58e+07
Co-60	0.00e+00	6.93e+07	2.04e+08	0.00e+00	0.00e+00	0.00e+00	3.84e+08
Ni-59	2.18e+08	5.80e+07	3.69e+07	0.00e+00	0.00e+00	0.00e+00	3.85e+06
Ni-63	2.91e+09	1.56e+08	9.91e+07	0.00e+00	0.00e+00	0.00e+00	1.05e+07
Ni-65	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cu-64	0.00e+00	3.07e-07	1.85e-07	0.00e+00	7.41e-07	0.00e+00	1.44e-05
Zn-65	3.75e+08	1.00e+09	6.22e+08	0.00e+00	6.30e+08	0.00e+00	1.76e+08
Zn-69	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zn-69m	2.91e-05	4.95e-05	5.85e-06	0.00e+00	2.88e-05	0.00e+00	1.61e-03
Se-79	0.00e+00	1.29e+08	2.87e+07	0.00e+00	2.10e+08	0.00e+00	8.48e+06
Br-82	0.00e+00	0.00e+00	1.53e+03	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-83	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-84	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

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MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	5.77e+08	3.55e+08	0.00e+00	0.00e+00	0.00e+00	3.71e+07
Rb-87	0.00e+00	1.25e+09	5.80e+08	0.00e+00	0.00e+00	0.00e+00	1.88e+07
Rb-88	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rb-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-89	4.82e+08	0.00e+00	1.38e+07	0.00e+00	0.00e+00	0.00e+00	1.87e+07
Sr-90	1.57e+10	0.00e+00	3.15e+08	0.00e+00	0.00e+00	0.00e+00	1.40e+08
Sr-91	2.50e-10	0.00e+00	9.42e-12	0.00e+00	0.00e+00	0.00e+00	5.51e-10
Sr-92	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-90	1.72e+02	0.00e+00	4.61e+00	0.00e+00	0.00e+00	0.00e+00	4.91e+05
Y-91	1.80e+06	0.00e+00	4.82e+04	0.00e+00	0.00e+00	0.00e+00	2.40e+08
Y-91m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-92	2.69e-39	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	7.76e-35
Y-93	7.73e-12	0.00e+00	2.12e-13	0.00e+00	0.00e+00	0.00e+00	1.15e-07
Zr-93	5.80e+06	2.17e+05	1.55e+05	0.00e+00	8.41e+05	0.00e+00	8.24e+07
Zr-95	2.66e+06	5.86e+05	5.21e+05	0.00e+00	8.38e+05	0.00e+00	6.11e+08
Zr-97	3.28e-05	4.74e-06	2.80e-06	0.00e+00	6.80e-06	0.00e+00	7.18e-01
Nb-93m	2.99e+07	7.46e+06	2.45e+06	0.00e+00	8.05e+06	0.00e+00	1.12e+09
Nb-95	3.10e+06	1.21e+06	8.62e+05	0.00e+00	1.13e+06	0.00e+00	2.23e+09
Nb-97	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Mo-93	0.00e+00	1.97e+08	7.07e+06	0.00e+00	5.19e+07	0.00e+00	9.98e+06
Mo-99	0.00e+00	1.16e+05	2.86e+04	0.00e+00	2.47e+05	0.00e+00	9.57e+04
Tc-101	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tc-99	2.19e+08	2.44e+08	8.75e+07	0.00e+00	2.87e+09	2.15e+07	2.56e+09
Tc-99m	6.61e-21	1.30e-20	2.15e-19	0.00e+00	1.88e-19	6.58e-21	7.37e-18
Ru-103	1.55e+08	0.00e+00	5.96e+07	0.00e+00	3.90e+08	0.00e+00	4.01e+09
Ru-105	9.83e-28	0.00e+00	3.57e-28	0.00e+00	8.64e-27	0.00e+00	6.42e-25
Ru-106	4.44e+09	0.00e+00	5.54e+08	0.00e+00	5.99e+09	0.00e+00	6.90e+10
Rh-105	6.01e+00	3.23e+00	2.76e+00	0.00e+00	1.29e+01	0.00e+00	2.00e+02
Pd-107	0.00e+00	1.93e+06	1.64e+05	0.00e+00	1.61e+07	0.00e+00	3.83e+06
Pd-109	0.00e+00	1.77e-06	5.32e-07	0.00e+00	9.51e-06	0.00e+00	1.05e-04

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MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	8.39e+06	5.67e+06	4.53e+06	0.00e+00	1.06e+07	0.00e+00	6.74e+08
Ag-111	2.33e+05	7.28e+04	4.81e+04	0.00e+00	2.20e+05	0.00e+00	4.46e+07
Cd-113m	0.00e+00	5.50e+06	2.34e+05	0.00e+00	5.66e+06	0.00e+00	1.42e+07
Cd-115m	0.00e+00	1.78e+06	7.58e+04	0.00e+00	1.32e+06	0.00e+00	2.42e+07
Sn-123	8.81e+09	1.09e+08	2.15e+08	1.16e+08	0.00e+00	0.00e+00	4.32e+09
Sn-125	2.80e+08	4.22e+06	1.25e+07	4.37e+06	0.00e+00	0.00e+00	8.67e+08
Sn-126	2.72e+10	3.39e+08	7.74e+08	9.32e+07	0.00e+00	0.00e+00	2.04e+09
Sb-124	2.92e+07	3.79e+05	1.02e+07	6.46e+04	0.00e+00	1.62e+07	1.83e+08
Sb-125	2.85e+07	2.20e+05	5.97e+06	2.64e+04	0.00e+00	1.59e+07	6.80e+07
Sb-126	2.80e+06	4.28e+04	1.01e+06	1.64e+04	0.00e+00	1.34e+06	5.64e+07
Sb-127	2.63e+04	4.06e+02	9.11e+03	2.92e+02	0.00e+00	1.14e+04	1.48e+06
Te-125m	5.69e+08	1.54e+08	7.59e+07	1.60e+08	0.00e+00	0.00e+00	5.49e+08
Te-127	3.53e-10	9.51e-11	7.57e-11	2.44e-10	1.00e-09	0.00e+00	1.38e-08
Te-127m	1.77e+09	4.78e+08	2.11e+08	4.24e+08	5.06e+09	0.00e+00	1.44e+09
Te-129	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-129m	1.79e+09	5.00e+08	2.78e+08	5.77e+08	5.26e+09	0.00e+00	2.18e+09
Te-131	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-131m	7.09e+02	2.45e+02	2.61e+02	5.04e+02	2.37e+03	0.00e+00	9.94e+03
Te-132	2.13e+06	9.43e+05	1.14e+06	1.37e+06	8.76e+06	0.00e+00	9.49e+06
Te-133m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-134	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-129	2.06e+08	1.26e+08	1.13e+08	8.27e+10	2.13e+08	0.00e+00	6.36e+06
I-130	3.13e-06	6.33e-06	3.26e-06	6.97e-04	9.46e-06	0.00e+00	2.96e-06
I-131	1.66e+07	1.67e+07	9.48e+06	5.51e+09	2.74e+07	0.00e+00	1.48e+06
I-132	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-133	5.78e-01	7.15e-01	2.70e-01	1.33e+02	1.19e+00	0.00e+00	2.88e-01
I-134	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-135	6.91e-17	1.24e-16	5.88e-17	1.10e-14	1.91e-16	0.00e+00	9.47e-17
Cs-134	9.22e+08	1.51e+09	3.19e+08	0.00e+00	4.69e+08	1.68e+08	8.16e+06
Cs-134m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

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Ri factors for Child age group by nuclide.
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	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	3.39e+08	2.36e+08	2.42e+07	0.00e+00	8.34e+07	2.78e+07	1.77e+06
Cs-136	1.62e+07	4.46e+07	2.89e+07	0.00e+00	2.38e+07	3.54e+06	1.57e+06
Cs-137	1.33e+09	1.28e+09	1.88e+08	0.00e+00	4.16e+08	1.50e+08	7.99e+06
Cs-138	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-140	4.39e+07	3.85e+04	2.56e+06	0.00e+00	1.25e+04	2.29e+04	2.22e+07
Ba-141	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-140	5.64e-02	1.97e-02	6.64e-03	0.00e+00	0.00e+00	0.00e+00	5.49e+02
La-141	5.50e-37	1.28e-37	2.78e-38	0.00e+00	0.00e+00	0.00e+00	2.85e-32
La-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ce-141	2.22e+04	1.11e+04	1.65e+03	0.00e+00	4.86e+03	0.00e+00	1.38e+07
Ce-143	3.21e-02	1.74e+01	2.52e-03	0.00e+00	7.29e-03	0.00e+00	2.55e+02
Ce-144	2.32e+06	7.26e+05	1.24e+05	0.00e+00	4.02e+05	0.00e+00	1.89e+08
Pr-143	3.34e+04	1.00e+04	1.66e+03	0.00e+00	5.43e+03	0.00e+00	3.61e+07
Pr-144	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nd-147	1.17e+04	9.48e+03	7.34e+02	0.00e+00	5.20e+03	0.00e+00	1.50e+07
Pm-147	1.52e+06	1.08e+05	5.81e+04	0.00e+00	1.91e+05	0.00e+00	4.38e+07
Pm-148	3.11e+03	3.74e+02	2.42e+02	0.00e+00	6.35e+02	0.00e+00	9.98e+06
Pm-148m	2.70e+05	5.37e+04	5.37e+04	0.00e+00	7.96e+04	0.00e+00	1.51e+08
Pm-149	8.19e+00	8.71e-01	4.72e-01	0.00e+00	1.54e+00	0.00e+00	5.94e+04
Pm-151	8.80e-03	1.07e-03	6.96e-04	0.00e+00	1.81e-03	0.00e+00	1.21e+02
Sm-151	1.31e+06	1.95e+05	6.13e+04	0.00e+00	2.01e+05	0.00e+00	2.82e+07
Sm-153	1.86e+00	1.16e+00	1.12e-01	0.00e+00	3.53e-01	0.00e+00	1.54e+04
Eu-152	3.00e+06	5.46e+05	6.49e+05	0.00e+00	2.31e+06	0.00e+00	8.97e+07
Eu-154	1.13e+07	1.02e+06	9.27e+05	0.00e+00	4.46e+06	0.00e+00	2.36e+08
Eu-155	2.27e+06	1.63e+05	1.28e+05	0.00e+00	6.11e+05	0.00e+00	4.09e+08
Eu-156	5.77e+04	3.09e+04	6.39e+03	0.00e+00	1.99e+04	0.00e+00	7.01e+07
Tb-160	5.16e+05	0.00e+00	6.40e+04	0.00e+00	1.54e+05	0.00e+00	1.14e+08

