Wolf Creek Generating Station

Docket No: STN 50-482
Facility Operating License No: NPF-42

SEMIANNUAL RADIOLOGICAL EFFLUENT RELEASE REPORT

Report No: 2

Reporting Period: July 1, 1985 through December 31, 1985

Submitted by:
Kansas Gas and Electric Company

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INTRODUCTION

This Semiannual Radiological Effluent Release Report covers the period of July 1, 1985, through December 31, 1985, and satisfies the requirements specified in Technical Specification 6.9.1.7.

Section I provides a summary of the quantities of radioactive liquid and gaseous effluents for this reporting period. The format is similar to that provided in Regulatory Guide 1.21, Revision 4. An elevated release pathway does not exist at Wolf Creek Generating Station. Therefore, all airborne releases are considered to be ground level releases. Dose data for the year 1985 are included in this report. Dose calculations to a member of the public for liquid effluents are based on the actual isotopic analysis of the radioactive liquid effluents, the radioactive liquid effluent flow and the dilution flow. This dose comes from drinking the diluted liquid effluent and consuming the fish removed from diluted liquid effluent. Dose calculations to a member of the public due to gaseous effluents are based on an analysis of the radioactive gaseous effluent, effluent flow and highest annual average (X/Q). Gaseous doses are based on submersion dose calculations for the whole body and skin, while doses to the seven body organs are based on ingestion doses for the following pathways: inhalation, ground plane, grass-cow-milk, grass-cow-meat and vegetation. The dose calculations for both liquid and gaseous effluents were calculated in accordance with the methodology and parameters in the Offsite Dose Calculation Manual. There were no solid radioactive waste shipments during 1985.

Section II provides Supplemental Information as described in Regulatory Guide 1.21, Revision 4.

Section III provides a summary of meteorological data for the period of July 1, 1985, through December 31, 1985. A summary of meteorological data for the period of May 1, 1985, through June 30, 1985, was provided in Semiannual Radioactive Effluent Release Report Number 1. This information is available on site for review and inspection.

Section IV provides additional information required by Technical Specification 6.9.1.7.

SECTION I

Year 1985

REPORT OF RADIOACTIVE EFFLUENTS: AIRBORNE

	Unit	Quarter 3	Quarter 4
A. Fission and Activation Gases			
1. Total Release	Ci	1.23E-01	1.72E+02
2. Average release rate for period	uCi/sec	5.41E-01	2.43E+01
3. Percent of Technical Specification Limits	%	2.46E-04	3.43E-01
B. Iodines			
1. Total Iodine-131	Ci	0.00E00	0.00E00
2. Average release rate for period	uCi/sec	0.00E00	0.00E00
3. Percent of Technical Specification Limits	%	0.00E00	0.00E00
C. Particulates			
1. Particulates with half-lives > 8 days	Ci	1.61E-06	6.41E-08
2. Average release rate for period	uCi/sec	2.05E-07	6.62E-08
3. Percent of Technical Specification Limits	%	1.61E-10	6.41E-12
4. Gross Alpha radioactivity	Ci	0.00E00	3.29E-08
D. Tritium			
1. Total Release	Ci	2.43E+01	1.68E+01
2. Average release rate for period	uCi/sec	3.33E00	2.17E00
3. Percent of Technical Specification Limits	%	1.62E-03	1.12E-03

Year 1985

GASEOUS EFFLUENTS

NUCLIDES RELEASED	Unit	Continuous Mode Quarter 3	Continuous Mode Quarter 4	Batch Mode Quarter 3	Batch Mode Quarter 4
1. Fission and Activation Gases					
Ar-41	Ci	0.00E00	0.00E00	4.38E-03	3.00E-01
Kr-85	Ci	0.00E00	0.00E00	0.00E00	0.00E00
Kr-85m	Ci	0.00E00	0.00E00	0.00E00	7.63E-05
Kr-87	Ci	<1.37E+01	<1.37E+01	<2.33E-02	<1.24E-02
Kr-88	Ci	<1.05E+01	<1.05E+01	<2.93E-02	<1.56E-02
Xe-131m	Ci	0.00E00	0.00E00	0.00E00	4.89E-05
Xe-133	Ci	<1.26E+01	1.36E+02	8.83E-02	1.09E00
Xe-133m	Ci	<3.31E+01	<3.31E+01	<8.46E-02	3.74E-03
Xe-135	Ci	1.72E-02	3.44E+01	4.16E-04	3.11E-02
Xe-135m	Ci	0.00E00	0.00E00	0.00E00	0.00E00
Xe-138	Ci	<1.28E+02	<1.28E+02	<6.20E-02	<3.31E-02
Total	Ci	1.72E-02	1.70E+02	9.31E-02	1.42E00
2. Halogens (Gaseous)					
I-131	Ci	<3.02E-05	<3.02E-05	0.00E00	0.00E00
I-133	Ci	<7.70E-04	<7.70E-04	0.00E00	0.00E00
I-135	Ci	0.00E00	0.00E00	0.00E00	0.00E00
Br-82	Ci	0.00E00	0.00E00	0.00E00	0.00E00
Total	Ci	0.00E00	0.00E00	0.00E00	0.00E00

Year 1985

GASEOUS EFFLUENTS

NUCLIDES RELEASED	Unit	Continuous Mode Quarter 3	Continuous Mode Quarter 4	Batch Mode Quarter 3	Batch Mode Quarter 4
H-3	Ci	2.43E+01	1.68E+01	5.35E-02	3.14E-02
Sr-90	Ci	1.61E-06	<5.24E-08	0.00E00	0.00E00
Gross Alpha	Ci	<2.61E-07	3.29E-08	0.00E00	0.00E00
Sr-89	Ci	<1.04E-07	<1.04E-07	0.00E00	0.00E00
Mn-54	Ci	<1.23E-05	<1.23E-05	0.00E00	0.00E00
Fe-59	Ci	<3.01E-5	<3.01E-05	0.00E00	0.00E00
Co-58	Ci	<1.23E-05	<1.23E-05	0.00E00	0.00E00
Co-60	Ci	<1.94E-05	<1.94E-05	0.00E00	0.00E00
Zn-65	Ci	<3.23E-05	<3.23E-05	0.00E00	0.00E00
Mo-99	Ci	<3.01E-04	<3.01E-04	0.00E00	0.00E00
Cs-134	Ci	<1.37E-05	<1.37E-05	0.00E00	0.00E00
Cs-137	Ci	<1.14E-05	<1.14E-05	0.00E00	0.00E00
Ce-141	Ci	<1.25E-05	<1.25E-05	0.00E00	0.00E00
Ce-144	Ci	<2.87E-05	<2.87E-05	0.00E00	0.00E00

There was no detectable Sr-90 or Sr-89 during the second quarter of 1985. The detection limit is <2.06E-16 uCi/cc for Sr-90 and <4.12E-16 uCi/cc for Sr-89. This data was not available for inclusion in Semiannual Radioactive Effluent Release Report Number 1 for the first half of 1985.

CUMULATIVE DOSE DATA
GASEOUS RADIOACTIVE RELEASES

QUARTER 1 OF 1985

Dose from Radioiodines, Particulates, and Tritium at controlling location:	
Total Dose (MREM) for Bone	0.00E-01
Total Dose (MREM) for Liver	0.00E-01
Total Dose (MREM) for Total Body	0.00E-01
Total Dose (MREM) for Thyroid	0.00E-01
Total Dose (MREM) for Kidney	0.00E-01
Total Dose (MREM) for Lung	0.00E-01
Total Dose (MREM) for GI-LLI	0.00E-01
Noble Gas Dose at Site Boundary:	
Total Body Dose Total (MREM)	0.00E-01
Skin Dose Total (MREM)	0.00E-01
Noble Gas Airdose at Site Boundary:	
Total Gamma Airdose (MRAD)	0.00E-01
Total Beta Airdose (MRAD)	0.00E-01

QUARTER 2 OF 1985

Dose from Radioiodines, Particulates, and Tritium at controlling location:	
Total Dose (MREM) for Bone	0.00E-01
Total Dose (MREM) for Liver	1.33E-04
Total Dose (MREM) for Total Body	1.33E-04
Total Dose (MREM) for Thyroid	1.33E-04
Total Dose (MREM) for Kidney	1.33E-04
Total Dose (MREM) for Lung	1.33E-04
Total Dose (MREM) for GI-LLI	1.33E-04
Noble Gas Dose at Site Boundary:	
Total Body Dose Total (MREM)	0.00E-01
Skin Dose Total (MREM)	0.00E-01
Noble Gas Airdose at Site Boundary:	
Total Gamma Airdose (MRAD)	0.00E-01
Total Beta Airdose (MRAD)	0.00E-01

QUARTER 3 OF 1985

Dose from Radioiodines, Particulates, and Tritium at controlling location:	
Total Dose (MREM) for Bone	1.91E-04
Total Dose (MREM) for Liver	1.19E-02
Total Dose (MREM) for Total Body	1.20E-02
Total Dose (MREM) for Thyroid	1.20E-02
Total Dose (MREM) for Kidney	1.20E-02
Total Dose (MREM) for Lung	1.19E-02
Total Dose (MREM) for GI-LLI	1.19E-02
Noble Gas Dose at Site Boundary:	
Total Body Dose Total (MREM)	8.93E-06
Skin Dose Total (MREM)	1.80E-05
Noble Gas Airdose at Site Boundary:	
Total Gamma Airdose (MRAD)	9.70E-06
Total Beta Airdose (MRAD)	1.35E-05

QUARTER 4 OF 1985

Dose from Radioiodines, Particulates, and Tritium at controlling location:

Total Dose (MREM) for Bone	7.12E-11
Total Dose (MREM) for Liver	8.09E-03
Total Dose (MREM) for Total Body	8.09E-03
Total Dose (MREM) for Thyroid	8.09E-03
Total Dose (MREM) for Kidney	8.09E-03
Total Dose (MREM) for Lung	8.09E-03
Total Dose (MREM) for GI-LLI	8.09E-03

Noble Gas Dose at Site Boundary:

Total Body Dose Total (MREM)	7.35E-03
Skin Dose Total (MREM)	1.65E-02

Noble Gas Airdose at Site Boundary:

Total Gamma Airdose (MRAD)	8.19E-03
Total Beta Airdose (MRAD)	1.60E-02

TOTALS FOR 1985

Dose from Radioiodines, Particulates, and Tritium at controlling location:

Total Dose (MREM) for Bone	1.91E-04
Total Dose (MREM) for Liver	2.02E-02
Total Dose (MREM) for Total Body	2.02E-02
Total Dose (MREM) for Thyroid	2.02E-02
Total Dose (MREM) for Kidney	2.02E-02
Total Dose (MREM) for Lung	2.02E-02
Total Dose (MREM) for GI-LLI	2.02E-02

Noble Gas Dose at Site Boundary:

Total Body Dose Total (MREM)	7.36E-03
Skin Dose Total (MREM)	1.66E-02

Noble Gas Airdose at Site Boundary:

Total Gamma Airdose (MRAD)	8.20E-03
Total Beta Airdose (MRAD)	1.60E-02

Year 1985

REPORT OF RADIOACTIVE EFFLUENTS: LIQUID

	Unit	Quarter 3	Quarter 4
A. Fission and Activation Products			
1. Total Release (not including tritium, gases, alpha)	Ci	4.44E-01	1.91E-01
2. Average diluted concentration during period	uCi/ml	1.47E-06	1.80E-08
3. Percent of Applicable Limit	%	8.86E00	3.82E00
B. Tritium			
1. Total Release	Ci	5.08E+01	1.32E+02
2. Average diluted concentration during period	uCi/ml	5.14E-06	1.15E-05
3. Percent of Applicable Limit	%	3.87E-03	1.01E-02
C. Dissolved and Entrained Gases			
1. Total Release	Ci	3.31E-02	1.23E-01
2. Average diluted concentration during period	uCi/ml	3.33E-09	1.12E-08
3. Percent of Applicable Limit	%	3.31E-06	1.23E-05
D. Gross Alpha Radioactivity			
1. Total Release	Ci	0.00E00	0.00E00
E. Volume of waste released	liters	2.14E+07	3.58E+06
F. Volume of dilution water used	liters	4.20E+10	2.28E+10