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Ri factors for Child age group by nuclide.
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Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	4.86e+06	1.02e+06	8.59e+05	0.00e+00	1.45e+06	0.00e+00	1.18e+08
W-181	4.80e+04	1.18e+04	1.62e+03	0.00e+00	0.00e+00	0.00e+00	4.30e+05
W-185	1.72e+06	4.30e+05	6.02e+04	0.00e+00	0.00e+00	0.00e+00	1.60e+07
W-187	3.49e-02	2.06e-02	9.27e-03	0.00e+00	0.00e+00	0.00e+00	2.90e+00
Pb-210	1.40e+10	3.60e+09	6.17e+08	0.00e+00	1.08e+10	0.00e+00	6.79e+05
Bi-210	4.34e+05	2.24e+06	2.49e+05	0.00e+00	2.53e+07	0.00e+00	1.14e+07
Po-210	1.53e+10	2.45e+10	3.70e+09	0.00e+00	7.61e+10	0.00e+00	6.60e+08
Ra-223	9.80e+10	1.13e+08	1.96e+10	0.00e+00	3.00e+09	0.00e+00	1.56e+09
Ra-224	1.12e+09	2.04e+06	2.25e+08	0.00e+00	5.40e+07	0.00e+00	6.17e+07
Ra-225	1.96e+11	1.75e+08	3.91e+10	0.00e+00	4.63e+09	0.00e+00	2.25e+09
Ra-226	2.00e+13	6.39e+08	1.64e+13	0.00e+00	1.70e+10	0.00e+00	1.18e+10
Ra-228	1.32e+13	3.43e+08	1.48e+13	0.00e+00	9.09e+09	0.00e+00	1.99e+09
Ac-225	1.20e+08	1.24e+08	8.05e+06	0.00e+00	1.32e+07	0.00e+00	2.75e+09
Ac-227	2.52e+11	4.05e+10	1.56e+10	0.00e+00	8.92e+09	0.00e+00	5.15e+09
Th-227	3.22e+06	4.38e+04	9.30e+04	0.00e+00	2.32e+05	0.00e+00	3.10e+07
Th-228	4.07e+08	5.21c+06	1.38c+07	0.00e+00	2.71e+07	0.00e+00	1.14e+08
Th-229	4.80e+09	1.21e+08	8.01e+07	0.00e+00	5.91e+08	0.00e+00	1.64e+07
Th-230	7.26e+08	3.64e+07	2.03e+07	0.00e+00	1.77e+08	0.00e+00	1.27e+07
Th-232	8.10e+08	3.11e+07	6.15e+05	0.00e+00	1.51e+08	0.00e+00	1.08e+07
Th-234	2.49e+04	1.10e+03	7.19e+02	0.00e+00	5.83e+03	0.00e+00	8.58e+06
Pa-231	5.78e+15	1.91e+14	2.30e+14	0.00e+00	1.05e+15	0.00e+00	6.03e+13
Pa-233	5.91e+09	9.20e+08	1.03e+09	0.00e+00	3.39e+09	0.00e+00	4.70e+12
U-232	6.11e+09	0.00e+00	4.37e+08	0.00e+00	4.65e+08	0.00e+00	2.42e+07
U-233	1.29e+09	0.00e+00	7.82e+07	0.00e+00	2.12e+08	0.00e+00	2.24e+07
U-234	1.24e+09	0.00e+00	7.68e+07	0.00e+00	2.08e+08	0.00e+00	2.20e+07
U-235	1.19e+09	0.00e+00	7.19e+07	0.00e+00	1.95e+08	0.00e+00	2.79e+07
U-236	1.19e+09	0.00e+00	7.37e+07	0.00e+00	1.99e+08	0.00e+00	2.06e+07
U-237	3.42e+03	0.00e+00	9.09e+02	0.00e+00	9.87e+03	0.00e+00	3.02e+05
U-238	1.14e+09	0.00e+00	6.74e+07	0.00e+00	1.82e+08	0.00e+00	1.97e+07
Np-237	4.56e+08	3.01e+07	2.00e+07	0.00e+00	1.24e+08	0.00e+00	1.67e+07

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	2.27e+00	4.59e-02	3.53e-02	0.00e+00	1.46e-01	0.00e+00	1.57e+03
Np-239	4.29e-01	3.08e-02	2.17e-02	0.00e+00	8.91e-02	0.00e+00	2.28e+03
Pu-238	1.70e+07	1.97e+06	4.52e+05	0.00e+00	1.64e+06	0.00e+00	1.07e+06
Pu-239	1.85e+07	1.97e+06	4.74e+05	0.00e+00	1.75e+06	0.00e+00	9.80e+05
Pu-240	1.83e+07	2.05e+06	4.74e+05	0.00e+00	1.75e+06	0.00e+00	9.99e+05
Pu-241	5.51e+05	2.25e+04	1.14e+04	0.00e+00	4.21e+04	0.00e+00	2.05e+04
Pu-242	1.70e+07	1.97e+06	4.56e+05	0.00e+00	1.67e+06	0.00e+00	9.60e+05
Pu-244	1.99e+07	2.26e+07	5.22e+05	0.00e+00	1.93e+06	0.00e+00	1.43e+06
Am-241	2.73e+08	2.35e+08	2.05e+07	0.00e+00	1.25e+08	0.00e+00	1.53e+07
Am-242m	2.86e+08	2.29e+08	2.12e+07	0.00e+00	1.29e+08	0.00e+00	1.96e+07
Am-243	2.74e+08	2.31e+08	2.01e+07	0.00e+00	1.24e+08	0.00e+00	1.83e+07
Cm-242	1.52e+07	1.21e+07	1.01e+06	0.00e+00	3.23e+06	0.00e+00	1.41e+07
Cm-243	2.61e+08	2.12e+08	1.68e+07	0.00e+00	6.28e+07	0.00e+00	1.64e+07
Cm-244	2.20e+08	1.78e+08	1.41e+07	0.00e+00	5.17e+07	0.00e+00	1.58e+07
Cm-245	3.41e+08	2.74e+08	2.15e+07	0.00e+00	8.40e+07	0.00e+00	1.48e+07
Cm-246	3.37e+08	2.74e+08	2.15e+07	0.00e+00	8.38e+07	0.00e+00	1.45e+07
Cm-247	3.29e+08	2.70e+08	2.11e+07	0.00e+00	8.26e+07	0.00e+00	1.91e+07
Cm-248	2.74e+09	2.23e+09	1.74e+08	0.00e+00	6.81e+08	0.00e+00	3.09e+08
Cf-252	2.08e+08	0.00e+00	5.03e+06	0.00e+00	0.00e+00	0.00e+00	5.87e+07

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Be-10	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
C-14	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
N-13	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F-18	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Na-22	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Na-24	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
P-32	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ca-41	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sc-46	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cr-51	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Mn-54	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Mn-56	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Fe-55	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Fe-59	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Co-57	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Co-58	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Co-60	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ni-59	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ni-63	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ni-65	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cu-64	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zn-65	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zn-69	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zn-69m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Se-79	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-82	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-83	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-84	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rb-87	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rb-88	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rb-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-90	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-91	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-92	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-90	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-91	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-91m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-92	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-93	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zr-93	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zr-95	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zr-97	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nb-93m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nb-95	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nb-97	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Mo-93	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Mo-99	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tc-101	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tc-99	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tc-99m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ru-103	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ru-105	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ru-106	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rh-105	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pd-107	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pd-109	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

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MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ag-111	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cd-113m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cd-115m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sn-123	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sn-125	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sn-126	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sb-124	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sb-125	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sb-126	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sb-127	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-125m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-127	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-127m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-129	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-129m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-131	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-131m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-132	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-133m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-134	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-129	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-130	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-131	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-132	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-133	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-134	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-135	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-134	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-134m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

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MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-136	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-137	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-138	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-140	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-141	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-140	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-141	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ce-141	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ce-143	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ce-144	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pr-143	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pr-144	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nd-147	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pm-147	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pm-148	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pm-148m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pm-149	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pm-151	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sm-151	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sm-153	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Eu-152	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Eu-154	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Eu-155	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Eu-156	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tb-160	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
W-181	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
W-185	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
W-187	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pb-210	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Bi-210	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Po-210	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ra-223	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ra-224	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ra-225	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ra-226	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ra-228	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ac-225	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ac-227	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Th-227	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Th-228	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Th-229	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Th-230	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Th-232	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Th-234	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pa-231	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pa-233	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-232	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-233	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-234	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-235	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-236	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-237	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-238	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Np-237	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

MEAT PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Meat & Poultry Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Np-239	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pu-238	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pu-239	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pu-240	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pu-241	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pu-242	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pu-244	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Am-241	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Am-242m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Am-243	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-242	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-243	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-244	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-245	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-246	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-247	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-248	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cf-252	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	1.29e+03	1.29e+03	1.29e+03	1.29e+03	1.29e+03	1.29e+03
Be-10	2.55e+08	3.93e+07	6.36e+06	0.00e+00	2.97e+07	0.00e+00	2.15e+09
C-14	2.28e+08	4.55e+07	4.55e+07	4.55e+07	4.55e+07	4.55e+07	4.55e+07
N-13	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F-18	4.26e+00	0.00e+00	4.72e-01	0.00e+00	0.00e+00	0.00e+00	1.26e-01
Na-22	1.32e+09	1.32e+09	1.32e+09	1.32e+09	1.32e+09	1.32e+09	1.32e+09
Na-24	2.68e+05	2.68e+05	2.68e+05	2.68e+05	2.68e+05	2.68e+05	2.68e+05
P-32	1.40e+09	8.73e+07	5.42e+07	0.00e+00	0.00e+00	0.00e+00	1.58e+08
Ca-41	1.48e+10	0.00e+00	1.60e+09	0.00e+00	0.00e+00	0.00e+00	1.47e+07
Sc-46	2.51e+05	4.86e+05	1.41e+05	0.00e+00	4.54e+05	0.00e+00	2.37e+09
Cr-51	0.00e+00	0.00e+00	4.64e+04	2.77e+04	1.02e+04	6.16e+04	1.17e+07
Mn-54	0.00e+00	3.13e+08	5.97e+07	0.00e+00	9.31e+07	0.00e+00	9.58e+08
Mn-56	0.00e+00	1.53e+01	2.72e+00	0.00e+00	1.94e+01	0.00e+00	4.89e+02
Fe-55	2.10e+08	1.45e+08	3.38e+07	0.00e+00	0.00e+00	8.08e+07	8.31e+07
Fe-59	1.26e+08	2.96e+08	1.14e+08	0.00e+00	0.00e+00	8.28e+07	9.88e+08
Co-57	0.00e+00	1.17e+07	1.94e+07	0.00e+00	0.00e+00	0.00e+00	2.97e+08
Co-58	0.00e+00	3.07e+07	6.89e+07	0.00e+00	0.00e+00	0.00e+00	6.23e+08
Co-60	0.00e+00	1.67e+08	3.69e+08	0.00e+00	0.00e+00	0.00e+00	3.14e+09
Ni-59	7.82e+08	2.68e+08	1.31e+08	0.00e+00	0.00e+00	0.00e+00	5.53e+07
Ni-63	1.04e+10	7.21e+08	3.49e+08	0.00e+00	0.00e+00	0.00e+00	1.50e+08
Ni-65	5.96e+01	7.75e+00	3.54e+00	0.00e+00	0.00e+00	0.00e+00	1.97e+02
Cu-64	0.00e+00	9.15e+03	4.29e+03	0.00e+00	2.31e+04	0.00e+00	7.79e+05
Zn-65	3.17e+08	1.01e+09	4.56e+08	0.00e+00	6.75e+08	0.00e+00	6.36e+08
Zn-69	5.06e-06	9.67e-06	6.72e-07	0.00e+00	6.28e-06	0.00e+00	1.45e-06
Zn-69m	2.24e+04	5.38e+04	4.92e+03	0.00e+00	3.26e+04	0.00e+00	3.29e+06
Se-79	0.00e+00	2.11e+08	3.52e+07	0.00e+00	3.65e+08	0.00e+00	4.31e+07
Br-82	0.00e+00	0.00e+00	1.50e+06	0.00e+00	0.00e+00	0.00e+00	1.72e+06
Br-83	0.00e+00	0.00e+00	3.01e+00	0.00e+00	0.00e+00	0.00e+00	4.33e+00
Br-84	0.00e+00	0.00e+00	2.14e-11	0.00e+00	0.00e+00	0.00e+00	1.68e-16
Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

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LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	2.19e+08	1.02e+08	0.00e+00	0.00e+00	0.00e+00	4.32e+07
Rb-87	0.00e+00	9.86e+08	3.43e+08	0.00e+00	0.00e+00	0.00e+00	4.62e+07
Rb-88	0.00e+00	2.64e-22	1.40e-22	0.00e+00	0.00e+00	0.00e+00	3.65e-33
Rb-89	0.00e+00	2.88e-26	2.03e-26	0.00e+00	0.00e+00	0.00e+00	1.67e-39
Sr-89	9.96e+09	0.00e+00	2.86e+08	0.00e+00	0.00e+00	0.00e+00	1.60e+09
Sr-90	6.95e+11	0.00e+00	1.40e+10	0.00e+00	0.00e+00	0.00e+00	1.75e+10
Sr-91	3.02e+05	0.00e+00	1.22e+04	0.00e+00	0.00e+00	0.00e+00	1.44e+06
Sr-92	4.15e+02	0.00e+00	1.79e+01	0.00e+00	0.00e+00	0.00e+00	8.21e+03
Y-90	1.33e+04	0.00e+00	3.56e+02	0.00e+00	0.00e+00	0.00e+00	1.41e+08
Y-91	5.11e+06	0.00e+00	1.37e+05	0.00e+00	0.00e+00	0.00e+00	2.81e+09
Y-91m	4.76e-09	0.00e+00	1.84e-10	0.00e+00	0.00e+00	0.00e+00	1.40e-08
Y-92	8.96e-01	0.00e+00	2.62e-02	0.00e+00	0.00e+00	0.00e+00	1.57e+04
Y-93	1.68e+02	0.00e+00	4.65e+00	0.00e+00	0.00e+00	0.00e+00	5.34e+06
Zr-93	3.35e+06	1.88e+05	8.73e+04	0.00e+00	7.11e+05	0.00e+00	1.95e+08
Zr-95	1.17e+06	3.77e+05	2.55e+05	0.00e+00	5.91e+05	0.00e+00	1.19e+09
Zr-97	3.36e+02	6.78e+01	3.10e+01	0.00e+00	1.02e+02	0.00e+00	2.10e+07
Nb-93m	2.02e+06	6.60e+05	1.63e+05	0.00e+00	7.59e+05	0.00e+00	3.05e+08
Nb-95	1.42e+05	7.91e+04	4.25e+04	0.00e+00	7.82e+04	0.00e+00	4.80e+08
Nb-97	2.84e-06	7.19e-07	2.63e-07	0.00e+00	8.39e-07	0.00e+00	2.65e-03
Mo-93	0.00e+00	6.02e+08	1.63e+07	0.00e+00	1.71e+08	0.00e+00	9.78e+07
Mo-99	0.00e+00	6.14e+06	1.17e+06	0.00e+00	1.39e+07	0.00e+00	1.42e+07
Tc-101	5.93e-31	8.55e-31	8.39e-30	0.00e+00	1.54e-29	4.37e-31	0.00e+00
Tc-99	1.00e+07	1.49e+07	4.02e+06	0.00e+00	1.88e+08	1.27e+06	4.87e+08
Tc-99m	3.06e+00	8.66e+00	1.10e+02	0.00e+00	1.31e+02	4.24e+00	5.12e+03
Ru-103	4.77e+06	0.00e+00	2.05e+06	0.00e+00	1.82e+07	0.00e+00	5.57e+08
Ru-105	5.29e+01	0.00e+00	2.09e+01	0.00e+00	6.84e+02	0.00e+00	3.24e+04
Ru-106	1.93e+08	0.00e+00	2.44e+07	0.00e+00	3.72e+08	0.00e+00	1.25e+10
Rh-105	8.01e+04	5.86e+04	3.86e+04	0.00e+00	2.49e+05	0.00e+00	9.34e+06
Pd-107	0.00e+00	1.18e+07	7.53e+05	0.00e+00	1.06e+08	0.00e+00	7.30e+07
Pd-109	0.00e+00	2.23e+04	5.02e+03	0.00e+00	1.27e+05	0.00e+00	2.47e+06

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	1.05e+07	9.74e+06	5.79e+06	0.00e+00	1.92e+07	0.00e+00	3.98e+09
Ag-111	2.11e+05	8.81e+04	4.39e+04	0.00e+00	2.84e+05	0.00e+00	1.62e+08
Cd-113m	0.00e+00	2.52e+08	8.10e+06	0.00e+00	2.78e+08	0.00e+00	2.03e+09
Cd-115m	0.00e+00	5.34e+07	1.70e+06	0.00e+00	4.24e+07	0.00e+00	2.25e+09
Sn-123	1.71e+09	2.84e+07	4.18e+07	2.41e+07	0.00e+00	0.00e+00	3.49e+09
Sn-125	3.84e+07	7.74e+05	1.74e+06	6.40e+05	0.00e+00	0.00e+00	4.79e+08
Sn-126	6.77e+09	1.34e+08	1.92e+08	3.94e+07	0.00e+00	0.00e+00	1.95e+09
Sb-124	1.04e+08	1.96e+06	4.11e+07	2.51e+05	0.00e+00	8.07e+07	2.94e+09
Sb-125	1.37e+08	1.53e+06	3.25e+07	1.39e+05	0.00e+00	1.05e+08	1.50e+09
Sb-126	7.07e+06	1.44e+05	2.55e+06	4.33e+04	0.00e+00	4.34e+06	5.78e+08
Sb-127	5.22e+05	1.14e+04	2.00e+05	6.28e+03	0.00e+00	3.10e+05	1.19e+08
Te-125m	9.65e+07	3.50e+07	1.29e+07	2.90e+07	3.93e+08	0.00e+00	3.85e+08
Te-127	5.61e+03	2.02e+03	1.21e+03	4.16e+03	2.29e+04	0.00e+00	4.43e+05
Te-127m	3.49e+08	1.25e+08	4.25e+07	8.92e+07	1.42e+09	0.00e+00	1.17e+09
Te-129	7.13e-04	2.68e-04	1.74e-04	5.48e-04	3.00e-03	0.00e+00	5.38e-04
Te-129m	2.51e+08	9.37e+07	3.98e+07	8.63e+07	1.05e+09	0.00e+00	1.26e+09
Te-131	1.25e-15	5.21e-16	3.94e-16	1.03e-15	5.47e-15	0.00e+00	1.77e-16
Te-131m	9.10e+05	4.45e+05	3.71e+05	7.05e+05	4.51e+06	0.00e+00	4.42e+07
Te-132	4.30e+06	2.78e+06	2.61e+06	3.07e+06	2.68e+07	0.00e+00	1.31e+08
Te-133m	2.12e-05	1.24e-05	1.19e-05	1.79e-05	1.22e-04	0.00e+00	4.24e-06
Te-134	3.19e-08	2.09e-08	1.28e-08	2.79e-08	2.02e-07	0.00e+00	3.54e-11
I-129	1.31e+09	1.13e+09	3.69e+09	2.90e+12	2.42e+09	0.00e+00	1.78e+08
I-130	3.90e+05	1.15e+06	4.54e+05	9.75e+07	1.79e+06	0.00e+00	9.90e+05
I-131	8.07e+07	1.15e+08	6.62e+07	3.78e+10	1.98e+08	0.00e+00	3.05e+07
I-132	5.57e+01	1.49e+02	5.21e+01	5.21e+03	2.37e+02	0.00e+00	2.80e+01
I-133	2.08e+06	3.61e+06	1.10e+06	5.31e+08	6.31e+06	0.00e+00	3.25e+06
I-134	8.84e-05	2.40e-04	8.59e-05	4.16e-03	3.82e-04	0.00e+00	2.09e-07
I-135	3.85e+04	1.01e+05	3.72e+04	6.65e+06	1.62e+05	0.00e+00	1.14e+05
Cs-134	4.67e+09	1.11e+10	9.08e+09	0.00e+00	3.59e+09	1.19e+09	1.94e+08
Cs-134m	6.57e+00	1.38e+01	7.06e+00	0.00e+00	7.49e+00	1.18e+00	4.87e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	1.56e+09	1.44e+09	6.40e+08	0.00e+00	5.46e+08	1.63e+08	3.37e+07
Cs-136	4.26e+07	1.68e+08	1.21e+08	0.00e+00	9.37e+07	1.28e+07	1.91e+07
Cs-137	6.36e+09	8.70e+09	5.70e+09	0.00e+00	2.95e+09	9.81e+08	1.68e+08
Cs-138	3.39e-11	6.70e-11	3.32e-11	0.00e+00	4.92e-11	4.86e-12	2.86e-16
Cs-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-139	2.70e-02	1.92e-05	7.91e-04	0.00e+00	1.80e-05	1.09e-05	4.79e-02
Ba-140	1.28e+08	1.61e+05	8.41e+06	0.00e+00	5.48e+04	9.23e+04	2.64e+08
Ba-141	8.94e-22	6.76e-25	3.02e-23	0.00e+00	6.28e-25	3.83e-25	4.21e-31
Ba-142	3.88e-39	0.00e+00	2.44e-40	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-140	1.97e+03	9.95e+02	2.63e+02	0.00e+00	0.00e+00	0.00e+00	7.30e+07
La-141	5.98e-01	1.85e-01	3.04e-02	0.00e+00	0.00e+00	0.00e+00	2.21e+04
La-142	1.92e-04	8.75e-05	2.18e-05	0.00e+00	0.00e+00	0.00e+00	6.39e-01
Ce-141	1.97e+05	1.33e+05	1.51e+04	0.00e+00	6.19e+04	0.00e+00	5.09e+08
Ce-143	9.95e+02	7.36e+05	8.14e+01	0.00e+00	3.24e+02	0.00e+00	2.75e+07
Ce-144	3.29e+07	1.38e+07	1.77e+06	0.00e+00	8.16e+06	0.00e+00	1.11e+10
Pr-143	6.26e+04	2.51e+04	3.10e+03	0.00e+00	1.45e+04	0.00e+00	2.74e+08
Pr-144	2.36e-26	9.81e-27	1.20e-27	0.00e+00	5.53e-27	0.00e+00	3.40e-33
Nd-147	3.33e+04	3.85e+04	2.30e+03	0.00e+00	2.25e+04	0.00e+00	1.85e+08
Pm-147	5.74e+06	5.39e+05	2.18e+05	0.00e+00	1.02e+06	0.00e+00	6.79e+08
Pm-148	1.96e+04	3.25e+03	1.64e+03	0.00e+00	6.14e+03	0.00e+00	2.55e+08
Pm-148m	8.29e+05	2.15e+05	1.64e+05	0.00e+00	3.24e+05	0.00e+00	1.82e+09
Pm-149	1.69e+03	2.39e+02	9.77e+01	0.00e+00	4.52e+02	0.00e+00	4.48e+07
Pm-151	3.36e+02	5.65e+01	2.85e+01	0.00e+00	1.01e+02	0.00e+00	1.55e+07
Sm-151	5.52e+06	9.52e+05	2.28e+05	0.00e+00	1.06e+06	0.00e+00	4.20e+08
Sm-153	8.20e+02	6.84e+02	5.00e+01	0.00e+00	2.21e+02	0.00e+00	2.44e+07
Eu-152	1.55e+07	3.52e+06	3.09e+06	0.00e+00	2.18e+07	0.00e+00	2.03e+09
Eu-154	4.92e+07	6.05e+06	4.31e+06	0.00e+00	2.90e+07	0.00e+00	4.39e+09
Eu-155	6.39e+06	9.07e+05	5.85e+05	0.00e+00	4.18e+06	0.00e+00	7.13e+08
Eu-156	1.08e+05	8.35e+04	1.35e+04	0.00e+00	5.58e+04	0.00e+00	5.72e+08
Tb-160	1.96e+06	0.00e+00	2.44e+05	0.00e+00	8.09e+05	0.00e+00	1.81e+09