Year 1985

LIQUID EFFLUENTS

NUCLIDES RELEASED	Unit	Continuous Mode		Batch Mode	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
H-3	Ci	0.00E00	0.00E00	5.08E+01	1.32E+02
Na-24	Ci	*3.89E-01	0.00E00	4.26E-03	2.40E-04
Cr-51	Ci	0.00E00	0.00E00	9.30E-03	4.27E-02
Mn-54	Ci	0.00E00	0.00E00	7.28E-04	3.60E-03
Fe-59	Ci	0.00E00	0.00E00	6.24E-04	4.04E-03
Co-58	Ci	0.00E00	0.00E00	1.36E-02	7.24E-02
Co-60	Ci	0.00E00	0.00E00	3.49E-04	4.36E-03
Br-83	Ci	0.00E00	0.00E00	2.52E-06	0.00E00
Rb-88	Ci	0.00E00	0.00E00	1.63E-05	4.89E-05
Sr-91	Ci	0.00E00	0.00E00	1.37E-05	0.00E00
Zr-95	Ci	0.00E00	0.00E00	1.50E-03	9.01E-03
Zr-97	Ci	0.00E00	0.00E00	8.15E-05	7.57E-05
Nb-95	Ci	0.00E00	0.00E00	9.58E-04	1.04E-02
Mo-99	Ci	0.00E00	0.00E00	4.55E-04	9.70E-04
Tc-99M	Ci	0.00E00	0.00E00	4.91E-04	3.64E-04
Ag-110M	Ci	0.00E00	0.00E00	7.88E-06	4.61E-05
I-131	Ci	0.00E00	0.00E00	1.14E-03	2.05E-03
I-132	Ci	0.00E00	0.00E00	7.34E-06	0.00E00
I-133	Ci	0.00E00	0.00E00	3.07E-03	1.97E-03

Note: *Na-24 released during moisture carry over testing

Year 1985

LIQUID EFFLUENTS

NUCLIDES RELEASED	Unit	Continuous Mode		Batch Mode	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
I-134	Ci	0.00E00	0.00E00	3.88E-06	0.00E00
I-135	Ci	0.00E00	0.00E00	5.73E-04	1.68E-04
Cs-136	Ci	0.00E00	0.00E00	0.00E00	3.45E-06
Cs-137	Ci	0.00E00	0.00E00	4.02E-06	1.18E-04
Ba-140	Ci	0.00E00	0.00E00	2.14E-04	2.97E-04
La-140	Ci	0.00E00	0.00E00	2.15E-03	4.14E-03
Ce-144	Ci	0.00E00	0.00E00	1.26E-03	2.30E-03
W-187	Ci	0.00E00	0.00E00	2.18E-03	2.84E-03
Np-239	Ci	0.00E00	0.00E00	5.35E-06	1.08E-05
Kr-85M	Ci	0.00E00	0.00E00	5.34E-06	0.00E00
Kr-85	Ci	0.00E00	0.00E00	1.35E-02	7.52E-02
Xe-131M	Ci	0.00E00	0.00E00	3.55E-04	5.08E-04
Xe-133M	Ci	0.00E00	0.00E00	1.50E-04	2.69E-04
Xe-133	Ci	0.00E00	0.00E00	1.14E-02	2.61E-02
Xe-135M	Ci	0.00E00	0.00E00	1.20E-05	2.39E-04
Xe-135	Ci	0.00E00	0.00E00	8.42E-03	2.11E-02
Ar-41	Ci	0.00E00	0.00E00	9.19E-06	3.96E-05
Fe-55	Ci	0.00E00	0.00E00	1.50E-04	<1.79E-05
Be-7	Ci	0.00E00	0.00E00	1.13E-02	2.74E-02

Year 1985

LIQUID EFFLUENTS

NUCLIDES RELEASED	Unit	Continuous Mode Quarter 3	Continuous Mode Quarter 4	Batch Mode Quarter 3	Batch Mode Quarter 4
Sn-113	Ci	0.00E00	0.00E00	2.50E-06	2.88E-04
Sn-117M	Ci	0.00E00	0.00E00	8.57E-05	2.88E-04
Br-82	Ci	0.00E00	0.00E00	2.31E-06	2.67E-05
Co-57	Ci	0.00E00	0.00E00	0.00E00	1.73E-05
Nb-97	Ci	0.00E00	0.00E00	2.89E-05	6.86E-06
Sc-46	Ci	0.00E00	0.00E00	0.00E00	2.59E-05
Zn-65	Ci	0.00E00	0.00E00	<1.21E-03	<2.02E-04
Cs-134	Ci	0.00E00	0.00E00	<7.99E-04	<1.34E-04
Ce-141	Ci	0.00E00	0.00E00	<1.20E-03	<2.00E-04
Sr-89	Ci	0.00E00	0.00E00	<2.14E-05	9.17E-07
Sr-90	Ci	0.00E00	0.00E00	<1.07E-05	<1.79E-06
Gross Alpha	Ci	0.00E00	0.00E00	<8.09E-04	<1.35E-04

There was no detectable Sr-90 or Sr-89 for the second quarter of 1985. The detection limit for Sr-90 is 5.0E-10 uCi/ml and for Sr-89 is 1.0E-09 uCi/ml. This data was not available for inclusion in Semiannual Radioactive Effluent Release Report Number 1 for the first half of 1985.

LIQUID RADIOACTIVE WASTE
CUMULATIVE DOSE DATA

QUARTER 1 OF 1985

Total Dose (MREM) for Bone	0.00E-01
Total Dose (MREM) for Liver	0.00E-01
Total Dose (MREM) for Total Body	0.00E-01
Total Dose (MREM) for Thyroid	0.00E-01
Total Dose (MREM) for Kidney	0.00E-01
Total Dose (MREM) for Lung	0.00E-01
Total Dose (MREM) for GI-LLI	0.00E-01

QUARTER 2 OF 1985

Total Dose (MREM) for Bone	7.87E-07
Total Dose (MREM) for Liver	1.61E-05
Total Dose (MREM) for Total Body	1.58E-05
Total Dose (MREM) for Thyroid	1.57E-04
Total Dose (MREM) for Kidney	1.64E-05
Total Dose (MREM) for Lung	1.54E-05
Total Dose (MREM) for GI-LLI	4.66E-05

QUARTER 3 OF 1985

Total Dose (MREM) for Bone	1.13E-01
Total Dose (MREM) for Liver	1.16E-01
Total Dose (MREM) for Total Body	1.16E-01
Total Dose (MREM) for Thyroid	1.17E-01
Total Dose (MREM) for Kidney	1.16E-01
Total Dose (MREM) for Lung	1.16E-01
Total Dose (MREM) for GI-LLI	1.29E-01

QUARTER 4 OF 1985

Total Dose (MREM) for Bone	5.88E-04
Total Dose (MREM) for Liver	1.19E-02
Total Dose (MREM) for Total Body	1.17E-02
Total Dose (MREM) for Thyroid	1.64E-02
Total Dose (MREM) for Kidney	1.12E-02
Total Dose (MREM) for Lung	1.10E-02
Total Dose (MREM) for GI-LLI	1.69E-01

TOTALS FOR 1985

Total Dose (MREM) for Bone	1.14E-01
Total Dose (MREM) for Liver	1.28E-01
Total Dose (MREM) for Total Body	1.28E-01
Total Dose (MREM) for Thyroid	1.34E-01
Total Dose (MREM) for Kidney	1.28E-01
Total Dose (MREM) for Lung	1.27E-01
Total Dose (MREM) for GI-LLI	2.99E-01

SECTION II
Supplemental Information

Facility: Wolf Creek Generating Station License Number: NPF-42

1. Regulatory Limits

A. For liquid waste effluents

A.1 The concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2, for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2×10^{-4} microCurie/ml total activity.

A.2 The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released, from each unit, to UNRESTRICTED AREAS shall be limited:

a. During any calendar quarter to less than or equal to 1.5 mrems to the whole body and to less than or equal to 5 mrems to any organ, and

b. During any calendar year to less than or equal to 3 mrems to the whole body and to less than or equal to 10 mrems to any organ.

B. For gaseous waste effluents

B.1 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 the following:

a. For noble gases: Less than or equal to 500 mrems/yr to the whole body and less than or equal to 3000 mrems/yr to the skin, and

b. For Iodine-131 and 133, for tritium, and for all radionuclides in particulate form with half-lives greater than 8 days: Less than or equal to 1500 mrems/yr to any organ.

B.2 The air dose due to noble gases released in gaseous effluents, from each unit, to areas at and beyond the SITE BOUNDARY shall be limited to the following:

a. During any calendar quarter: Less than or equal to 5 mrads for gamma radiation and less than or equal to 10 mrads for beta radiation, and

b. During any calendar year: Less than or equal to 10 mrads for gamma radiation and less than or equal to 20 mrads for beta radiation.

2. Maximum Permissible Concentrations

WATER - covered in section 1.A.

AIR - covered in section 1.B.

3. Average energy of fission and activation gaseous effluents is not applicable. This information is not utilized for dose or release calculations.

4. Measurements and Approximations of Total Radioactivity

A. Liquid Effluents

LIQUID RELEASE TYPE	SAMPLING FREQUENCY	METHODS OF ANALYSIS	TYPE OF ACTIVITY ANALYSIS
1. Batch Waste Release Tanks	P Each Batch	P.H.A.	Principal Gamma Emitters
		P.H.A.	I-131
a. Waste Monitor Tank	P One Batch/M	P.H.A.	Dissolved and Entrained Gases (Gamma Emitters)
b. Secondary Liquid Waste Monitor Tank	P Each Batch	L.S.	H-3
		G.F.P.	Gross Alpha
	P Each Batch	O.S.L.	Sr-89, Sr-90
		O.S.L.	Fe-55

p = prior to each batch

m = monthly

P.H.A. = gamma spectrum pulse height analysis using a High Purity Germanium detector.

L.S. = liquid scintillation

G.F.P. = Gas Flow Proportional counting

O.S.L. = performed by an Offsite Laboratory

There were no continuous liquid radioactive waste effluents for this reporting period.

b. Gaseous Waste Effluents

GASEOUS, RELEASE TYPE	SAMPLING FREQUENCY	METHODS OF ANALYSIS	TYPE OF ACTIVITY ANALYSIS
Waste Gas Decay Tank	P Each Tank Grab Sample	P.H.A.	Principal Gamma Emitters
Containment Purge or Vent	P Each PURGE Grab Sample	P.H.A.	Principal Gamma Emitters
		Gas Bubbler and L.S.	H-3 (oxide)
Unit Vent	M Grab Sample	P.H.A.	Principal Gamma Emitters
		Gas Bubbler and L.S.	H-3 (oxide)
Radwaste Building Vent	M Grab Sample	P.H.A.	Principal Gamma Emitters
All Release Types as listed above	Continuous	P.H.A.	I-131
			I-133
	Continuous	P.H.A. Particulate Sample	Principal Gamma Emitters
	Continuous Composite	G.F.P. Particulate Sample	Gross Alpha
	Continuous	O.S.L. Composite Particulate Sample	Sr-89, Sr-90

C. A conservative error of ± 30% has been estimated. This includes volumetric measurement device, flow measurement device and analytical errors.

5. Batch Releases

There were sixty (60) gaseous batch releases during the second half of 1985. The longest gaseous batch release took 151 hours, the shortest occurred over a twenty-one (21) minute interval. The average release took 6.9 hours with a total gaseous batch release time of 414 hours.

There were 422 liquid batch releases during the second half of 1985. The longest liquid batch release took 115 minutes while the shortest took only 37 minutes. The average release time for the liquid batch releases was 55 minutes. Total release time for all liquid batch releases was 386 hours.

The meteorological conditions during batch releases are available on site for review and inspection.

6. Abnormal Releases

There were no abnormal liquid or gaseous releases for this report period.

SECTION III
HOURS AT EACH WIND SPEED AND DIRECTION

All gaseous releases at the Wolf Creek Generating Station are ground level releases. The meteorological data supplied in these tables cover the period from July 1, 1985 through December 31, 1985, and indicate the number of hours at each wind speed and direction for each stability class.