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	2.16e+07	6.75e+06	5.13e+06	0.00e+00	1.01e+07	0.00e+00	2.05e+09
W-181	5.33e+05	1.74e+05	1.86e+04	0.00e+00	0.00e+00	0.00e+00	1.98e+07
W-185	1.73e+07	5.77e+06	6.07e+05	0.00e+00	0.00e+00	0.00e+00	6.67e+08
W-187	3.79e+04	3.17e+04	1.11e+04	0.00e+00	0.00e+00	0.00e+00	1.04e+07
Pb-210	1.22e+12	3.48e+11	4.33e+10	0.00e+00	9.79e+11	0.00e+00	1.78e+08
Bi-210	1.18e+06	8.17e+06	6.78e+05	0.00e+00	9.83e+07	0.00e+00	1.22e+08
Po-210	2.01e+10	4.26e+10	4.85e+09	0.00e+00	1.42e+11	0.00e+00	3.59e+09
Ra-223	2.74e+10	4.23e+07	5.49e+09	0.00e+00	1.20e+09	0.00e+00	1.77e+09
Ra-224	3.08e+09	7.47e+06	6.19e+08	0.00e+00	2.11e+08	0.00e+00	6.51e+08
Ra-225	4.99e+10	5.92e+07	9.97e+09	0.00e+00	1.68e+09	0.00e+00	2.33e+09
Ra-226	2.42e+13	4.60e+08	1.76e+13	0.00e+00	1.31e+10	0.00e+00	2.66e+10
Ra-228	8.76e+12	2.44e+08	9.47e+12	0.00e+00	6.91e+09	0.00e+00	4.41e+09
Ac-225	2.11e+07	2.90e+07	1.42e+06	0.00e+00	3.31e+06	0.00e+00	1.95e+09
Ac-227	1.49e+11	1.97e+10	8.84e+09	0.00e+00	6.37e+09	0.00e+00	6.52e+09
Th-227	1.41e+08	2.55e+06	4.06e+06	0.00e+00	1.45e+07	0.00e+00	5.55e+09
Th-228	3.70e+10	6.27e+08	1.25e+09	0.00e+00	3.49e+09	0.00e+00	4.20e+10
Th-229	1.09e+12	3.12e+10	1.80e+10	0.00e+00	1.51e+11	0.00e+00	6.26e+09
Th-230	1.65e+11	9.38e+09	4.57e+09	0.00e+00	4.53e+10	0.00e+00	4.82e+09
Th-232	1.84e+11	8.01e+09	1.20e+08	0.00e+00	3.86e+10	0.00e+00	4.10e+09
Th-234	1.17e+06	6.89e+04	3.38e+04	0.00e+00	3.91e+05	0.00e+00	1.65e+09
Pa-231	3.29e+11	1.23e+10	1.27e+10	0.00e+00	6.92e+10	0.00e+00	5.75e+09
Pa-233	9.05e+04	1.82e+04	1.57e+04	0.00e+00	6.87e+04	0.00e+00	2.82e+08
U-232	3.30e+11	0.00e+00	2.36e+10	0.00e+00	3.58e+10	0.00e+00	5.42e+09
U-233	6.98e+10	0.00e+00	4.23e+09	0.00e+00	1.63e+10	0.00e+00	5.02e+09
U-234	6.70e+10	0.00e+00	4.14e+09	0.00e+00	1.59e+10	0.00e+00	4.92e+09
U-235	6.42e+10	0.00e+00	3.89e+09	0.00e+00	1.50e+10	0.00e+00	6.26e+09
U-236	6.42e+10	0.00e+00	3.97e+09	0.00e+00	1.53e+10	0.00e+00	4.62e+09
U-237	1.84e+05	0.00e+00	4.89e+04	0.00e+00	7.55e+05	0.00e+00	6.45e+07
U-238	6.15e+10	0.00e+00	3.64e+09	0.00e+00	1.40e+10	0.00e+00	4.41e+09
Np-237	1.01e+11	7.18e+09	4.44e+09	0.00e+00	3.30e+10	0.00e+00	6.36e+09

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Adult age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	1.45e+04	3.91e+02	2.26e+02	0.00e+00	1.32e+03	0.00e+00	3.63e+07
Np-239	1.43e+03	1.40e+02	7.73e+01	0.00e+00	4.37e+02	0.00e+00	2.88e+07
Pu-238	5.04e+10	6.38e+09	1.37e+09	0.00e+00	5.86e+09	0.00e+00	5.84e+09
Pu-239	5.81e+10	6.98e+09	1.53e+09	0.00e+00	6.50e+09	0.00e+00	5.34e+09
Pu-240	5.80e+10	6.97e+09	1.53e+09	0.00e+00	6.49e+09	0.00e+00	5.43e+09
Pu-241	1.25e+09	5.92e+07	2.64e+07	0.00e+00	1.22e+08	0.00e+00	1.11e+08
Pu-242	5.39e+10	6.72e+09	1.47e+09	0.00e+00	6.26e+09	0.00e+00	5.23e+09
Pu-244	6.28e+10	7.70e+09	1.69e+09	0.00e+00	7.17e+09	0.00e+00	7.80e+09
Am-241	5.86e+10	5.47e+10	4.20e+09	0.00e+00	3.16e+10	0.00e+00	5.76e+09
Am-242m	6.09e+10	5.31e+10	4.35e+09	0.00e+00	3.24e+10	0.00e+00	7.48e+09
Am-243	6.04e+10	5.53e+10	4.25e+09	0.00e+00	3.20e+10	0.00e+00	6.97e+09
Cm-242	1.22e+09	1.30e+09	8.14e+07	0.00e+00	3.70e+08	0.00e+00	4.71e+09
Cm-243	4.78e+10	4.38e+10	2.99e+09	0.00e+00	1.40e+10	0.00e+00	6.23e+09
Cm-244	3.63e+10	3.40e+10	2.28e+09	0.00e+00	1.07e+10	0.00e+00	6.00e+09
Cm-245	7.52e+10	6.55e+10	4.62e+09	0.00e+00	2.16e+10	0.00e+00	5.64e+09
Cm-246	7.45e+10	6.54e+10	4.61e+09	0.00e+00	2.15e+10	0.00e+00	5.54e+09
Cm-247	7.27e+10	6.44e+10	4.54e+09	0.00e+00	2.12e+10	0.00e+00	7.28e+09
Cm-248	6.04e+11	5.31e+11	3.74e+10	0.00e+00	1.75e+11	0.00e+00	1.18e+11
Cf-252	1.98e+10	0.00e+00	4.77e+08	0.00e+00	0.00e+00	0.00e+00	2.18e+10

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	1.47e+03	1.47e+03	1.47e+03	1.47e+03	1.47e+03	1.47e+03
Be-10	4.07e+08	6.31e+07	1.03e+07	0.00e+00	4.82e+07	0.00e+00	2.58e+09
C-14	3.69e+08	7.38e+07	7.38e+07	7.38e+07	7.38e+07	7.38e+07	7.38e+07
N-13	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F-18	3.87e+00	0.00e+00	4.24e-01	0.00e+00	0.00e+00	0.00e+00	3.48e-01
Na-22	2.01e+09	2.01e+09	2.01e+09	2.01e+09	2.01e+09	2.01e+09	2.01e+09
Na-24	2.38e+05	2.38e+05	2.38e+05	2.38e+05	2.38e+05	2.38e+05	2.38e+05
P-32	1.61e+09	9.96e+07	6.23e+07	0.00e+00	0.00e+00	0.00e+00	1.35e+08
Ca-41	1.79e+10	0.00e+00	1.94e+09	0.00e+00	0.00e+00	0.00e+00	1.77e+07
Sc-46	3.61e+05	7.02e+05	2.08e+05	0.00e+00	6.72e+05	0.00e+00	2.39e+09
Cr-51	0.00e+00	0.00e+00	6.16e+04	3.42e+04	1.35e+04	8.80e+04	1.04e+07
Mn-54	0.00e+00	4.54e+08	9.01e+07	0.00e+00	1.36e+08	0.00e+00	9.32e+08
Mn-56	0.00e+00	1.38e+01	2.46e+00	0.00e+00	1.75e+01	0.00e+00	9.09e+02
Fe-55	3.26e+08	2.31e+08	5.39e+07	0.00e+00	0.00e+00	1.47e+08	1.00e+08
Fe-59	1.79e+08	4.18e+08	1.62e+08	0.00e+00	0.00e+00	1.32e+08	9.90e+08
Co-57	0.00e+00	1.79e+07	2.99e+07	0.00e+00	0.00e+00	0.00e+00	3.33e+08
Co-58	0.00e+00	4.36e+07	1.00e+08	0.00e+00	0.00e+00	0.00e+00	6.01e+08
Co-60	0.00e+00	2.49e+08	5.60e+08	0.00e+00	0.00e+00	0.00e+00	3.24e+09
Ni-59	1.20e+09	4.24e+08	2.04e+08	0.00e+00	0.00e+00	0.00e+00	6.64e+07
Ni-63	1.61e+10	1.13e+09	5.45e+08	0.00e+00	0.00e+00	0.00e+00	1.81e+08
Ni-65	5.55e+01	7.09e+00	3.23e+00	0.00e+00	0.00e+00	0.00e+00	3.85e+02
Cu-64	0.00e+00	8.29e+03	3.90e+03	0.00e+00	2.10e+04	0.00e+00	6.43e+05
Zn-65	4.24e+08	1.47e+09	6.86e+08	0.00e+00	9.42e+08	0.00e+00	6.23e+08
Zn-69	4.73e-06	9.02e-06	6.31e-07	0.00e+00	5.89e-06	0.00e+00	1.66e-05
Zn-69m	2.08e+04	4.90e+04	4.50e+03	0.00e+00	2.98e+04	0.00e+00	2.69e+06
Se-79	0.00e+00	3.39e+08	5.70e+07	0.00e+00	5.91e+08	0.00e+00	5.18e+07
Br-82	0.00e+00	0.00e+00	1.32e+06	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-83	0.00e+00	0.00e+00	2.82e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-84	0.00e+00	0.00e+00	1.95e-11	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

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LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	2.73e+08	1.28e+08	0.00e+00	0.00e+00	0.00e+00	4.05e+07
Rb-87	0.00e+00	1.59e+09	5.55e+08	0.00e+00	0.00e+00	0.00e+00	5.55e+07
Rb-88	0.00e+00	2.44e-22	1.30e-22	0.00e+00	0.00e+00	0.00e+00	2.09e-29
Rb-89	0.00e+00	2.59e-26	1.83e-26	0.00e+00	0.00e+00	0.00e+00	3.98e-35
Sr-89	1.51e+10	0.00e+00	4.33e+08	0.00e+00	0.00e+00	0.00e+00	1.80e+09
Sr-90	9.22e+11	0.00e+00	1.84e+10	0.00e+00	0.00e+00	0.00e+00	2.11e+10
Sr-91	2.82e+05	0.00e+00	1.12e+04	0.00e+00	0.00e+00	0.00e+00	1.28e+06
Sr-92	3.86e+02	0.00e+00	1.65e+01	0.00e+00	0.00e+00	0.00e+00	9.83e+03
Y-90	1.24e+04	0.00e+00	3.34e+02	0.00e+00	0.00e+00	0.00e+00	1.02e+08
Y-91	7.83e+06	0.00e+00	2.10e+05	0.00e+00	0.00e+00	0.00e+00	3.21e+09
Y-91m	4.43e-09	0.00e+00	1.69e-10	0.00e+00	0.00e+00	0.00e+00	2.09e-07
Y-92	8.42e-01	0.00e+00	2.43e-02	0.00e+00	0.00e+00	0.00e+00	2.31e+04
Y-93	1.58e+02	0.00e+00	4.33e+00	0.00e+00	0.00e+00	0.00e+00	4.82e+06
Zr-93	5.03e+06	2.48e+05	1.35e+05	0.00e+00	8.77e+05	0.00e+00	2.34e+08
Zr-95	1.72e+06	5.43e+05	3.73e+05	0.00e+00	7.98e+05	0.00e+00	1.25e+09
Zr-97	3.11e+02	6.15e+01	2.83e+01	0.00e+00	9.33e+01	0.00e+00	1.67e+07
Nb-93m	3.09e+06	1.02e+06	2.55e+05	0.00e+00	1.19e+06	0.00e+00	3.66e+08
Nb-95	1.92e+05	1.07e+05	5.87e+04	0.00e+00	1.03e+05	0.00e+00	4.56e+08
Nb-97	2.63e-06	6.54e-07	2.39e-07	0.00e+00	7.65e-07	0.00e+00	1.56e-02
Mo-93	0.00e+00	9.63e+08	2.64e+07	0.00e+00	2.76e+08	0.00e+00	1.17e+08
Mo-99	0.00e+00	5.64e+06	1.08e+06	0.00e+00	1.29e+07	0.00e+00	1.01e+07
Tc-101	5.52e-31	7.85e-31	7.71e-30	0.00e+00	1.42e-29	4.78e-31	1.34e-37
Tc-99	1.63e+07	2.39e+07	6.52e+06	0.00e+00	3.04e+08	2.47e+06	5.85e+08
Tc-99m	2.70e+00	7.54e+00	9.77e+01	0.00e+00	1.12e+02	4.18e+00	4.95e+03
Ru-103	6.82e+06	0.00e+00	2.91e+06	0.00e+00	2.40e+07	0.00e+00	5.69e+08
Ru-105	4.92e+01	0.00e+00	1.91e+01	0.00e+00	6.20e+02	0.00e+00	3.97e+04
Ru-106	3.09e+08	0.00e+00	3.90e+07	0.00e+00	5.97e+08	0.00e+00	1.48e+10
Rh-105	7.52e+04	5.43e+04	3.56e+04	0.00e+00	2.31e+05	0.00e+00	6.91e+06
Pd-107	0.00e+00	1.89e+07	1.22e+06	0.00e+00	1.71e+08	0.00e+00	8.78e+07
Pd-109	0.00e+00	2.07e+04	4.71e+03	0.00e+00	1.20e+05	0.00e+00	2.09e+06

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	1.52e+07	1.43e+07	8.72e+06	0.00e+00	2.73e+07	0.00e+00	4.03e+09
Ag-111	2.01e+05	8.35e+04	4.20e+04	0.00e+00	2.72e+05	0.00e+00	1.17e+08
Cd-113m	0.00e+00	4.06e+08	1.30e+07	0.00e+00	4.49e+08	0.00e+00	2.44e+09
Cd-115m	0.00e+00	7.94e+07	2.56e+06	0.00e+00	6.35e+07	0.00e+00	2.51e+09
Sn-123	2.72e+09	4.46e+07	6.61e+07	3.57e+07	0.00e+00	0.00e+00	4.11e+09
Sn-125	3.84e+07	7.65e+05	1.73e+06	6.01e+05	0.00e+00	0.00e+00	3.62e+08
Sn-126	1.05e+10	1.96e+08	3.00e+08	5.17e+07	0.00e+00	0.00e+00	2.34e+09
Sb-124	1.54e+08	2.84e+06	6.02e+07	3.50e+05	0.00e+00	1.35e+08	3.11e+09
Sb-125	2.14e+08	2.34e+06	5.01e+07	2.05e+05	0.00e+00	1.88e+08	1.67e+09
Sb-126	7.45e+06	1.52e+05	2.68e+06	4.21e+04	0.00e+00	5.34e+06	4.41e+08
Sb-127	4.82e+05	1.03e+04	1.82e+05	5.42e+03	0.00e+00	3.28e+05	8.19e+07
Te-125m	1.48e+08	5.34e+07	1.98e+07	4.14e+07	0.00e+00	0.00e+00	4.37e+08
Te-127	5.29e+03	1.88e+03	1.14e+03	3.65e+03	2.14e+04	0.00e+00	4.09e+05
Te-127m	5.51e+08	1.96e+08	6.56e+07	1.31e+08	2.23e+09	0.00e+00	1.37e+09
Te-129	6.68e-04	2.49e-04	1.63e-04	4.77e-04	2.80e-03	0.00e+00	3.65e-03
Te-129m	3.61e+08	1.34e+08	5.72e+07	1.17e+08	1.51e+09	0.00e+00	1.36e+09
Te-131	1.16e-15	4.78e-16	3.62e-16	8.93e-16	5.07e-15	0.00e+00	9.52e-17
Te-131m	8.42e+05	4.04e+05	3.37e+05	6.07e+05	4.21e+06	0.00e+00	3.24e+07
Te-132	3.90e+06	2.47e+06	2.33e+06	2.61e+06	2.37e+07	0.00e+00	7.83e+07
Te-133m	1.94e-05	1.10e-05	1.07e-05	1.54e-05	1.09e-04	0.00e+00	4.45e-05
Te-134	2.89e-08	1.85e-08	1.94e-08	2.37e-08	1.77e-07	0.00e+00	1.07e-09
I-129	2.12e+09	1.78e+09	2.97e+09	2.17e+12	3.19e+09	0.00e+00	2.08e+08
I-130	3.49e+05	1.01e+06	4.03e+05	8.22e+07	1.55e+06	0.00e+00	7.75e+05
I-131	7.68e+07	1.08e+08	5.78e+07	3.14e+10	1.85e+08	0.00e+00	2.13e+07
I-132	5.02e+01	1.31e+02	4.72e+01	4.43e+03	2.07e+02	0.00e+00	5.72e+01
I-133	1.93e+06	3.27e+06	9.99e+05	4.57e+08	5.74e+06	0.00e+00	2.48e+06
I-134	7.99e-05	2.12e-04	7.61e-05	3.53e-03	3.34e-04	0.00e+00	2.79e-06
I-135	3.48e+04	8.96e+04	3.32e+04	5.76e+06	1.42e+05	0.00e+00	9.93e+04
Cs-134	7.10e+09	1.67e+10	7.75e+09	0.00e+00	5.31e+09	2.03e+09	2.08e+08
Cs-134m	5.95e+00	1.23e+01	6.33e+00	0.00e+00	6.86e+00	1.20e+00	8.20e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	2.53e+09	2.32e+09	5.42e+08	0.00e+00	8.84e+08	3.20e+08	4.05e+07
Cs-136	4.37e+07	1.72e+08	1.15e+08	0.00e+00	9.36e+07	1.48e+07	1.38e+07
Cs-137	1.01e+10	1.35e+10	4.69e+09	0.00e+00	4.59e+09	1.78e+09	1.92e+08
Cs-138	3.13e-11	6.01e-11	3.00e-11	0.00e+00	4.44e-11	5.16e-12	2.73e-14
Cs-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-139	2.54e-02	1.79e-05	7.40e-04	0.00e+00	1.69e-05	1.23e-05	2.27e-01
Ba-140	1.38e+08	1.69e+05	8.89e+06	0.00e+00	5.73e+04	1.14e+05	2.13e+08
Ba-141	8.36e-22	6.24e-25	2.79e-23	0.00e+00	5.79e-25	4.27e-25	1.78e-27
Ba-142	3.57e-39	0.00e+00	2.20e-40	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-140	1.80e+03	8.86e+02	2.36e+02	0.00e+00	0.00e+00	0.00e+00	5.09e+07
La-141	5.59e-01	1.72e-01	2.84e-02	0.00e+00	0.00e+00	0.00e+00	3.05e+04
La-142	1.77e-04	7.84e-05	1.95e-05	0.00e+00	0.00e+00	0.00e+00	2.39e+00
Ce-141	2.83e+05	1.89e+05	2.17e+04	0.00e+00	8.89e+04	0.00e+00	5.40e+08
Ce-143	9.30e+02	6.77e+05	7.56e+01	0.00e+00	3.04e+02	0.00e+00	2.04e+07
Ce-144	5.27e+07	2.18e+07	2.83e+06	0.00e+00	1.30e+07	0.00e+00	1.33e+10
Pr-143	7.00e+04	2.79e+04	3.48e+03	0.00e+00	1.62e+04	0.00e+00	2.30e+08
Pr-144	2.22e-26	9.07e-27	1.12e-27	0.00e+00	5.20e-27	0.00e+00	2.44e-29
Nd-147	3.62e+04	3.93e+04	2.36e+03	0.00e+00	2.31e+04	0.00e+00	1.42e+08
Pm-147	9.04e+06	8.57e+05	3.49e+05	0.00e+00	1.64e+06	0.00e+00	8.15e+08
Pm-148	1.83e+04	2.98e+03	1.50e+03	0.00e+00	5.39e+03	0.00e+00	1.78e+08
Pm-148m	1.17e+06	2.96e+05	2.31e+05	0.00e+00	4.48e+05	0.00e+00	1.86e+09
Pm-149	1.58e+03	2.23e+02	9.13e+01	0.00e+00	4.24e+02	0.00e+00	3.28e+07
Pm-151	3.13e+02	5.16e+01	2.61e+01	0.00e+00	9.28e+01	0.00e+00	1.16e+07
Sm-151	7.92e+06	1.52e+06	3.58e+05	0.00e+00	1.67e+06	0.00e+00	5.17e+08
Sm-153	7.66e+02	6.34e+02	4.67e+01	0.00e+00	2.07e+02	0.00e+00	1.79e+07
Eu-152	2.20e+07	5.30e+06	4.67e+06	0.00e+00	2.46e+07	0.00e+00	1.95e+09
Eu-154	7.18e+07	9.26e+06	6.53e+06	0.00e+00	4.14e+07	0.00e+00	4.89e+09
Eu-155	1.46e+07	1.41e+06	8.73e+05	0.00e+00	5.52e+06	0.00e+00	8.09e+09
Eu-156	1.24e+05	9.31e+04	1.52e+04	0.00e+00	6.26e+04	0.00e+00	4.76e+08
Tb-160	2.94e+06	0.00e+00	3.66e+05	0.00e+00	1.16e+06	0.00e+00	1.90e+09