STABILITY CLASS: A
ELEVATION: GROUND

	WIND SPEED (MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	2	0	0	0	0	2
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	2	0	0	2
S	0	0	0	5	0	0	5
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	1	0	0	0	0	1
TOTAL	0	3	0	7	0	0	10

STABILITY CLASS: B
ELEVATION: GROUND

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	2	0	0	0	2
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	2	5	0	0	7
S	0	0	1	10	0	0	11
SSW	0	0	1	2	0	0	3
SW	0	0	0	2	0	0	2
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	1	0	0	0	1
NW	0	0	2	0	0	0	2
NNW	0	0	1	0	4	0	5
TOTAL	0	0	10	19	4	0	33

STABILITY CLASS: C
ELEVATION: GROUND

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	3	4	4	2	0	14
NNE	0	1	0	1	0	0	2
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	1	0	0	1
SE	0	0	3	1	0	0	4
SSE	0	0	4	7	0	0	11
S	0	0	4	15	3	0	22
SSW	0	0	4	8	2	0	14
SW	0	0	3	1	0	0	4
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	1	0	0	0	0	1
NW	0	0	4	1	0	1	6
NNW	0	4	9	9	0	0	22
TOTAL	1	9	35	48	7	1	101

STABILITY CLASS: D
ELEVATION: GROUND

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	69	93	51	4	0	218
NNE	5	53	102	43	5	0	208
NE	2	65	75	16	0	0	158
ENE	1	52	46	2	0	0	101
E	5	36	31	10	0	0	82
ESE	3	32	44	19	2	0	100
SE	4	40	61	15	3	0	123
SSE	3	39	60	63	12	4	181
S	2	23	46	83	44	9	207
SSW	4	15	31	39	14	0	103
SW	1	15	26	2	0	0	44
WSW	0	22	16	7	2	0	47
W	3	24	21	5	1	0	54
WNW	1	16	20	11	0	1	49
NW	0	32	40	35	32	9	148
NNW	5	24	53	49	13	1	145
TOTAL	40	557	765	450	132	24	1968

STABILITY CLASS: E
ELEVATION: GROUND

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	10	40	5	0	0	57
NNE	1	23	31	3	0	0	58
NE	8	41	13	0	0	0	62
ENE	7	57	24	1	0	0	89
E	5	45	49	1	0	0	100
ESE	2	46	40	6	0	0	94
SE	1	37	66	1	0	0	105
SSE	5	26	120	86	12	2	251
S	7	11	92	95	21	5	231
SSW	6	39	30	31	2	0	108
SW	1	19	19	5	0	0	44
WSW	1	20	7	2	0	0	30
W	2	16	13	2	0	0	33
WNW	1	11	15	14	0	0	41
NW	4	11	28	23	1	0	67
NNW	0	31	19	7	1	0	58
TOTAL	53	443	606	282	37	7	1428

STABILITY CLASS: F
ELEVATION: GROUND

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	8	8	1	0	0	17
NNE	0	15	6	0	0	0	21
NE	5	22	1	0	0	0	28
ENE	8	35	3	0	0	0	46
E	2	46	15	0	0	0	63
ESE	2	36	14	0	0	0	52
SE	1	36	27	0	0	0	64
SSE	2	22	34	0	0	0	58
S	2	18	30	4	0	0	54
SSW	0	10	6	0	0	0	16
SW	2	20	4	0	0	0	26
WSW	0	8	1	0	0	0	9
W	1	3	2	0	0	0	6
WNW	4	8	3	0	0	0	15
NW	1	19	6	0	0	0	26
NNW	1	26	17	1	0	0	45
TOTAL	31	332	177	6	0	0	546

STABILITY CLASS: G
ELEVATION: GROUND

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	7	1	0	0	0	8
NNE	0	6	4	0	0	0	10
NE	0	13	0	0	0	0	13
ENE	0	18	1	0	0	0	19
E	1	12	2	0	0	0	15
ESE	0	9	1	0	0	0	10
SE	1	10	0	0	0	0	11
SSE	0	2	3	0	0	0	5
S	0	0	1	0	0	0	1
SSW	0	0	3	0	0	0	3
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	7	1	0	0	0	8
NNW	0	3	5	0	0	0	8
TOTAL	2	87	22	0	0	0	111

STABILITY CLASS: ALL
ELEVATION: GROUND

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4	99	148	61	6	0	318
NNE	6	98	143	47	5	0	299
NE	15	141	89	16	0	0	261
ENE	16	162	74	3	0	0	255
E	13	139	97	11	0	0	260
ESE	7	123	99	26	2	0	257
SE	7	123	157	17	3	0	307
SSE	10	89	223	163	24	6	515
S	11	52	174	212	68	14	531
SSW	10	64	75	80	18	0	247
SW	4	54	52	10	0	0	120
WSW	1	50	24	9	2	0	86
W	6	43	36	7	1	0	93
WNW	6	36	39	25	0	1	107
NW	5	69	81	59	33	10	257
NNW	6	89	104	66	18	1	284
TOTAL	127	1431	1615	812	180	32	4197

The computer that supplies the wind speed and direction data for the Wolf Creek Generating Station does not report hours unless there are three 15 minute intervals of good data per hour. The 219 missing hours of data are due to this criteria. In most cases there is at least one good fifteen minute interval for each hour. This data is available for review at the Wolf Creek site.

SECTION IV

Additional Information

1. Unplanned Releases

The performance of a surveillance test on the containment purge isolation valves inadvertently led to an unplanned release of the containment atmosphere to the environment. The surveillance procedure had two sets of isolation dampers open at the same time.

Samples of the containment atmosphere were subsequently obtained and analyzed. There was no detectable radioactive noble gas, radioiodines or radioactive particulates detected. A review of the installed radiation monitor trends showed no increase of activity during the forty minute release period. The radiation monitor's setpoint was set in accordance with the Offsite Dose Calculation Manual (ODCM) and would have initiated a Containment Purge Isolation had the setpoint been reached.

The surveillance procedure has been revised, requiring a release permit be obtained prior to exercising the isolation dampers and/or eliminating the damper movement step.

There were no liquid effluent unplanned releases during the reporting period.

2. Process Control Program

The Process Control Program was revised to allow an alternate method of processing solid radioactive waste. This change was approved by the Plant Safety Review Committee on September 4, 1985. The revised section is highlighted by revision bars on Attachment 1 which has been excerpted from the Process Control Program.

3. Offsite Dose Calculation Manual

Revision I of the Offsite Dose Calculation Manual was approved by the Plant Safety Review Committee on July 18, 1985. Provided below is a summary of the changes and the justification for each change. Attachment 2 provides the revised pages of the Offsite Dose Calculation Manual which are dated July 9, 1985.

Page Revised	Revision
ii	Titles and page numbers for Tables A.5-2 through A.5-5 were changed.
iii	This is a new page that includes Tables A.5-6 through A.5-16; titles as well as page numbers.
1	The last paragraph from section 1 was deleted. Emergency offsite dose calculations are not included in the ODCM but are included in site emergency plan procedures.
3	A sentence allowing the high alarm trip set point to be set at 1.5 times the background count rate was added to the last paragraph of this page. This was done to remove these two monitors from a constant alarm condition.
8	This was an editorial change: "Σ"was added to the formula at the bottom of this page.
9	Editorial change: Added the "A=" to the fmax/fp notation.
12	Deleted the last two sentences from 2.4.2. Cneck source actuation is covered in the plant monitor calibration procedures.
19	Added the bar (-) over "X/Q" used in the last two equations at the bottom of page 19. The highest annual average relative concentration factor is used. This was done to make all the equations consistent throughout the ODCM.
20	Added the bar (-) over all the "X/Q" notations on this page. Reason for change same as page 19.
22	Added the bar (-) over all the "X/Q" notation on this this page. Reason for change same as page 19.
23	Added the bar (-) over all the "X/Q" notations on this page. Also enclosed "X/Q" in parenthesis on this page. Parenthesis were added for consistency. Other change same reason as page 19.

Page Revised	Revision
24	Eliminated the "$\bar{z}_p$" for clarity. Only "$\bar{z}_I$" is used which matches NUREG-0133 guidance.
24	Paragraph 3.3.2 a & b separated the word "to" from "mrem". Editorial change.
24	Added the bar (-) over "X/Q". Reason for change same as page 19.
31	Deleted the last two sentences of 3.4.1.3. Reason for change same as page 12.
32	Deleted the last two sentences of 3.4.2.2. Reason for change same as page 12.
32	Deleted the last two sentences of 3.4.3.2. Reason for change same as page 12.
33	Changed notation "Table 4-2" to "Table 4.2" for consistency.
34	Table 4.1, Section 1: The air particulate sampling location was changed from 31 to 32 to be more representative of the town of New Strawn in compliance with Technical Specification 3.12.1. The new location is also identical to that used by the Kansas Department of Health and Environment in their monitoring program and therefore should provide a better comparison of results.
35	Table 4.1, Section 3.a: The addition is to provide a better description of the sampling location.
35	Table 4.1, Section 3.c: The addition is to reference the appropriate figure.
35	Table 4.1, Section 3.d: The change is to provide a more conservative sampling location in complying with Technical Specification 3.12.1, Table 3.12-1, Section 3.d.
36	Table 4.1, Section 4.a: Sampling locations C-11 and B-8 were deleted because residents have sold the milk animals at these locations. Location P-2 was added as a replacement because it is the location with the next highest D/Q within five miles of the plant site; additionally, the milk from location P-2 is goat's milk, which is potentially a more sensitive indicator of radioiodine than is cow's milk.

	Reference to an alternate location was removed for better conformance with the final format of the corresponding Technical Specification 3.12.1, Table 3.12-1, Section 4.a.
36	Table 4.1, Section 4.b: The change is to make terminology consistent.
36	Table 4.1, Section 4.c: Reference to alternate broad leaf vegetation sampling locations was removed for better conformance with the final format of Technical Specification 3.12.1, Section 4.c. Irrigated crops were added to comply with Technical Specification 3.12.1, Table 3.12-1, Section 4.c.
37	TLD and Air Particulate location distances were changed to reflect either location changes or minor corrections to earlier distance measurements. Milk and food product location deletions reflect the deletions described above (see justifications 6 and 8).

New RI factor tables were calculated since Technical Specification 3.11.2.3 refers to any organ and not some imaginary organ that accumulates all the organ doses. NUREG-0133 methodology as well as Regulatory Guide 1.109 methodology calculate seven separate organ doses. Therefore new RI factor tables were generated and added to the ODCM. These tables are found on pages A-44 through A-100.

4. Major Changes to Liquid, Gaseous, or Solid Radwaste Systems

This information will be provided in the next annual FSAR update, as allowed by Technical Specification 6.15.

5. Technical Specification Action Statement Information

On January 23, 1986, it was discovered that certain surveillances required by Technical Specification 3.3.3.11 had been inadvertently omitted from the surveillance testing program. These surveillances are utilized to demonstrate the operability of the radioactive gaseous effluent monitoring instrumentation. The surveillances which had not been performed were the daily channel check and quarterly analog channel operational test on the Unit Vent Sampler Flow Rate Monitor for the particulate and iodine monitoring skid and the daily channel check on the Radwaste Building Vent System Sampler Flow Rate Monitor for the particulate and iodine monitoring skid.

Since these required surveillances were not being performed during the time period of this report, this Technical Specification violation existed during this report period. The required surveillances were satisfactorily performed on January 22, and have been incorporated into the surveillance program. Since the analog channel operational test confirmed that no setpoint "drift" had occurred, there is no evidence to indicate that this situation affected the validity of monitor readings taken during this report period. This event is discussed in Wolf Creek Licensee Event Report 86-003-00.

The liquid effluent monitoring instrumentation time limits for inoperability, as listed in Technical Specification 3.3.3.10 were not exceeded during this reporting period.

The quantity of radioactive material contained in the liquid holdup tanks or gas storage tanks did not exceed the limits specified in Technical Specifications 3.11.1.4 or 3.11.2.6, respectively, during this reporting period.

6. Land Use Census

There were no new locations for dose calculations identified during this reporting period.

3.10 CORRECTIVE ACTIONS

3.10.1 At predetermined intervals a portion of the solidified containers will be inverted and allowed to stand for a period of time. Each of these containers will then be inspected for free standing water. The results of each inspection shall be recorded. Should any container be found to exhibit free standing water greater than the FSW criteria established by the low level radioactive waste disposal facility, the following actions shall be taken:

3.10.1.1 Secure solidification until new solidification ratios can be determined and proven.

3.10.1.2 Inspect all available containers from the same batch of radioactive waste solidified using the formulas which provided the unsatisfactory results.

3.10.2 Drums that exhibit free standing water shall either be dewatered or reprocessed by determining the quantity of water and adding proper quantities of cement and additive chemicals as required by a sample verification test.

4. BACK-UP PROCESSING

4.1 In the event that the stock solid radwaste processing system is unavailable, or that extra processing capacity becomes necessary, Kansas Gas & Electric Company will use vendor processing from NUS Process Services Corporation.

4.1.1 The latest revision of the NUS Process Control Program will be used to control waste processing whenever this service is in use.

ATTACHMENT II
EXCERPTS FROM THE ODCM
LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

The Offsite Dose Calculation Manual (ODCM) describes the methodology and parameters to be used in the calculation of offsite doses due to radioactive liquid and gaseous effluents. These dose estimates are used to demonstrate compliance with the Radiological Effluent Technical Specifications as required by 10CFR50.36, 10 CFR 20.106, 10 CFR 50 Appendix I, and 40CFR190. The ODCM contents are based on "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants (NUREG-0133)," and Regulatory Guide 1.109, Revision 1.

The ODCM provides the methodology to be used in the calculation of liquid and gaseous effluent monitor alarm/trip setpoints to assure compliance with the concentration and dose limitations of the Radiological Effluent Technical Specifications.

The ODCM provides the Radiological Environmental Monitoring Program. The program consists of monitoring stations and sampling programs designed to confirm the dose estimates made under normal or accident conditions, and conform to NRC requirements in 10 CFR Part 50.

2.0 LIQUID EFFLUENTS

2.1 LIQUID EFFLUENT MONITOR SETPOINTS

The alarm/trip setpoints for the liquid effluent radiation monitors are based on the instantaneous concentration limits of 10CFR20, Appendix B, Table II, Column 2 applied at the boundary of the restricted area. Specifically, the High Alarm setpoint will correspond to the 10 CFR Part 20 limits at the boundary of the restricted area; the alert alarm setpoint is set one order of magnitude below the High Alarm/Trip setpoint. Since the High Alarm/Trip initiates isolation of the particular system and termination of the release, this setpoint represents assurance that the instantaneous liquid release limit of 10 CFR Part 20 is not exceeded. Auditable records shall be maintained indicating the actual setpoints used at all times.

2.1.1 CONTINUOUS LIQUID EFFLUENT MONITORS

The two monitors associated with continuous liquid releases are listed below:

Monitor ID	Description
0-BM-RE-52	Steam Generator Blowdown Discharge Monitor
0-LE-RE-59	Turbine Building Drain Monitor

The steam generator blowdown discharge effluent monitor continuously monitors the blowdown discharge pump outlet to detect excess radioactivity due to system demineralizer breakthrough or abnormal primary to secondary leakage. The blowdown discharge monitor's high alarm setpoint initiates closure of the blowdown isolation valves and the blowdown discharge valve. Similarly, the high radiation alarm on the turbine building drain monitor initiates closure of the drain line isolation valve to prevent the release of radioactive effluents.

Monitor setpoints will be conservatively based on I-131, the most restrictive isotope expected to be present. This is particularly appropriate for the turbine building drain line monitor since the most probable source is the secondary steam system which is expected to have negligible activity unless there is a significant primary to secondary leak. Due to changing activities, it will not be possible to select a radionuclide distribution on which to base the monitor setpoint. Additionally, maximum effluent flows and minimum dilution flows will normally be assumed.

The High Alarm/Trip Setpoint will be set to correspond to the I-131 MPC limit at the boundary of the restricted area from 10 CFR Part 20, Appendix B, Table II, Column 2. The alert alarm is set one order of magnitude below the high alarm/trip setpoint. This high alarm/trip setpoint assures the limits of Specification 3.11.1.1 are not exceeded at the boundary of the restricted area.

In the event that an alarm is tripped, an evaluation of the system will be made by taking an actual isotopic and flow analysis of the discharge.

The above continuous liquid effluents are not radioactive effluents until activity has been detected by the liquid effluent monitor, a tritium analysis of the secondary system, or a gross beta analysis of the secondary system. At that time an analysis of the effluent will be made to verify activity in the system effluent. During periods of time when the above liquid effluents are not radioactive the high alarm/trip set point may be set to 1.5 times the back ground count rate.

Where:

F_m = The expected minimum dilution water flow rate.

LC_i = Measured concentration of nuclide i in the cooling lake water sample.

MPC_i = Limiting concentration of radionuclide i from 10CFR20 Appendix B, Table II, Column 2.

For the purpose of setpoint calculations the expected minimum dilution flow rate is assigned a value based upon the type and number of pumps running into the circulating water piping.

Having established the values of F_{dn} and F_{eff}, the calculated maximum permissible waste tank flow rate is given by

$$f_{max} \leq \frac{F_{eff} + f_p}{F_{dn}} \qquad \frac{F_{eff}}{f_{dn}} \text{ for } f_p << F_{eff}$$

Where f_p is the expected effluent flow rate; normally the rated capacity of the effluent pump. Thus the pump flow rate is set at or below f_{max}. Even though the value of f_{max} may be larger than the actual effluent pump capacity, f_p, it does represent the upper limit to the effluent flow rate, whereby the requirement of 10CFR20 may still be met. If $F_d \leq 1$, the effluent pump flow rate may be assigned any value since the waste tank effluent concentration meets the limits of 10CFR20 without dilution and the release may be made without regard to the setpoints for other release pathways. For those discharge pathways selected to be secured during the release under consideration, the pump flow rate should be set at as low a value as practicable to detect any inadvertent release.

A setpoint for the dilution stream flow rate is not applicable since the minimum flow rate is administratively set.

5) The liquid radiation monitor setpoint may now be determined based on the values of $\sum_i C_i$, and f_{max}. The monitor response is primarily to gamma radiation, therefore, the actual setpoint is based on $\sum_g C_g$. The calculated monitor setpoint concentration is determined as follows:

$$c = A \sum_g C_g \quad (uCi/ml)$$

Where:

A = Adjustment factor which will allow the setpoint to be established in a practical manner for convenience and to prevent spurious alarms.

$$A = \frac{f_{max}}{f_p}$$

If A > 1, Calculate c and determine the maximum value for the actual monitor setpoint (uCi/ml).

If A < 1, No release may be made.

If $F_d < 1$, no further dilution is required and the release may be made without regard to available dilution or to other releases made simultaneously. However, it is necessary to establish a monitor setpoint which will provide alarm should the release concentration inadvertently exceed 10CFR20 limits. This can be accomplished by establishing the adjustment factor as follows:

$$A = 1/F_d$$

2.2 LIQUID EFFLUENT CONCENTRATION - COMPLIANCE WITH 10 CFR 20

Specification 3.11.1.1 requires that the radioactive material released in liquid effluents to unrestricted areas shall be limited to:

a. The concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases.

b. For dissolved or entrained noble gases, the concentration shall be limited to 2×10^{-4} uCi/ml total activity.

To show compliance with this specification, concentrations of actual liquid effluents will be determined by performing an isotopic analysis. The liquid effluent monitors will provide assurance that the liquid concentration limits are not exceeded.

2.4 CALIBRATION OF LIQUID EFFLUENT MONITORS

The four monitors associated with liquid releases are listed below

Monitor ID	Description
O-BM-RE-52	Steam Generator Blowdown Discharge Monitor
O-LE-RE-59	Turbine Building Drain Monitor
O-HF-RE-45	Secondary Liquid Waste System Monitor
O-HB-RE-18	Liquid Radwaste Discharge Monitor

2.4.1 Liquid effluent streams are monitored by an NaI(Tl) detector. The detector operates in a gross counting mode and is gamma sensitive.

2.4.2 Calibration of the liquid monitors shall be performed using three standard solutions of Cs-137. The solutions shall cover the appropriate range of the detector and have concentrations of approximately 5×10^{-7} uCi/cc, 1×10^{-5} uCi/cc, and 1×10^{-3} uCi/cc. The solutions shall be presented to the detector and the meter reading in counts per minute shall be recorded. A graph of counts per minute versus concentration shall be produced from the data.

3.0 GASEOUS EFFLUENTS

3.1 GASEOUS EFFLUENT MONITOR SETPOINTS

Technical Specification 3.3.3.11 requires the gaseous effluent monitoring instrumentation channels shown in Table 3.3-13 to be operable with their Alarm/Trip setpoints set to ensure that the limits of Specification 3.11.2.1 are not exceeded. Specification 3.11.2.1 states that the dose rate due to radioactive materials released in gaseous effluents from the site shall be limited to less than or equal to 500 mrem/yr to the total body and less than or equal to 3000 mrem/yr to the skin due to noble gases.

where:

MPC_i = 5×10^{-10} uCi/cc for Cs-137

= 1×10^{-10} uCi/cc for I-131

AF = as defined previously

SF = .0625 for I-131 *

= .9375 for C_s-137 *

* derived from ratio of isotope activity (either I-131 or Cs-137) to sum of activity of Cs-137 and I-131 found in FSAR Table 11.1-1 for reactor coolant.

Q = Vent flow in M^3/sec

This will provide the Hi alarm setpoint. The alert alarm setpoint is 10% of the Hi alarm setpoint.

3.2 GASEOUS EFFLUENT CONCENTRATION/DOSE RATE

- Compliance with 10 CFR 20

The Standard Technical Specification 3.11.2.1 requires that the instantaneous 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 the following values:

a. The dose rate limit for noble gases shall be <500 mrem/yr to the total body and <3000 mrem/yr to the skin, and

b. The dose rate limit for I-131 and I-133 and for all radioactive materials in particulate form and radionuclides other than noble gases with half lives greater than 8 days shall be <1500 mrem/yr to any organ.

Based on the methodology of NUREG-0133;

a. Release rate limit for noble gases:

$\sum_i K_i \overline{(X/Q)} Q_i$ <500 mrem/yr for the total body,

and

$\sum_i (L_i + 1.1 M_i) \overline{(X/Q)} Q_i$ <3000 mrem/yr for the skin.

where:

K_i = Total body dose factor due to gamma emissions for each identified noble gas radionuclide, in mrem/yr per μCi/m^3, from Table A.1-2.

$(\overline{X/Q})$ = 2.2 E-06 sec/m^3, The highest calculated annual average relative concentration at the restricted area boundary in the North Sector.

Q_i = Release rate of radionuclide i from vent, in μCi/sec.

L_i = Skin dose factor due to beta emissions for each identified noble gas radionuclide, in mrem/yr per μCi/m^3, from Table A.1-2.

M_i = Air dose factor due to gamma emissions for each identified noble gas radionuclide, in mrad/yr per μCi/m^3 from Table A.1-2.

1.1 = Conversion constant of air dose to skin dose.

b. Release rate limit for all radionuclides and radioactive materials in particulate form and radionuclides other than noble gases:

$$\sum_i (P_{(i)IN} \cdot (\overline{X/Q}) \cdot Q_i) < 1500 \text{ mrem/yr to any organ.}$$

where:

Q_i = The release rate of radionuclides, i, in gaseous effluent from all vent releases, in μCi/sec.

$P_{(i)IN}$ = The dose parameter for radionuclides other than noble gases for the inhalation pathway, in mrem/yr per μCi/m^3. See Table A.5-1.

$(\overline{X/Q})$ = 2.2 E-06 sec/m^3 (the highest annual average). The highest calculated relative concentration for estimating the dose to an individual at the unrestricted area boundary in the N sector.

The P_i value for tritium is:

P_i (Inhalation) = 3.7×10^9 DFA_i

3.3 GASEOUS EFFLUENT DOSES

- Compliance with 10 CFR 50 Appendix I

3.3.1 NOBLE GASES

Specification 3.11.2.2 requires that the air dose due to noble gases released in gaseous effluents to areas at and beyond the site boundary shall be limited to the following:

a. During any calendar quarter, to $\leq$ 5 mrad for gamma radiation and $\leq$ 10 mrad for beta radiation;

b. During any calendar year, to $\leq$ 10 mrad for gamma radiation and $\leq$ 20 mrad for beta radiation.

To show compliance with this specification, the dose calculations for the actual releases of radioactive noble gases in gaseous effluent will be consistent with the methodology provided in Reg. Guide 1.109, Rev. 1. The following dose calculations will be performed:

a. During any calendar quarter;

For gamma radiation;

$$D = 3.17\ E\text{-}8 \sum_{i=1} M_i \left[\left(\overline{X/Q}\right) \cdot Q_i\right] \leq 5 \text{ mrad.}$$

For beta radiation;

$$D = 3.17\ E\text{-}8 \sum_{i=1} N_i \left[\left(\overline{X/Q}\right) \cdot Q_i\right] \leq 10 \text{ mrad.}$$

b. During any calendar year:

For gamma radiation:

$$D = 3.17\ E\text{-}8 \sum_{i=1} M_i \left[\left(\overline{X/Q}\right) \cdot Q_i\right] \leq 10 \text{ mrad.}$$

For beta radiation:

$$D = 3.17\ E\text{-}8 \sum_{i=1} N_i \left[\left(\overline{X/Q}\right) \cdot Q_i\right] \leq 20 \text{ mrad}$$

where:

3.17 E-8 = The inverse of the number of seconds in a year.

M_i = The air dose factor due to gamma emissions for each identified noble gas radionuclide, in mrad/yr per μCi/m^3 from Table A.1-2 (Reg. Guide 1.109, Table B-1, Col. 4)

N_i = The air dose factor due to beta emissions for each identified noble gas radionuclide, in mrad/year per μCi/m^3 from Table A.1-2 (Reg. Guide 1.109, Table B-1, Column 2).

$(\overline{X/Q})$ = 2.2 E-6 sec/m^3. The highest calculated annual average relative concentration for any area at the unrestricted area boundary.

Q_i = The release of noble gas radionuclides, 'i', in gaseous effluents, in μCi. Releases shall be cumulative over the calendar quarter or year as appropriate.

An average monthly air dose schedule should be setup to ensure section 3.11.2.2 of Wolf Creek Technical Specifications are not exceeded. The average monthly air dose should be as follows:

a. For gamma radiation $\leq$ 1.6 mrad/mo.
For beta radiation $\leq$ 3.3 mrad/mo.

If the monthly average air dose for: (a) is exceeded, it should be noted that if the release is continued at the same (or higher) frequencies or activities the quarterly limit of Technical Specification 3.11.2.2.A will be exceeded.

b. For gamma radiation $\leq$ 0.8 mrad/mo.
For beta radiation $\leq$ 1.6 mrad/mo.