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LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	3.24e+07	1.00e+07	7.23e+06	0.00e+00	1.46e+07	0.00e+00	2.46e+09
W-181	8.47e+05	2.73e+05	2.86e+04	0.00e+00	0.00e+00	0.00e+00	2.33e+07
W-185	2.70e+07	8.90e+06	9.41e+05	0.00e+00	0.00e+00	0.00e+00	7.69e+08
W-187	3.53e+04	2.87e+04	1.01e+04	0.00e+00	0.00e+00	0.00e+00	7.78e+06
Pb-210	1.63e+12	4.91e+11	6.33e+10	0.00e+00	1.55e+12	0.00e+00	2.14e+08
Bi-210	1.11e+06	7.61e+06	6.36e+05	0.00e+00	9.25e+07	0.00e+00	8.69e+07
Po-210	3.19e+10	6.71e+10	7.72e+09	0.00e+00	2.26e+11	0.00e+00	4.24e+09
Ra-223	2.90e+10	4.40e+07	5.78e+09	0.00e+00	1.26e+09	0.00e+00	1.40e+09
Ra-224	2.90e+09	6.94e+06	5.80e+08	0.00e+00	1.99e+08	0.00e+00	4.66e+08
Ra-225	5.79e+10	6.80e+07	1.16e+10	0.00e+00	1.95e+09	0.00e+00	2.02e+09
Ra-226	2.93e+13	7.39e+08	2.17e+13	0.00e+00	2.11e+10	0.00e+00	3.19e+10
Ra-228	1.21e+13	3.91e+08	1.34e+13	0.00e+00	1.12e+10	0.00e+00	5.30e+09
Ac-225	2.13e+07	2.91e+07	1.43e+06	0.00e+00	3.34e+06	0.00e+00	1.48e+09
Ac-227	1.85e+11	2.74e+10	1.10e+10	0.00e+00	7.95e+09	0.00e+00	7.84e+09
Th-227	1.77e+08	3.18e+06	5.11e+06	0.00e+00	1.82e+07	0.00e+00	5.20e+09
Th-228	5.74e+10	9.62e+08	1.94e+09	0.00e+00	5.41e+09	0.00e+00	5.04e+10
Th-229	1.30e+12	3.74e+10	2.15e+10	0.00e+00	1.81e+11	0.00e+00	7.53e+09
Th-230	1.96e+11	1.12e+10	5.45e+09	0.00e+00	5.44e+10	0.00e+00	5.80e+09
Th-232	2.20e+11	9.54e+09	1.48e+08	0.00e+00	4.64e+10	0.00e+00	4.93e+09
Th-234	1.59e+06	9.30e+04	4.61e+04	0.00e+00	5.30e+05	0.00e+00	1.68e+09
Pa-231	3.92e+11	1.47e+10	1.53e+10	0.00e+00	8.27e+10	0.00e+00	6.91e+09
Pa-233	1.24e+05	2.38e+04	2.12e+04	0.00e+00	8.96e+04	0.00e+00	2.71e+08
U-232	5.34e+11	0.00e+00	3.82e+10	0.00e+00	5.79e+10	0.00e+00	6.52e+09
U-233	1.13e+11	0.00e+00	6.85e+09	0.00e+00	2.64e+10	0.00e+00	6.04e+09
U-234	1.08e+11	0.00e+00	6.72e+09	0.00e+00	2.59e+10	0.00e+00	5.92e+09
U-235	1.04e+11	0.00e+00	6.31e+09	0.00e+00	2.43e+10	0.00e+00	7.53e+09
U-236	1.04e+11	0.00e+00	6.44e+09	0.00e+00	2.48e+10	0.00e+00	5.55e+09
U-237	1.74e+05	0.00e+00	4.64e+04	0.00e+00	7.16e+05	0.00e+00	4.62e+07
U-238	9.91e+10	0.00e+00	5.90e+09	0.00e+00	2.27e+10	0.00e+00	5.30e+09
Np-237	1.21e+11	8.68e+09	5.32e+09	0.00e+00	3.94e+10	0.00e+00	7.64e+09

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LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Teen age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	1.36e+04	3.63e+02	2.11e+02	0.00e+00	1.24e+03	0.00e+00	2.66e+07
Np-239	1.38e+03	1.31e+02	7.25e+01	0.00e+00	4.10e+02	0.00e+00	2.10e+07
Pu-238	6.08e+10	7.79e+09	1.65e+09	0.00e+00	7.08e+09	0.00e+00	7.01e+09
Pu-239	6.95e+10	8.44e+09	1.83e+09	0.00e+00	7.79e+09	0.00e+00	6.42e+09
Pu-240	6.94e+10	8.42e+09	1.83e+09	0.00e+00	7.78e+09	0.00e+00	6.53e+09
Pu-241	1.58e+09	7.56e+07	3.32e+07	0.00e+00	1.54e+08	0.00e+00	1.33e+08
Pu-242	6.44e+10	8.13e+09	1.76e+09	0.00e+00	7.50e+09	0.00e+00	6.29e+09
Pu-244	7.53e+10	9.27e+09	2.02e+09	0.00e+00	8.59e+09	0.00e+00	9.36e+09
Am-241	7.02e+10	6.62e+10	5.06e+09	0.00e+00	3.79e+10	0.00e+00	6.92e+09
Am-242m	7.33e+10	6.46e+10	5.27e+09	0.00e+00	3.90e+10	0.00e+00	8.99e+09
Am-243	7.23e+10	6.68e+10	5.11e+09	0.00e+00	3.84e+10	0.00e+00	8.39e+09
Cm-242	1.95e+09	2.06e+09	1.29e+08	0.00e+00	5.90e+08	0.00e+00	5.57e+09
Cm-243	5.88e+10	5.45e+10	3.70e+09	0.00e+00	1.73e+10	0.00e+00	7.49e+09
Cm-244	4.54e+10	4.30e+10	2.88e+09	0.00e+00	1.34e+10	0.00e+00	7.21e+09
Cm-245	9.00e+10	7.92e+10	5.54e+09	0.00e+00	2.59e+10	0.00e+00	6.78e+09
Cm-246	8.92e+10	7.91e+10	5.53e+09	0.00e+00	2.58e+10	0.00e+00	6.66e+09
Cm-247	8.70e+10	7.79e+10	5.45e+09	0.00e+00	2.54e+10	0.00e+00	8.75e+09
Cm-248	7.23e+11	6.42e+11	4.50e+10	0.00e+00	2.10e+11	0.00e+00	1.41e+11
Cf-252	2.98e+10	0.00e+00	7.18e+08	0.00e+00	0.00e+00	0.00e+00	2.62e+10

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	2.29e+03	2.29e+03	2.29e+03	2.29e+03	2.29e+03	2.29e+03
Be-10	9.92e+08	1.15e+08	2.49e+07	0.00e+00	8.16e+07	0.00e+00	2.02e+09
C-14	8.89e+08	1.78e+08	1.78e+08	1.78e+08	1.78e+08	1.78e+08	1.78e+08
N-13	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F-18	6.90e+00	0.00e+00	6.84e-01	0.00e+00	0.00e+00	0.00e+00	1.87e+00
Na-22	4.09e+09	4.09e+09	4.09e+09	4.09e+09	4.09e+09	4.09e+09	4.09e+09
Na-24	3.71e+05	3.71e+05	3.71e+05	3.71e+05	3.71e+05	3.71e+05	3.71e+05
P-32	3.37e+09	1.58e+08	1.30e+08	0.00e+00	0.00e+00	0.00e+00	9.30e+07
Ca-41	2.55e+10	0.00e+00	2.79e+09	0.00e+00	0.00e+00	0.00e+00	1.40e+07
Sc-46	7.85e+05	1.08e+06	4.14e+05	0.00e+00	9.52e+05	0.00e+00	1.57e+09
Cr-51	0.00e+00	0.00e+00	1.17e+05	6.50e+04	1.78e+04	1.19e+05	6.21e+06
Mn-54	0.00e+00	6.65e+08	1.77e+08	0.00e+00	1.86e+08	0.00e+00	5.58e+08
Mn-56	0.00e+00	1.81e+01	4.08e+00	0.00e+00	2.19e+01	0.00e+00	2.62e+03
Fe-55	8.01e+08	4.25e+08	1.32e+08	0.00e+00	0.00e+00	2.40e+08	7.87e+07
Fe-59	3.97e+08	6.43e+08	3.20e+08	0.00e+00	0.00e+00	1.86e+08	6.69e+08
Co-57	0.00e+00	2.98e+07	6.04e+07	0.00e+00	0.00e+00	0.00e+00	2.44e+08
Co-58	0.00e+00	6.44e+07	1.97e+08	0.00e+00	0.00e+00	0.00e+00	3.75e+08
Co-60	0.00e+00	3.78e+08	1.12e+09	0.00e+00	0.00e+00	0.00e+00	2.10e+09
Ni-59	2.95e+09	7.86e+08	5.01e+08	0.00e+00	0.00e+00	0.00e+00	5.22e+07
Ni-63	3.95e+10	2.11e+09	1.34e+09	0.00e+00	0.00e+00	0.00e+00	1.42e+08
Ni-65	1.02e+02	9.59e+00	5.60e+00	0.00e+00	0.00e+00	0.00e+00	1.17e+03
Cu-64	0.00e+00	1.09e+04	6.60e+03	0.00e+00	2.64e+04	0.00e+00	5.13e+05
Zn-65	8.12e+08	2.16e+09	1.35e+09	0.00e+00	1.36e+09	0.00e+00	3.80e+08
Zn-69	8.73e-06	1.26e-05	1.17e-06	0.00e+00	7.66e-06	0.00e+00	7.96e-04
Zn-69m	3.81e+04	6.49e+04	7.67e+03	0.00e+00	3.77e+04	0.00e+00	2.11e+06
Se-79	0.00e+00	6.20e+08	1.37e+08	0.00e+00	1.01e+09	0.00e+00	4.06e+07
Br-82	0.00e+00	0.00e+00	2.03e+06	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-83	0.00e+00	0.00e+00	5.20e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-84	0.00e+00	0.00e+00	3.30e-11	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