If the monthly average air dose for: (b) is exceeded, it should be noted that if the release is continued at the same (or higher) frequencies or activities the annual limit of Technical Specification 3.11.2.2.B will be exceeded.

If any of the above monthly average air doses are exceeded, evaluation of the causes of the high air dose should be performed and steps should be taken to reduce the activity or frequency (e.g. delay the release of a Waste Gas Decay Tank) of the release.

3.3.2 RADIOIODINES, PARTICULATES, AND OTHER RADIONUCLIDES

Specification 3.11.2.3 requires that the dose to an individual from iodine-131 and 133, tritium, and all radioactive materials in particulate form with half-lives greater than 8 days in gaseous effluents released to areas at and beyond the site boundary shall be limited to the following:

a. During any calendar quarter to $\leq$ 7.5 mrem to any organ; and

b. During any calendar year to $\leq$ 15 mrem to any organ.

To show compliance with this specification, the dose calculations for the actual releases of the subject materials are consistent with the methodology provided in Regulation Guide 1.109, Revision 1. The following dose calculations will be performed:

a. $D\ (mrem) = 3.17E\text{-}8 \left[\sum_i R_i\ (WQ_i) \right] \leq 7.5\ mrem$

b. $D\ (mrem) = 3.17E\text{-}8 \left[\sum_i R_i\ (WQ_i) \right] \leq 15\ mrem$

where:

3.17E-8 = The inverse of the number of seconds in a year.

Q_i = The release of radioiodines, radioactive materials in particulate form and radionuclides other than noble gases in gaseous effluents, 'i', in Ci. Releases shall be cumulative over the calendar quarter or year as appropriate. The Q_i value shall be determined as the product of the flow rate through the release point and grab samples of the effluent analyzed in accordance with Radiological Effluent Technical Specification 3.11.2.1.

W = The annual average dispersion parameter for estimating the dose to an individual at the controlling location.

$W = \overline{(X/Q)}$, 2.2×10^{-6} sec/m^3 for the inhalation pathway.

$W = (D/Q)$, 1.8 E-8 m^{-2}, for the food and ground plane pathways.

R_i = The dose factor for each identified radionuclide, 'i', in mrem/yr per μCi/m^3. See Table A.5-2 through Table A.5-5.

3.4.1 PARTICULATE DETECTOR CALIBRATION

3.4.1.1 Beta particulate is monitored by a 50 mm diamter by 0.25 mm thick plastic scintillator optically coupled to a 50 mm diameter photomultiplier tube. This detector shall be calibrated over its range of energy and rate capabilities.

3.4.1.2 For energy range calibration four sources shall be used. Each source consists of a filter paper impregnated with a beta emitting radionuclide. The radionuclides used should be Tc-99, Cs-137, Cl-36, and Rh-106. Each source shall be positioned in the filter paper retaining ring and counted separately. The count rates for each radionuclide source shall be recorded and the data plotted on a graph of cpm/uCi versus average beta energy. This curve represents the detectors response characteristics over the range of beta energies observed. The efficiency for setpoint calculations shall be based on the efficiency of the detector for Cs-137.

3.4.1.3 The detector shall be calibrated for its rate capabilities using a filter paper impregnated with stand activities of Cs-137. Increasing amounts of a standard Cs-137 solution shall be impregnated on a filter paper. The counts per minute for each Cs-137 standard shall be recorded and the data plotted on a graph of counts per minute versus activity. At least three sources covering approximately 1/4, 1/2, and 3/4 of full scale shall be checked.

3.4.2 IODINE DETECTOR CALIBRATION

3.4.2.1 Iodine gas is monitored by absorbing the gas on a charcoal filter element. The charcoal filter is viewed by an NaI(Tl) integral line gamma scintillator assembly.

3.4.2.2 Because of its short half life and the difficulty in handling gaseous iodine. barium sources shall be used for calibration. The photo peaks of interest are as follows:

A. Ba-133: 356 KeV gamma is 0.69 efficient/disintegration

B. I-131: 364 KeV gamma is 0.82 efficient/disintegration

Therefore, each iodine disintegration will produce 0.82/0.69 x barium disintegrations. Assuming that the detector efficiency for 356 KeV is the same as for the 364 KeV, the sensitivity for I-131 equals 1.19 x Ba-133 (counts/min)/uCi. The standard sources shall be constructed by impregnating a standard Ba-133 solution into the charcoal filter element. The geometry shall simulate the iodine retention on the first surface of the charcoal. Sources shall be prepared to cover approximately 1/4, 1/2, and 3/4 of full scale. The barium counts per minute for each standard shall be adjusted to iodine counts per minute as described above. The adjusted counts per minute shall be plotted on a graph of counts per minute versus activity.

3.4.3 GAS DETECTOR CALIBRATION

3.4.3.1 The gas detectors associated with monitors O-GT-RE-22&33, O-GT-RE-31&32 and the low-range detectors of monitors O-GT-RE-21B and O-GH-RE-10B are a plastic scintillator identical to the particulate detector. The mid-range and high-range detectors of monitors O-GT-RE-21B and O-GH-RE-10B are cadmium telluride, solid state sensors.

3.4.3.2 Sources for all gas detectors shall be produced by evacuating the sample chamber with a vacuum pump. The sample chamber then shall be backfilled to the desired pressure with a source of standard Xe-133. The source is then counted and the counts per minute recorded. A graph of counts per minute versus concentration shall be produced from the data. Sources shall be prepared to cover approximately 1/4, 1/2, and 3/4 of full scale for the detectors associated with monitors O-GT-RE-22&33, O-GT-RE-31&32 and the low-range detectors of monitors O-GT-RE-21B and O-GH-RE-10B. Sources shall be prepared for the mid/high range detector to cover two points on the mid-range scale. For ALARA purposes, response for the high-range scale shall be extrapolated using the data from the mid-range calibration.

4.0 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Table 4.1 gives specific Radiological Environmental sampling pathways, locations and frequencies corresponding to Table 3.12-1 of Wolf Creek Technical Specifications. Maps showing these locations in relation to the Wolf Creek site are shown in Figures 4-1, 4-2 and 4-3; Table 4.2 lists distances and directions from the site to the sampling locations.

4.1 INTERLABORATORY COMPARISON PROGRAM

Analysis of KG&E Radiological Environmental samples is presently performed by Teledyne Isotopes, which takes part in the EPA Laboratory Intercomparison Program. Results of intercomparisons are then provided to KG&E in revisions to Teledyne's Quality Control Manual (IWL-0032-361) which is maintained at KG&E corporate offices.

TABLE 4.1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples and Sample Locations	Sampling and Collection Frequency	Type and Frequency of Analysis
1. AIRBORNE			
Radioiodine and Particulates	Five locations, station numbers 2, 3, 32, 37 and 40 (control) Figure 4-1.	Continuous operation of sampler with sample collection as required by dust loading but at least weekly.	Radioiodine canister. Analyze weekly for I-131. Analyze for gross beta radioactivity not less than 24 hours following filter change. Perform gamma isotopic analysis on each sample when gross beta activity is greater than 10 times the yearly mean of control samples. Perform gamma isotopic analysis on composite (by location) once per quarter.
2. DIRECT RADIATION	38 TLD locations within 5-mile radius of site (station numbers 1-38 on Figure 4-1) and two offsite locations (stations 39 and 40); two TLD dosimeters at each location.	Quarterly at each location	Gamma dose quarterly.

TABLE 4.1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples and Sample Locations	Sampling and Collection Frequency	Type and Frequency of Analysis
3. WATERBORNE			
a. Surface	One upstream location near the John Redmond Reservoir spillway, one sample from Wolf Creek Cooling Lake discharge cove.	Monthly grab sample	Monthly gamma isotopic analysis. Quarterly trituim analysis of composite sample.
b. Ground	Three locations at C-10, C-49, D-65, one control location at B-12 (see Figure 4-2).	Quarterly	Quarterly gamma isotopic and trituim analysis.
c. Drinking	Municipal water supplies at Burlington (upstream) and Le Roy (downstream) (see Figure 4-2).	Monthly composite*	Monthly gross beta and gamma isotopic analysis. Quarterly tritium analysis of composite sample.
d. Sediment from Shoreline	One sample from Wolf Creek Cooling Lake discharge cove.	Semiannually	Semiannual gamma isotopic analysis.

*Composite sampling shall be performed by collecting an aliquot at intervals not exceeding 2 hours.

TABLE 4.1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples and Sample Locations	Sampling and Collection Frequency	Type and Frequency of Analysis
4. INGESTION			
a. Milk	Samples from F-1, Q-5, P-2, and a control sample from S-3 (see Figure 4-3).	Semimonthly when animals are on pasture; monthly at other times.	Gamma isotopic and I-131 analysis of each sample.
b. Fish	One sample from Wolf Creek Cooling Lake, similar sample from John Redmond Reservoir spillway as control	Semiannually	Gamma isotopic analysis on edible portions
c. Food Products	Broad leaf vegetation samples locations Q-1 and A-1 on Figure 4-3; control at S-4	Monthly during harvest.	Gamma isotopic analysis on edible portions.
	Two samples of crops irrigated with Neosho River water from locations downstream of the Neosho-Wolf Creek Confluence and one control sample upstream of the Confluence; (Locations will vary from year to year).	At time of harvest	Gamma isotopic analysis on edible portions.

TABLE 4.2

SAMPLING LOCATION NUMBERS, DISTANCES (miles) AND DIRECTIONS

TLD and Air Particulate

Location Number	Distance/ Direction	Location Number	Distance/ Direction	Location Number	Distance/ Direction	Location Number	Distance Direction
1	1.4/N	11	1.6/E	21	3.8/S	31	3.0/WNW
2	2.7/N	12	1.8/ESE	22	4.1/SSW	32	3.2/WNW
3	3.0/NNE	13	1.5/SE	23	4.5/SW	33	3.7/WNW
4	4.0/NNE	14	2.6/SE	24	4.1/WSW	34	4.0/NW
5	4.0/NE	15	4.5/ESE	25	3.6/W	35	4.6/NNW
6	4.4/ENE	16	4.2/E	26	2.6/WSW	36	4.2/N
7	1.9/NE	17	3.6/SE	27	2.1/SW	37	2.1/NNW
8	1.6/NNE	18	3.2/SSE	28	2.8/SW	38	1.2/NW
9	2.0/ENE	19	4.0/SSE	29	2.6/SSW	39	13.0/N
10	2.4/ENE	20	3.3/S	30	2.2/W	40	15.0/WNW

Groundwater

B-12	2.2/NE	C-10	2.8/W	C-49	2.9/SW	D-65	3.9/S

Milk and Food Products

A-1	1.4/N	F-1	1.6/ESE	Q-1	1.3/NW	R-1	2.2/NNW
						S-3	15.0/WNW
		P-2	2.9/WNW	Q-5	3.6/NW	S-4	15.0/WNW

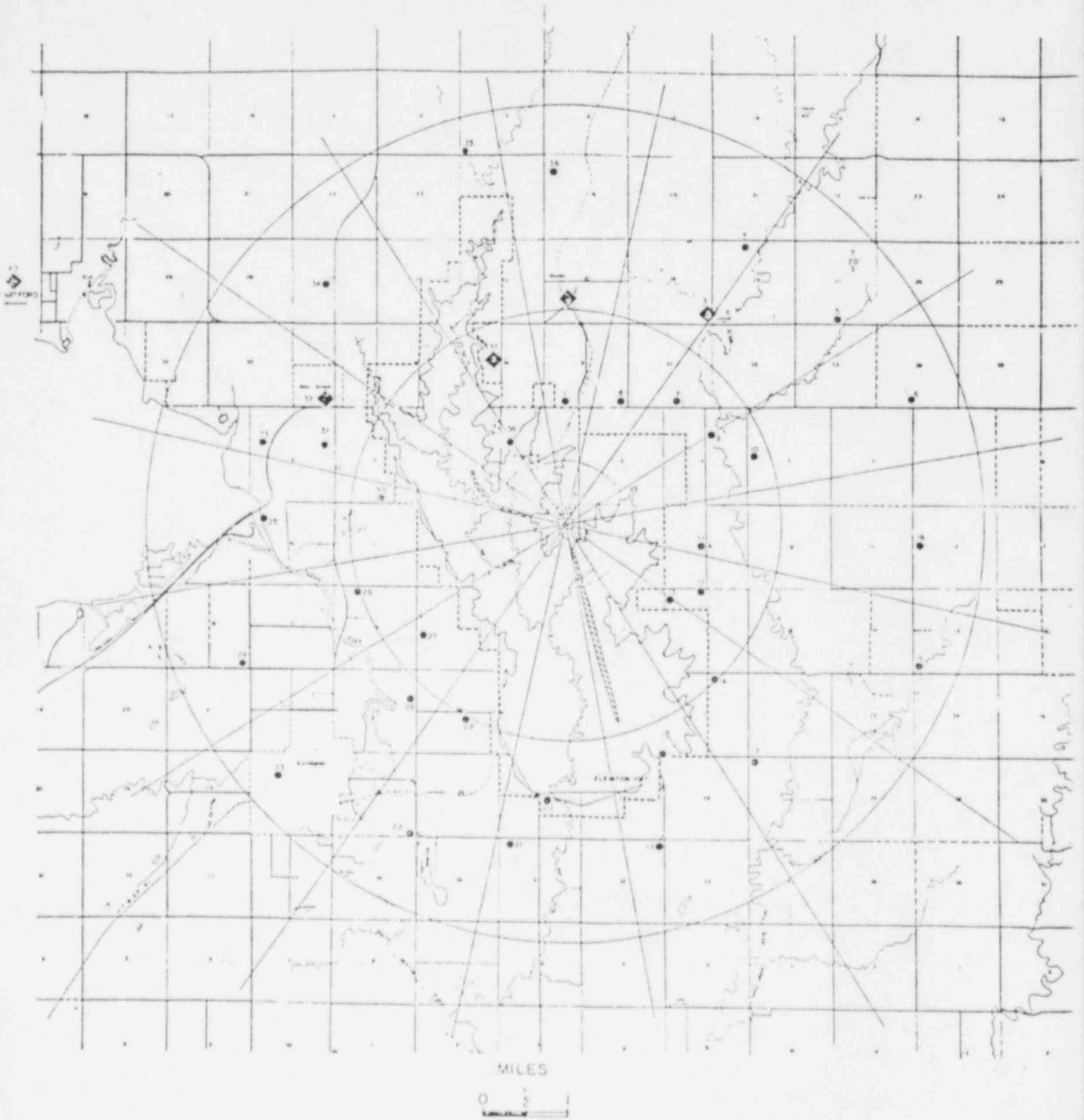

FIGURE 4-1
ATMOSPHERIC PATHWAY SAMPLING

• - TLD
◇ - Particulate, Iodine, and TLD

7-08-85

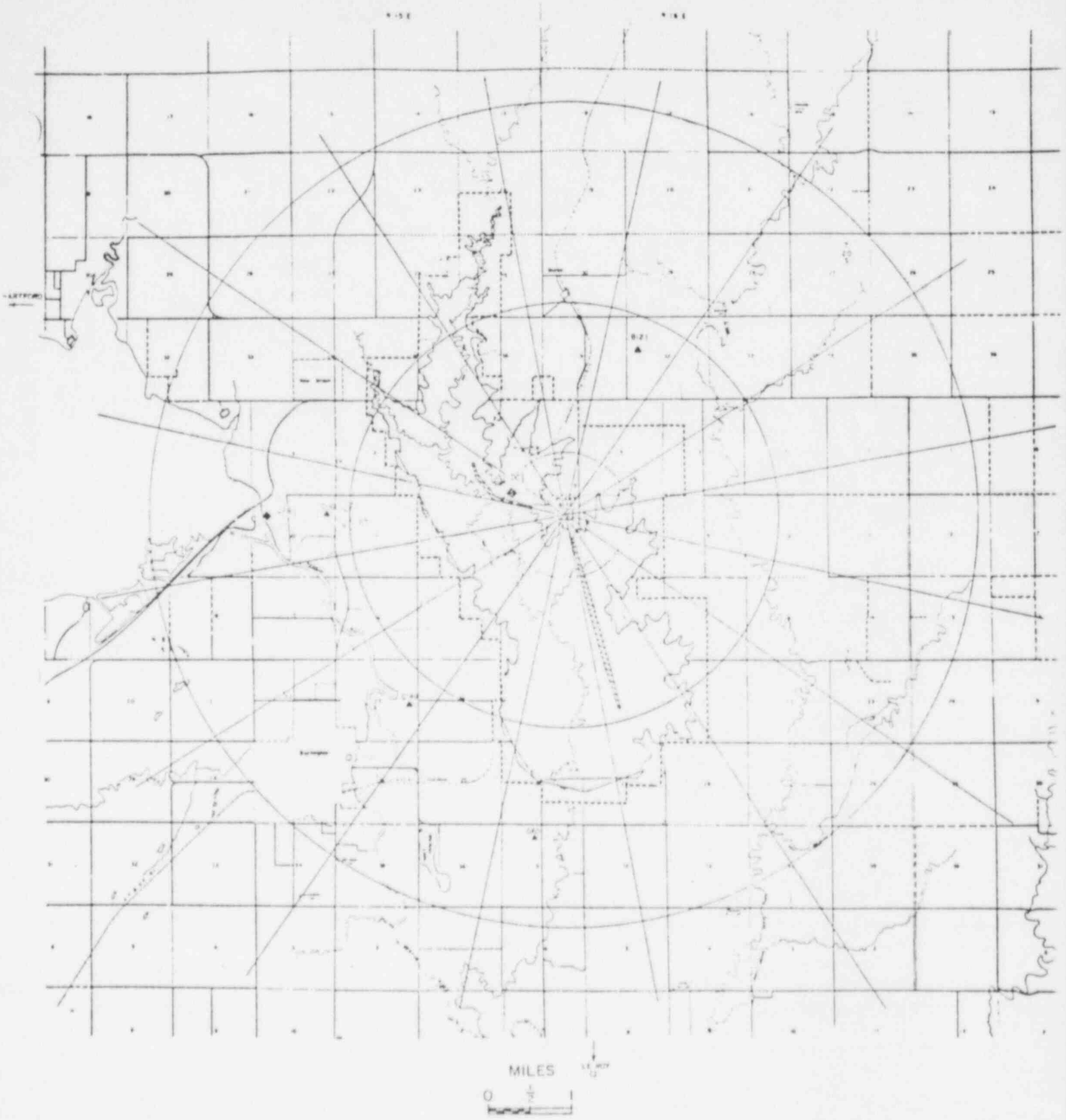

FIGURE 4-2

WATER AND SEDIMENT SAMPLING LOCATIONS

- ◆ – SURFACE WATER
- □ – DRINKING WATER
- ▲ – GROUND WATER
- △ – SHORELINE SEDIMENT

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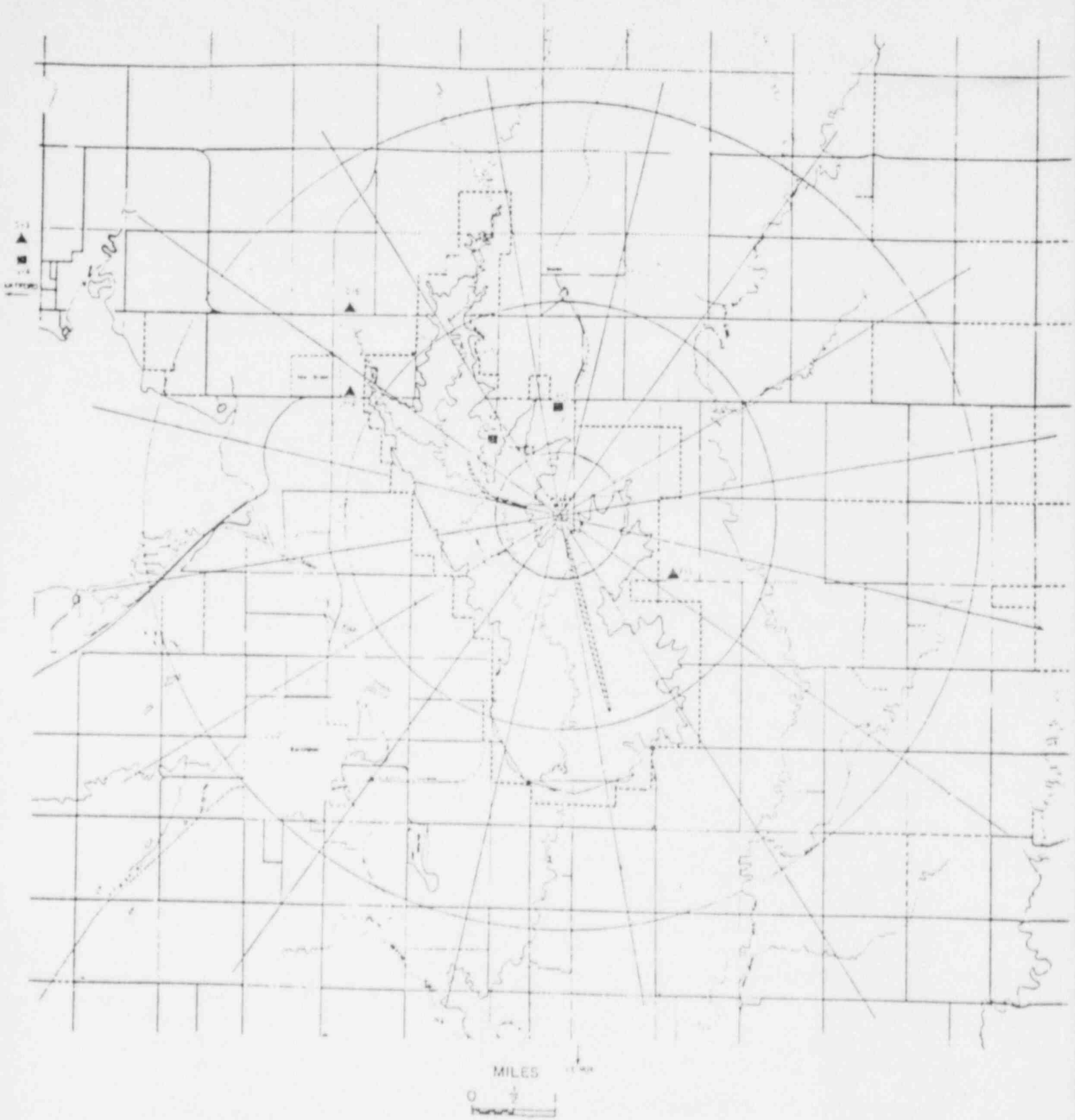
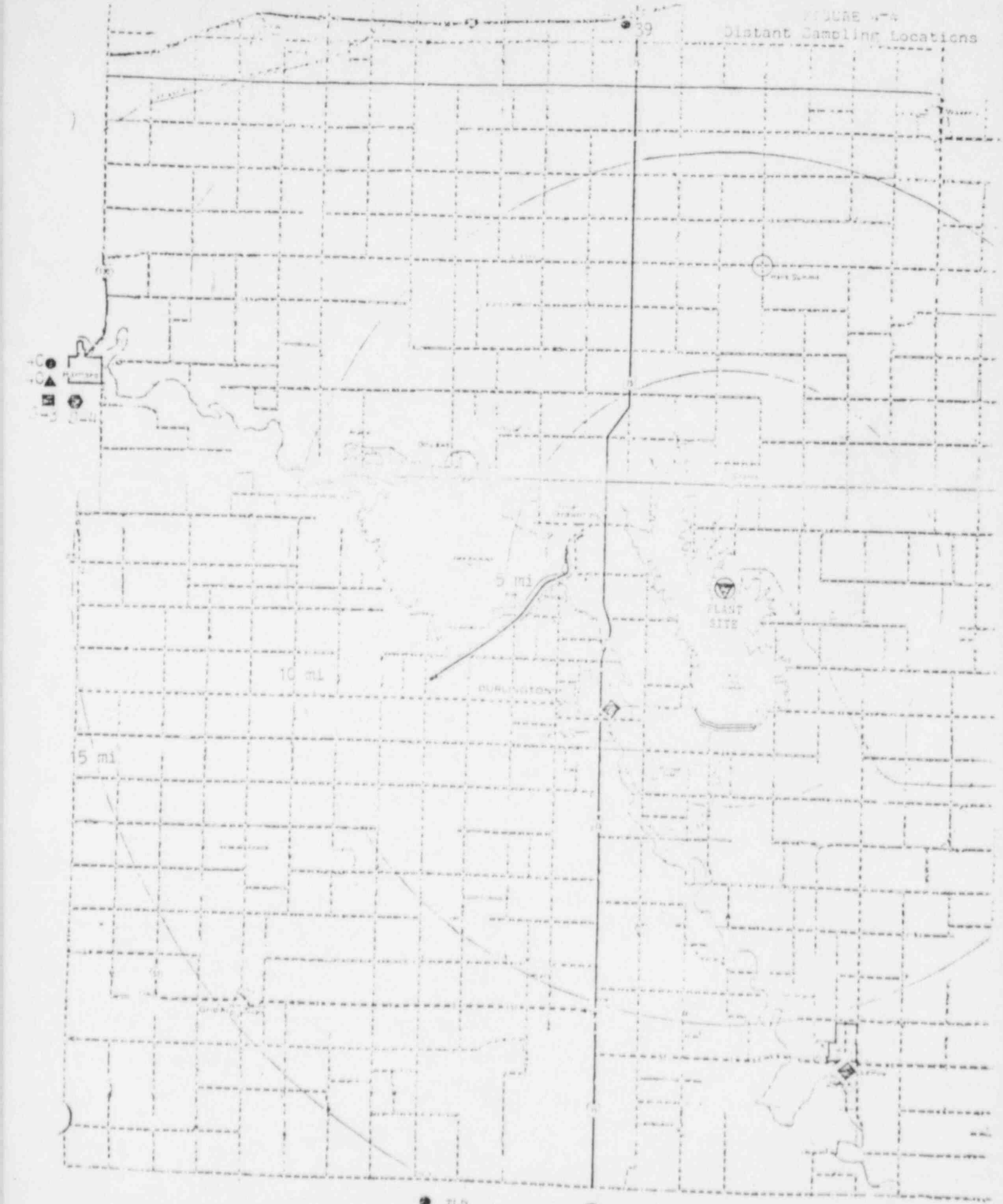