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LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	4.52e+08	2.78e+08	0.00e+00	0.00e+00	0.00e+00	2.90e+07
Rb-87	0.00e+00	2.90e+09	1.35e+09	0.00e+00	0.00e+00	0.00e+00	4.35e+07
Rb-88	0.00e+00	3.37e-22	2.34e-22	0.00e+00	0.00e+00	0.00e+00	1.65e-23
Rb-89	0.00e+00	3.42e-26	3.04e-26	0.00e+00	0.00e+00	0.00e+00	2.98e-28
Sr-89	3.59e+10	0.00e+00	1.03e+09	0.00e+00	0.00e+00	0.00e+00	1.39e+09
Sr-90	1.87e+12	0.00e+00	3.77e+10	0.00e+00	0.00e+00	0.00e+00	1.67e+10
Sr-91	5.20e+05	0.00e+00	1.96e+04	0.00e+00	0.00e+00	0.00e+00	1.15e+06
Sr-92	7.07e+02	0.00e+00	2.84e+01	0.00e+00	0.00e+00	0.00e+00	1.34e+04
Y-90	2.30e+04	0.00e+00	6.17e+02	0.00e+00	0.00e+00	0.00e+00	6.56e+07
Y-91	1.86e+07	0.00e+00	4.98e+05	0.00e+00	0.00e+00	0.00e+00	2.48e+09
Y-91m	8.12e-09	0.00e+00	2.95e-10	0.00e+00	0.00e+00	0.00e+00	1.59e-05
Y-92	1.55e+00	0.00e+00	4.43e-02	0.00e+00	0.00e+00	0.00e+00	4.48e+04
Y-93	2.91e+02	0.00e+00	7.98e+00	0.00e+00	0.00e+00	0.00e+00	4.34e+06
Zr-93	1.23e+07	4.59e+05	3.27e+05	0.00e+00	1.78e+06	0.00e+00	1.74e+08
Zr-95	3.86e+06	8.48e+05	7.54e+05	0.00e+00	1.21e+06	0.00e+00	8.84e+08
Zr-97	5.68e+02	8.20e+01	4.84e+01	0.00e+00	1.18e+02	0.00e+00	1.24e+07
Nb-93m	7.64e+06	1.91e+06	6.26e+05	0.00e+00	2.06e+06	0.00e+00	2.87e+08
Nb-95	4.10e+05	1.60e+05	1.14e+05	0.00e+00	1.50e+05	0.00e+00	2.95e+08
Nb-97	4.80e-06	8.68e-07	4.05e-07	0.00e+00	9.63e-07	0.00e+00	2.68e-01
Mo-93	0.00e+00	1.77e+09	6.36e+07	0.00e+00	4.67e+08	0.00e+00	8.97e+07
Mo-99	0.00e+00	7.70e+06	1.91e+06	0.00e+00	1.64e+07	0.00e+00	6.37e+06
Tc-101	1.02e-30	1.06e-30	1.35e-29	0.00e+00	1.81e-29	5.62e-31	3.38e-30
Tc-99	3.93e+07	4.38e+07	1.57e+07	0.00e+00	5.16e+08	3.87e+06	4.59e+08
Tc-99m	4.65e+00	9.12e+00	1.51e+02	0.00e+00	1.32e+02	4.63e+00	5.19e+03
Ru-103	1.53e+07	0.00e+00	5.89e+06	0.00e+00	3.86e+07	0.00e+00	3.96e+08
Ru-105	9.01e+01	0.00e+00	3.27e+01	0.00e+00	7.92e+02	0.00e+00	5.88e+04
Ru-106	7.45e+08	0.00e+00	9.30e+07	0.00e+00	1.01e+09	0.00e+00	1.16e+10
Rh-105	1.38e+05	7.43e+04	6.35e+04	0.00e+00	2.96e+05	0.00e+00	4.60e+06
Pd-107	0.00e+00	3.47e+07	2.95e+06	0.00e+00	2.90e+08	0.00e+00	6.89e+07
Pd-109	0.00e+00	2.90e+04	8.69e+03	0.00e+00	1.55e+05	0.00e+00	1.71e+06

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LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	3.21e+07	2.17e+07	1.73e+07	0.00e+00	4.04e+07	0.00e+00	2.58e+09
Ag-111	3.78e+05	1.18e+05	7.81e+04	0.00e+00	3.57e+05	0.00e+00	7.25e+07
Cd-113m	0.00e+00	7.42e+08	3.16e+07	0.00e+00	7.64e+08	0.00e+00	1.91e+09
Cd-115m	0.00e+00	1.42e+08	6.04e+06	0.00e+00	1.05e+08	0.00e+00	1.93e+09
Sn-123	6.54e+09	8.11e+07	1.59e+08	8.60e+07	0.00e+00	0.00e+00	3.20e+09
Sn-125	7.43e+07	1.12e+06	3.33e+06	1.16e+06	0.00e+00	0.00e+00	2.30e+08
Sn-126	2.45e+10	3.05e+08	6.95e+08	8.38e+07	0.00e+00	0.00e+00	1.84e+09
Sb-124	3.52e+08	4.56e+06	1.23e+08	7.76e+05	0.00e+00	1.95e+08	2.20e+09
Sb-125	4.99e+08	3.85e+06	1.05e+08	4.62e+05	0.00e+00	2.78e+08	1.19e+09
Sb-126	1.40e+07	2.15e+05	5.04e+06	8.24e+04	0.00e+00	6.70e+06	2.83e+08
Sb-127	8.72e+05	1.35e+04	3.03e+05	9.71e+03	0.00e+00	3.78e+05	4.91e+07
Te-125m	3.50e+08	9.50e+07	4.67e+07	9.83e+07	0.00e+00	0.00e+00	3.38e+08
Te-127	9.76e+03	2.63e+03	2.09e+03	6.76e+03	2.78e+04	0.00e+00	3.81e+05
Te-127m	1.32e+09	3.56e+08	1.57e+08	3.16e+08	3.77e+09	0.00e+00	1.07e+09
Te-129	1.24e-03	3.45e-04	2.94e-04	8.82e-04	3.62e-03	0.00e+00	7.70e-02
Te-129m	8.40e+08	2.35e+08	1.30e+08	2.71e+08	2.47e+09	0.00e+00	1.03e+09
Te-131	2.14e-15	6.51e-16	6.35e-16	1.63e-15	6.46e-15	0.00e+00	1.12e-14
Te-131m	1.54e+06	5.32e+05	5.66e+05	1.09e+06	5.15e+06	0.00e+00	2.16e+07
Te-132	6.99e+06	3.10e+06	3.74e+06	4.51e+06	2.87e+07	0.00e+00	3.12e+07
Te-133m	3.48e-05	1.41e-05	1.74e-05	2.70e-05	1.34e-04	0.00e+00	1.07e-03
Te-134	5.16e-08	2.32e-08	3.10e-08	4.08e-08	2.15e-07	0.00e+00	2.36e-07
I-129	5.11e+09	3.13e+09	2.80e+09	2.05e+12	5.29e+09	0.00e+00	1.58e+08
I-130	6.12e+05	1.24e+06	6.37e+05	1.36e+08	1.85e+06	0.00e+00	5.78e+05
I-131	1.43e+08	1.44e+08	8.16e+07	4.75e+10	2.36e+08	0.00e+00	1.28e+07
I-132	8.91e+01	1.64e+02	7.53e+01	7.60e+03	2.51e+02	0.00e+00	1.93e+02
I-133	3.52e+06	4.35e+06	1.65e+06	8.08e+08	7.25e+06	0.00e+00	1.75e+06
I-134	1.42e-04	2.64e-04	1.21e-04	6.07e-03	4.03e-04	0.00e+00	1.75e-04
I-135	6.18e+04	1.11e+05	5.26e+04	9.86e+06	1.71e+05	0.00e+00	8.48e+04
Cs-134	1.60e+10	2.63e+10	5.55e+09	0.00e+00	8.15e+09	2.93e+09	1.42e+08
Cs-134m	1.06e+01	1.57e+01	1.02e+01	0.00e+00	8.26e+00	1.37e+00	1.98e+01

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LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	6.10e+09	4.25e+09	4.36e+08	0.00e+00	1.50e+09	5.01e+08	3.18e+07
Cs-136	8.23e+07	2.26e+08	1.46e+08	0.00e+00	1.21e+08	1.80e+07	7.95e+06
Cs-137	2.39e+10	2.29e+10	3.38e+09	0.00e+00	7.46e+09	2.68e+09	1.43e+08
Cs-138	5.69e-11	7.91e-11	5.02e-11	0.00e+00	5.57e-11	5.99e-12	3.64e-11
Cs-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-139	4.69e-02	2.50e-05	1.36e-03	0.00e+00	2.18e-05	1.47e-05	2.70e+00
Ba-140	2.76e+08	2.42e+05	1.61e+07	0.00e+00	7.88e+04	1.44e+05	1.40e+08
Ba-141	1.54e-21	8.64e-25	5.02e-23	0.00e+00	7.47e-25	5.07e-24	8.79e-22
Ba-142	6.46e-39	0.00e+00	3.61e-40	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-140	3.24e+03	1.13e+03	3.82e+02	0.00e+00	0.00e+00	0.00e+00	3.16e+07
La-141	1.04e+00	2.41e-01	5.24e-02	0.00e+00	0.00e+00	0.00e+00	5.37e+04
La-142	3.20e-04	1.02e-04	3.19e-05	0.00e+00	0.00e+00	0.00e+00	2.02e+01
Ce-141	6.55e+05	3.27e+05	4.85e+04	0.00e+00	1.43e+05	0.00e+00	4.08e+08
Ce-143	1.71e+03	9.29e+05	1.35e+02	0.00e+00	3.90e+02	0.00e+00	1.36e+07
Ce-144	1.27e+08	3.98e+07	6.78e+06	0.00e+00	2.21e+07	0.00e+00	1.04e+10
Pr-143	1.45e+05	4.37e+04	7.22e+03	0.00e+00	2.36e+04	0.00e+00	1.57e+08
Pr-144	4.11e-26	1.27e-26	2.07e-27	0.00e+00	6.73e-27	0.00e+00	2.74e-23
Nd-147	7.14e+04	5.78e+04	4.48e+03	0.00e+00	3.17e+04	0.00e+00	9.16e+07
Pm-147	2.21e+07	1.58e+06	8.48e+05	0.00e+00	2.79e+06	0.00e+00	6.39e+08
Pm-148	3.36e+04	4.04e+03	2.62e+03	0.00e+00	6.87e+03	0.00e+00	1.08e+08
Pm-148m	2.28e+06	4.54e+05	4.54e+05	0.00e+00	6.73e+05	0.00e+00	1.28e+09
Pm-149	2.93e+03	3.12e+02	1.69e+02	0.00e+00	5.52e+02	0.00e+00	2.13e+07
Pm-151	5.72e+02	6.96e+01	4.53e+01	0.00e+00	1.18e+02	0.00e+00	7.90e+06
Sm-151	1.88e+07	2.80e+06	8.81e+05	0.00e+00	2.89e+06	0.00e+00	4.06e+08
Sm-153	1.42e+03	8.83e+02	8.51e+01	0.00e+00	2.69e+02	0.00e+00	1.17e+07
Eu-152	4.47e+07	8.14e+06	9.66e+06	0.00e+00	3.44e+07	0.00e+00	1.34e+09
Eu-154	1.69e+08	1.52e+07	1.39e+07	0.00e+00	6.68e+07	0.00e+00	3.53e+09
Eu-155	3.27e+07	2.35e+06	1.84e+06	0.00e+00	8.82e+06	0.00e+00	5.89e+09
Eu-156	2.58e+05	1.38e+05	2.86e+04	0.00e+00	8.89e+04	0.00e+00	3.13e+08
Tb-160	6.01e+06	0.00e+00	7.46e+05	0.00e+00	1.79e+06	0.00e+00	1.33e+09