FIGURE 4-3
MILK & VEGETATION SAMPLING LOCATIONS

▲ - Milk
■ - Broadleaf Vegetation

FIGURE 4-4

Distant Sampling Locations



● TLD

▲ Air Particulate

■ Milk

◆ Broadleaf Vegetation

◆ Drinking Water

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TABLE A.5-2

INHALATION PATHWAY FACTOR
MREM/YR per uCi/M^3
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E 01	1.26E 03	1.26E 03	1.26E 03	1.26E 03	1.26E 03	1.26E 03
C-14	1.82E 04	3.41E 03	3.41E 03	3.41E 03	3.41E 03	3.41E 03	3.41E 03
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-01	0.00E-01	0.00E-01	8.64E 04
Cr-51	0.00E 01	0.00E 01	1.00E 02	5.95E 01	2.28E 01	1.44E 04	3.32E 03
Mn-54	0.00E 01	3.96E 04	6.30E 03	0.00E-01	9.84E 03	1.40E 06	7.74E 04
Mn-56	0.00E 01	1.24E 00	1.83E-01	0.00E-01	1.30E 00	9.44E 03	2.02E 04
Fe-55	2.46E 04	1.70E 04	3.94E 03	0.00E-01	0.00E-01	7.21E 04	6.03E 03
Fe-59	1.18E 04	2.78E 04	1.06E 04	0.00E-01	0.00E-01	1.02E 06	1.88E 05
Co-58	0.00E 01	1.58E 03	2.07E 03	0.00E-01	0.00E-01	9.28E 05	1.08E 05
Co-60	0.00E 01	1.15E 04	1.48E 04	0.00E-01	0.00E-01	5.97E 06	2.85E 05
Ni-63	4.32E 05	3.14E 04	1.45E 04	0.00E-01	0.00E-01	1.78E 05	1.34E 04
Ni-65	1.54E 00	2.10E-01	9.12E-02	0.00E-01	0.00E-01	5.60E 03	1.23E 04
Cu-64	0.00E 01	1.46E 00	6.15E-01	0.00E-01	4.62E 00	6.78E 03	4.90E 04
Zn-65	3.24E 04	1.03E 05	4.66E 04	0.00E-01	6.90E 04	8.64E 05	5.34E 04

TABLE A.5-2 (Cont'd)

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Zn-69	3.38E-02	6.51E-02	4.52E-03	0.00E-01	4.22E-02	9.20E 02	1.63E 01
Br-83	0.00E-01	0.00E-01	2.41E 02	0.00E-01	0.00E-01	0.00E-01	2.32E 02
Br-84	0.00E-01	0.00E-01	3.13E 02	0.00E-01	0.00E-01	0.00E-01	1.64E-03
Br-85	0.00E-01	0.00E-01	1.28E 01	0.00E-01	0.00E-01	0.00E-01	8.00E-15
Rb-86	0.00E-01	1.35E 05	5.90E 04	0.00E-01	0.00E-01	0.00E-01	1.66E 04
Rb-88	0.00E-01	3.87E 02	1.93E 02	0.00E-01	0.00E-01	0.00E-01	3.34E-09
Rb-89	0.00E-01	2.56E 02	1.70E 02	0.00E-01	0.00E-01	0.00E-01	9.28E-12
Sr-89	3.04E 05	0.00E-01	8.72E 03	0.00E-01	0.00E-01	1.40E 06	3.50E 05
Sr-90	9.92E 07	0.00E-01	6.10E 06	0.00E-01	0.00E-01	9.60E 06	7.22E 05
Sr-91	6.19E 01	0.00E-01	2.50E 00	0.00E-01	0.00E-01	3.65E 04	1.91E 05
Sr-92	6.74E 00	0.00E-01	2.91E-01	0.00E-01	0.00E-01	1.65E 04	4.30E 04
Y-90	2.09E 03	0.00E-01	5.61E 01	0.00E-01	0.00E-01	1.70E 05	5.06E 05
Y-91M	2.61E-01	0.00E-01	1.02E-02	0.00E-01	0.00L-01	1.92E 03	1.33E 00
Y-91	4.62E 05	0.00E-01	1.24E 04	0.00E-01	0.00E-01	1.70E 06	3.85E 05
Y-92	1.03E 01	0.00E-01	3.02E-01	0.00E-01	0.00E-01	1.57E 04	7.35E 04
Y-93	9.44E 01	0.00E-01	2.61E 00	0.00E-01	0.00E-01	4.85E 04	4.22E 05
Zr-95	1.07E 05	3.44E 04	2.33E 04	0.00E-01	5.42E 04	1.77E 06	1.50E 05
Zr-97	9.68E 01	1.96E 01	9.04E 00	0.00E-01	2.97E 01	7.87E 04	5.23E 05

TABLE A.5-2 (Cont'd)

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Nb-95	1.41E 04	7.82E 03	4.21E 03	0.00E-01	7.74E 03	5.05E 05	1.04E 05
Mo-99	0.00E-01	1.21E 02	2.30E 01	0.00E-01	2.91E 02	9.12E 04	2.48E 05
Tc-99M	1.03E-03	2.91E-03	3.70E-02	0.00E-01	4.42E-02	7.64E 02	4.16E 03
Tc-101	4.18E-05	6.02E-05	5.90E-04	0.00E-01	1.08E-03	3.99E 02	1.09E-11
Ru-103	1.53E 03	0.00E-01	6.58E 02	0.00E-01	5.83E 03	5.05E 05	1.10E 05
Ru-105	7.90E-01	0.00E-01	3.11E-01	0.00E-01	1.02E 00	1.10E 04	4.82E 04
Ru-106	6.91E 04	0.00E-01	8.72E 03	0.00E-01	1.34E 05	9.36E 06	9.12E 05
Ag-110M	1.08E 04	1.00E 04	5.94E 03	0.00E-01	1.97E 04	4.63E 06	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-127M	1.26E 04	5.77E 03	1.57E 03	3.29E 03	4.58E 04	9.60E 05	1.50E 05
Te-127	1.40E 00	6.42E-01	3.10E-01	1.06E 00	5.10E 00	6.51E 03	5.74E 04
Te-129M	9.76E 03	4.67E 03	1.58E 03	3.44E 03	3.66E 04	1.16E 06	3.83E 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-131M	6.99E 01	4.36E 01	2.90E 01	5.50E 01	3.09E 02	1.46E 05	5.56E 05
Te-131	1.11E-02	5.95E-03	3.59E-03	9.36E-02	4.37E-02	1.39E 03	1.84E 01
Te-132	2.60E 02	2.15E 02	1.62E 02	1.90E 02	1.46E 03	2.88E 05	5.10E 05
I-130	4.58E 03	1.34E 04	5.28E 03	1.14E 06	2.09E 04	0.00E-01	7.69E 05
I-131	2.52E 04	3.58E 04	2.05E 04	1.19E 07	6.13E 04	0.00E-01	6.28E 03

TABLE A.5-2 (Cont'd)

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-132	1.16E 03	3.26E 03	1.16E 03	1.14E 05	5.18E 03	0.00E-01	4.06E 02
I-133	8.64E 03	1.48E 04	4.52E 03	2.15E 06	2.58E 04	0.00E-01	8.88E 03
I-134	6.44E 02	1.73E 03	6.15E 02	2.98E 04	2.75E 03	0.00E-01	1.01E 00
I-135	2.68E 03	6.98E 03	2.57E 03	4.48E 05	1.11E 04	0.00E-01	5.25E 03
Cs-134	3.73E 05	8.48E 05	7.28E 05	0.00E-01	2.87E 05	9.76E 04	1.04E 04
Cs-136	3.90E 04	1.46E 05	1.10E 05	0.00E-01	8.56E 04	1.20E 04	1.17E 04
Cs-137	4.78E 05	6.21E 05	4.28E 05	0.00E-01	2.22E 05	7.52E 04	8.40E 03
Cs-138	3.31E 02	6.21E 02	3.24E 02	0.00E-01	4.80E 02	4.86E 01	1.86E-03
Ba-139	9.36E-01	6.66E-04	2.74E-02	0.00E-01	6.22E-04	3.76E 03	8.96E 02
Ba-140	3.90E 04	4.90E 01	2.57E 03	0.00E-01	1.67E 01	1.27E 06	2.18E 05
Ba-141	1.00E-01	7.53E-05	3.36E-03	0.00E-01	7.00E-05	1.94E 03	1.16E-07
Ba-142	2.63E-02	2.70E-05	1.66E-03	0.00E-01	2.29E-05	1.19E 03	1.57E-16
La-140	3.44E 02	1.74E 02	4.58E 01	0.00E-01	0.00E-01	1.36E 05	4.58E 05
La-142	6.83E-01	3.10E-01	7.72E-02	0.00E-01	0.00E-01	6.33E 03	2.11E 03
Ce-141	1.99E 04	1.35E 04	1.53E 03	0.00E-01	6.26E 03	3.62E 05	1.20E 05
Ce-143	1.86E 02	1.38E 02	1.53E 01	0.00E-01	6.08E 01	7.98E 04	2.26E 05
Ce-144	3.43E 06	1.43E 06	1.84E 05	0.00E-01	8.48E 05	7.78E 06	8.16E 05
Pr-143	9.36E 03	3.75E 03	4.64E 02	0.00E-01	2.16E 03	2.81E 05	2.00E 05

TABLE A.5-2 (Cont'd)

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Pr-144	3.10E-02	1.25E-02	1.53E-03	0.00E-01	7.05E-03	1.02E 03	2.15E-08
Nd-147	5.27E 03	6.10E 03	3.65E 02	0.00E-01	3.56E 03	2.21E 05	1.73E 05
W-187	8.48E 00	7.08E 00	2.48E 00	0.00E-01	0.00E-01	2.90E 04	1.55E 05
Np-239	2.30E 02	2.26E 01	1.24E 01	0.00E-01	7.00E 01	3.76E 04	1.19E 05

TABLE A.5-3

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E-01	1.27E 03	1.27E 03	1.27E 03	1.27E 03	1.27E 03	1.27E 03
C-14	2.60E 04	4.87E 03	4.87E 03	4.87E 03	4.87E 03	4.87E 03	4.87E 03
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-01	0.00E-01	0.00E-01	9.28E 04
Cr-51	0.00E-01	0.00E-01	1.35E 02	7.50E 01	3.07E 01	2.10E 04	3.00E 03
Mn-54	0.00E-01	5.11E 04	8.40E 03	0.00E-01	1.27E 04	1.98E 06	6.68E 04
Mn-56	0.00E-01	1.70E 00	2.52E-01	0.00E 01	1.79E 00	1.53E 04	5.74E 04
Fe-55	3.34E 04	2.38E 04	5.54E 03	0.00E 01	0.00E-01	1.24E 05	6.39E 03
Fe-59	1.59E 04	3.70E 04	1.43E 04	0.00E 01	0.00E-01	1.53E 06	1.78E 05
Co-58	0.00E-01	2.07E 03	2.78E 03	0.00E 01	0.00E-01	1.34E 06	9.52E 04
Co-60	0.00E-01	1.51E 04	1.98E 04	0.00E 01	0.00E-01	8.72E 06	2.59E 05
Ni-63	5.80E 05	4.34E 04	1.98E 04	0.00E 01	0.00E-01	3.07E 05	1.42E 04
Ni-65	2.18E 00	2.93E-01	1.27E-01	0.00E 01	0.00E-01	9.36E 03	3.67E 04
Cu-64	0.00E-01	2.03E 00	8.48E-01	0.00E 01	6.41E 00	1.11E 04	6.14E 04
Zn-65	3.86E 04	1.34E 05	6.24E 04	0.00E 01	8.64E 04	1.24E 06	4.66E 04
Zn-69	4.83E-02	9.20E-02	6.46E-03	0.00E 01	6.02E-02	1.58E 03	2.85E 02
Br-83	0.00E-01	0.00E-01	3.44E 02	0.00E 01	0.00E-01	0.00E-01	8.00E-15
Br-84	0.00E-01	0.00E-01	4.33E 02	0.00E 01	0.00E-01	0.00E-01	8.00E-15