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Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
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Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	7.94e+07	1.66e+07	1.40e+07	0.00e+00	2.37e+07	0.00e+00	1.93e+09
W-181	2.03e+06	4.98e+05	6.85e+04	0.00e+00	0.00e+00	0.00e+00	1.81e+07
W-185	6.44e+07	1.61e+07	2.25e+06	0.00e+00	0.00e+00	0.00e+00	5.99e+08
W-187	6.41e+04	3.80e+04	1.70e+04	0.00e+00	0.00e+00	0.00e+00	5.34e+06
Pb-210	3.47e+12	8.90e+11	1.53e+11	0.00e+00	2.68e+12	0.00e+00	1.68e+08
Bi-210	2.06e+06	1.07e+07	1.18e+06	0.00e+00	1.20e+08	0.00e+00	5.41e+07
Po-210	7.66e+10	1.23e+11	1.85e+10	0.00e+00	3.81e+11	0.00e+00	3.30e+09
Ra-223	5.77e+10	6.67e+07	1.15e+10	0.00e+00	1.77e+09	0.00e+00	9.20e+08
Ra-224	5.36e+09	9.73e+06	1.07e+09	0.00e+00	2.58e+08	0.00e+00	2.94e+08
Ra-225	1.22e+11	1.09e+08	2.44e+10	0.00e+00	2.89e+09	0.00e+00	1.40e+09
Ra-226	4.23e+13	1.35e+09	3.47e+13	0.00e+00	3.59e+10	0.00e+00	2.51e+10
Ra-228	2.76e+13	7.16e+08	3.10e+13	0.00e+00	1.90e+10	0.00e+00	4.16e+09
Ac-225	4.16e+07	4.29e+07	2.79e+06	0.00e+00	4.58e+06	0.00e+00	9.54e+08
Ac-227	3.01e+11	4.84e+10	1.86e+10	0.00e+00	1.07e+10	0.00e+00	6.16e+09
Th-227	3.88e+08	5.28e+06	1.12e+07	0.00e+00	2.80e+07	0.00e+00	3.73e+09
Th-228	1.41e+11	1.81e+09	4.77e+09	0.00e+00	9.40e+09	0.00e+00	3.95e+10
Th-229	1.73e+12	4.34e+10	2.88e+10	0.00e+00	2.12e+11	0.00e+00	5.91e+09
Th-230	2.61e+11	1.31e+10	7.28e+09	0.00e+00	6.37e+10	0.00e+00	4.55e+09
Th-232	2.91e+11	1.12e+10	2.21e+08	0.00e+00	5.45e+10	0.00e+00	3.87e+09
Th-234	3.61e+06	1.59e+05	1.04e+05	0.00e+00	8.46e+05	0.00e+00	1.25e+09
Pa-231	5.20e+11	1.72e+10	2.07e+10	0.00e+00	9.41e+10	0.00e+00	5.42e+09
Pa-233	2.34e+05	3.65e+04	4.09e+04	0.00e+00	1.34e+05	0.00e+00	1.86e+08
U-232	1.29e+12	0.00e+00	9.24e+10	0.00e+00	9.83e+10	0.00e+00	5.12e+09
U-233	2.73e+11	0.00e+00	1.65e+10	0.00e+00	4.48e+10	0.00e+00	4.74e+09
U-234	2.62e+11	0.00e+00	1.62e+10	0.00e+00	4.40e+10	0.00e+00	4.65e+09
U-235	2.51e+11	0.00e+00	1.52e+10	0.00e+00	4.12e+10	0.00e+00	5.90e+09
U-236	2.51e+11	0.00e+00	1.56e+10	0.00e+00	4.21e+10	0.00e+00	4.35e+09
U-237	3.26e+05	0.00e+00	8.65e+04	0.00e+00	9.39e+05	0.00e+00	2.87e+07
U-238	2.40e+11	0.00e+00	1.43e+10	0.00e+00	3.85e+10	0.00e+00	4.16e+09
Np-237	1.64e+11	1.08e+10	7.20e+09	0.00e+00	4.45e+10	0.00e+00	6.00e+09

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Child age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	2.51e+04	5.08e+02	3.91e+02	0.00e+00	1.62e+03	0.00e+00	1.74e+07
Np-239	2.56e+03	1.84e+02	1.29e+02	0.00e+00	5.31e+02	0.00e+00	1.36e+07
Pu-238	8.73e+10	1.01e+10	2.32e+09	0.00e+00	8.44e+09	0.00e+00	5.50e+09
Pu-239	9.48e+10	1.01e+10	2.43e+09	0.00e+00	8.97e+09	0.00e+00	5.03e+09
Pu-240	9.41e+10	1.05e+10	2.43e+09	0.00e+00	8.97e+09	0.00e+00	5.13e+09
Pu-241	2.82e+09	1.15e+08	5.85e+07	0.00e+00	2.15e+08	0.00e+00	1.05e+08
Pu-242	8.75e+10	1.01e+10	2.34e+09	0.00e+00	8.60e+09	0.00e+00	4.93e+09
Pu-244	1.02e+11	1.16e+11	2.68e+09	0.00e+00	9.92e+09	0.00e+00	7.35e+09
Am-241	9.67e+10	8.32e+10	7.25e+09	0.00e+00	4.43e+10	0.00e+00	5.43e+09
Am-242m	1.03e+11	8.22e+10	7.64e+09	0.00e+00	4.63e+10	0.00e+00	7.06e+09
Am-243	9.85e+10	8.31e+10	7.23e+09	0.00e+00	4.45e+10	0.00e+00	6.58e+09
Cm-242	4.69e+09	3.74e+09	3.12e+08	0.00e+00	9.98e+08	0.00e+00	4.35e+09
Cm-243	9.36e+10	7.61e+10	6.03e+09	0.00e+00	2.25e+10	0.00e+00	5.87e+09
Cm-244	7.87e+10	6.37e+10	5.05e+09	0.00e+00	1.85e+10	0.00e+00	5.67e+09
Cm-245	1.23e+11	9.85e+10	7.72e+09	0.00e+00	3.02e+10	0.00e+00	5.32e+09
Cm-246	1.21e+11	9.85e+10	7.72e+09	0.00e+00	3.01e+10	0.00e+00	5.23e+09
Cm-247	1.18e+11	9.70e+10	7.57e+09	0.00e+00	2.97e+10	0.00e+00	6.87e+09
Cm-248	9.85e+11	8.01e+11	6.26e+10	0.00e+00	2.45e+11	0.00e+00	1.11e+11
Cf-252	7.28e+10	0.00e+00	1.76e+09	0.00e+00	0.00e+00	0.00e+00	2.05e+10

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Be-10	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
C-14	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
N-13	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F-18	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Na-22	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Na-24	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
P-32	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ca-41	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sc-46	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cr-51	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Mn-54	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Mn-56	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Fe-55	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Fe-59	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Co-57	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Co-58	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Co-60	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ni-59	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ni-63	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ni-65	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cu-64	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zn-65	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zn-69	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zn-69m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Se-79	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-82	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-83	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-84	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Rb-86	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rb-87	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rb-88	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rb-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-90	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-91	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sr-92	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-90	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-91	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-91m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-92	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Y-93	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zr-93	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zr-95	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Zr-97	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nb-93m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nb-95	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nb-97	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Mo-93	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Mo-99	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tc-101	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tc-99	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tc-99m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ru-103	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ru-105	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ru-106	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Rh-105	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pd-107	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pd-109	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

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LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ag-110m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ag-111	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cd-113m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cd-115m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sn-123	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sn-125	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sn-126	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sb-124	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sb-125	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sb-126	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sb-127	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-125m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-127	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-127m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-129	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-129m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-131	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-131m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-132	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-133m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Te-134	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-129	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-130	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-131	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-132	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-133	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-134	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
I-135	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-134	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-134m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

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LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Cs-135	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-136	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-137	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-138	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cs-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-139	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-140	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-141	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ba-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-140	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-141	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
La-142	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ce-141	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ce-143	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ce-144	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pr-143	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pr-144	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Nd-147	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pm-147	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pm-148	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pm-148m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pm-149	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pm-151	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sm-151	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Sm-153	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Eu-152	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Eu-154	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Eu-155	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Eu-156	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tb-160	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Conversion factors are in units of square meter-mrem/yr per uCi/sec for all nuclides except H-3, which is in units of mrem/yr per uCi/cubic meter.

LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Ho-166m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
W-181	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
W-185	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
W-187	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pb-210	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Bi-210	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Po-210	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ra-223	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ra-224	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ra-225	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ra-226	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ra-228	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ac-225	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ac-227	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Th-227	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Th-228	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Th-229	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Th-230	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Th-232	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Th-234	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pa-231	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pa-233	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-232	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-233	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-234	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-235	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-236	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-237	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
U-238	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Np-237	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

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LEAFY VEGETABLE PATHWAY DOSE FACTORS DUE TO RADIONUCLIDES OTHER THAN NOBLE GASES, R_i

Ri factors for Infant age group by nuclide.
Waterford Steam Electric Station
Pathway : Gaseous Release Leafy/Produce Vegetation Pathway Ri

Nuclide	Organ Dose Conversion Factors						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Np-238	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Np-239	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pu-238	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pu-239	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pu-240	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pu-241	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pu-242	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pu-244	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Am-241	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Am-242m	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Am-243	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-242	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-243	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-244	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-245	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-246	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-247	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cm-248	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cf-252	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

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