TABLE A.5-3 (Cont'd)

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Br-85	0.00E-01	0.00E-01	1.83E 01	0.00E-01	0.00E-01	0.00E-01	8.00E-15
Rb-86	0.00E-01	1.90E 05	8.40E 04	0.00E-01	0.00E-01	0.00E-01	1.77E 04
Rb-88	0.00E-01	5.46E 02	2.72E 02	0.00E-01	0.00E-01	0.00E-01	2.92E-05
Rb-89	0.00E-01	3.52E 02	2.33E 02	0.00E-01	0.00E-01	0.00E-01	3.38E-07
Sr-89	4.34E 05	0.00E-01	1.25E 04	0.00E-01	0.00E-01	2.42E 06	3.71E 05
Sr-90	1.08E 08	0.00E-01	6.68E 06	0.00E-01	0.00E-01	1.65E 07	7.65E 05
Sr-91	8.80E 01	0.00E-01	3.51E 00	0.00E-01	0.00E-01	6.07E 04	2.59E 05
Sr-92	9.52E 00	0.00E-01	4.06E-01	0.00E-01	0.00E-01	2.74E 04	1.19E 05
Y-90	2.98E 03	0.00E-01	8.00E 01	0.00E-01	0.00E-01	2.93E 05	5.59E 05
Y-91M	3.70E-01	0.00E-01	1.42E-02	0.00E-01	0.00E-01	3.20E 03	3.02E 01
Y-91	6.61E 05	0.00E-01	1.77E 04	0.00E-01	0.00E-01	2.94E 06	4.09E 05
Y-92	1.47E 01	0.00E-01	4.29E-01	0.00E-01	0.00E-01	2.68E 04	1.65E 05
Y-93	1.35E 02	0.00E-01	3.72E 00	0.00E-01	0.00E-01	8.32E 04	5.79E 05
Zr-95	1.46E 05	4.58E 04	3.15E 04	0.00E-01	6.74E 04	2.69E 06	1.49E 05
Zr-97	1.38E 02	2.72E 01	1.26E 01	0.00E-01	4.12E 01	1.30E 05	6.30E 05
Nb-95	1.86E 04	1.03E 04	5.66E 03	0.00E-01	1.00E 04	7.51E 05	9.68E 04
Mo-99	0.00E-01	1.69E 02	3.22E 01	0.00E-01	4.11E 02	1.54E 05	2.69E 05
Tc-99M	1.38E-03	3.86E-03	4.99E-02	0.00E-01	5.76E-02	1.15E 03	6.13E 03

TABLE A.5-3 (Cont'd)

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Tc-101	5.92E-05	8.40E-05	8.24E-04	0.00E-01	1.52E-03	6.67E 02	8.72E-07
Ru-103	2.10E 03	0.00E-01	8.96E 02	0.00E-01	7.43E 03	7.83E 05	1.09E 05
Ru-105	1.12E 00	0.00E-01	4.34E-01	0.00E-01	1.41E 00	1.82E 04	9.04E 04
Ru-106	9.84E 04	0.00E-01	1.24E 04	0.00E-01	1.90E 05	1.61E 07	9.60E 05
Ag-110M	1.38E 04	1.31E 04	7.99E 03	0.00E-01	2.50E 04	6.75E 06	2.73E 05
Te-125M	4.88E 03	2.24E 03	6.74E 02	1.40E 03	0.00E-01	5.36E 05	7.50E 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-127	2.01E 00	9.12E-01	4.42E-01	1.42E 00	7.28E 00	1.12E 04	8.08E 01
Te-129M	1.39E 04	6.58E 03	2.25E 03	4.58E 03	5.19E 04	1.98E 06	4.05E 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-131M	9.84E 01	6.01E 01	4.20E 01	7.25E 01	4.39E 02	2.38E 05	6.21E 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-132	3.60E 02	2.90E 02	2.19E 02	2.46E 02	1.95E 03	4.49E 05	4.63E 05
I-130	6.24E 03	1.79E 04	7.17E 03	1.49E 06	2.75E 04	0.00E-01	9.12E 03
I-131	3.54E 04	4.91E 04	2.64E 04	1.46E 07	8.40E 04	0.00E-01	6.49E 03
I-132	1.59E 03	4.38E 03	1.58E 03	1.51E 05	6.92E 03	0.00E-01	1.27E 03
I-133	1.22E 04	2.05E 04	6.22E 03	2.92E 06	3.59E 04	0.00E-01	1.03E 04
I-134	8.88E 02	2.32E 03	8.40E 02	3.95E 04	3.66E 03	0.00E-01	2.04E 01

TABLE A.5-3 (Cont'd)

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-135	3.70E 03	9.44E 03	3.49E 03	6.21E 05	1.49E 04	0.00E-01	6.95E 03
Cs-134	5.02E 05	1.13E 06	5.49E 05	0.00E-01	3.75E 05	1.46E 05	9.76E 03
Cs-136	5.15E 04	1.94E 05	1.37E 05	0.00E-01	1.10E 05	1.78E 04	1.09E 04
Cs-137	6.70E 05	8.48E 05	3.11E 05	0.00E-01	3.04E 05	1.21E 05	8.48E 03
Cs-138	4.66E 02	8.56E 02	4.46E 02	0.00E-01	6.62E 02	7.87E 01	2.70E-01
Ba-139	1.34E 00	9.44E-04	3.90E-02	0.00E-01	8.88E-04	6.46E 03	6.45E 03
Ba-140	5.47E 04	6.70E 01	3.52E 03	0.00E-01	2.28E 01	2.03E 06	2.29E 05
Ba-141	1.42E-01	1.06E-04	4.74E-03	0.00E-01	9.84E-05	3.29E 03	7.46E-04
Ba-142	3.70E-02	3.70E-05	2.27E-03	0.00E-01	3.14E-05	1.91E 03	4.79E-10
La-140	4.79E 02	2.36E 02	6.26E 01	0.00E-01	0.00E-01	2.14E 05	4.87E 05
La-142	9.60E-01	4.25E-01	1.06E-01	0.00E-01	0.00E-01	1.02E 04	1.20E 04
Ce-141	2.84E 04	1.90E 04	2.17E 03	0.00E-01	8.88E 03	6.14E 05	1.26E 05
Ce-143	2.66E 02	1.94E 02	2.16E 01	0.00E-01	8.64E 01	1.30E 05	2.55E 05
Ce-144	4.89E 06	2.02E 06	2.62E 05	0.00E-01	1.21E 06	1.34E 07	8.64E 05
Pr-143	1.34E 04	5.31E 03	6.62E 02	0.00E-01	3.09E 03	4.83E 05	2.14E 05
Pr-144	4.30E-02	1.76E-02	2.18E-03	0.00E-01	1.01E-02	1.75E 03	2.35E-04
Nd-147	7.86E 03	8.56E 03	5.13E 02	0.00E-01	5.02E 03	3.72E 05	1.82E 05
W-187	1.20E 01	9.76E 00	3.43E 00	0.00E-01	0.00E-01	4.74E 04	1.77E 05
Np-239	3.38E 02	3.19E 01	1.77E 01	0.00E-01	1.00E 02	6.49E 04	1.32E 05

TABLE A.5-4

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E-01	1.12E 03	1.12E 03	1.12E 03	1.12E 03	1.12E 03	1.12E 03
C-14	3.59E 04	6.73E 03	6.73E 03	6.73E 03	6.73E 03	6.73E 03	6.73E 03
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-01	0.00E-01	0.00E-01	4.22E 04
Cr-51	0.00E-01	0.00E-01	1.54E 02	0.00E-01	2.43E 01	1.70E 04	1.08E 03
Mn-54	0.00E-01	4.29E 04	9.51E 03	0.00E-01	1.00E 04	1.58E 06	2.29E 04
Mn-56	0.00E-01	1.66E 00	3.12E-01	0.00E-01	1.67E 00	1.31E 04	1.23E 05
Fe-55	4.74E 04	2.52E 04	7.77E 03	0.00E-01	0.00E-01	1.11E 05	2.87E 03
Fe-59	2.07E 04	3.34E 04	1.67E 04	0.00E-01	0.00E-01	1.27E 06	7.07E 04
Co-58	0.00E-01	1.77E 03	3.16E 03	0.00E-01	0.00E-01	1.11E 06	3.44E 04
Co-60	0.00E-01	1.31E 04	2.26E 04	0.00E-01	0.00E-01	7.07E 06	9.62E 04
Ni-63	8.21E 05	4.63E 04	2.80E 04	0.00E-01	0.00E-01	2.75E 05	6.33E 03
Ni-65	2.99E 00	2.96E-01	1.64E-01	0.00E-01	0.00E-01	8.13E 03	8.40E 04
Cu-64	0.00E-01	1.99E 00	1.07E 00	0.0E-01	6.03E 00	9.58E 03	3.67E 04
Zn-65	4.26E 04	1.13E 05	7.03E 04	0.00E-01	7.14E 04	9.95E 05	1.63E 04
Zn-69	6.70E-02	9.66E-02	8.92E-03	0.00E-01	5.85E-02	1.42E 03	1.02E 04
Br-83	0.00E-01	0.00E-01	4.74E 02	0.00E-01	0.00E-01	0.00E-01	3.70E-15
Br-84	0.00E-01	0.00E-01	5.48E 02	0.00E-01	0.00E-01	0.00E-01	3.70E-15

TABLE A.5-4 (Cont'd)

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Br-85	0.00E-01	0.00E-01	2.53E 01	0.00E-01	0.00E-01	0.00E-01	3.70E-15
Rb-86	0.00E-01	1.98E 05	1.14E 05	0.00E-01	0.00E-01	0.00E-01	7.99E 03
Rb-88	0.00E-01	5.62E 02	3.66E 02	0.00E-01	0.00E-01	0.00E-01	1.72E 01
Rb-89	0.00E-01	3.45E 02	2.90E 02	0.00E-01	0.00E-01	0.00E-01	1.89E 00
Sr-85	5.99E 05	0.00E-01	1.72E 04	0.00E-01	0.00E-01	2.16E 06	1.67E 05
Sr-90	1.01E 08	0.00E-01	6.44E 06	0.00E-01	0.00E-01	1.48E 07	3.43E 05
Sr-91	1.21E 02	0.00E-01	4.95E 00	0.00E-01	0.00E-01	5.33E 04	1.74E 05
Sr-92	1.31E 01	0.00E-01	5.25E-01	0.00E-01	0.00E-01	2.40E 04	2.42E 05
Y-90	4.11E 03	0.00E-01	1.11E 02	0.00E-01	0.00E-01	2.62E 05	2.68E 05
Y-91M	5.07E-01	0.00E-01	1.84E-02	0.00E-01	0.00E-01	2.81E 03	1.72E 03
Y-91	9.14E 05	0.00E-01	2.44E 04	0.00E-01	0.00E-01	2.63E 06	1.84E 05
Y-92	2.04E 01	0.00E-01	5.81E-01	0.00E-01	0.00E-01	2.39E 04	2.39E 05
Y-93	1.86E 02	0.00E-01	5.11E 00	0.00E-01	0.00E-01	7.44E 04	3.89E 05
Zr-95	1.90E 05	4.18E 04	3.70E 04	0.00E-01	5.96E 04	2.23E 06	6.11E 04
Zr-97	1.88E 02	2.72E 01	1.60E 01	0.00E-01	3.88E 01	1.13E 05	3.51E 05
Nb-95	2.35E 04	9.18E 03	6.55E 03	0.00E-01	8.62E 03	6.14E 05	3.70E 04
Mo-99	0.00E-01	1.72E 02	4.25E 01	0.00E-01	3.92E 02	1.35E 05	1.27E 05
Tc-99M	1.78E-03	3.48E-03	5.77E-02	0.00E-01	5.07E-02	9.51E 02	4.81E 03

TABLE A.5-4 (Cont'd)

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Tc-101	8.10E-05	8.51E-05	1.08E-03	0.00E-01	1.45E-03	5.85E 02	1.63E 01
Ru-103	2.79E 03	0.00E-01	1.07E 03	0.00E-01	7.03E 03	6.62E 05	4.48E 04
Ru-105	1.53E 00	0.00E-01	5.55E-01	0.00E-01	1.34E 00	1.59E 04	9.95E 04
Ru-106	1.36E 05	0.00E-01	1.69E 04	0.00E-01	1.84E 05	1.43E 07	4.29E 05
Ag-110M	1.69E 04	1.14E 04	9.14E 03	0.00E-01	2.12E 04	5.48E 06	1.00E 05
Te-125M	6.73E 03	2.33E 03	9.14E 02	1.92E 03	0.00E-01	4.77E 05	3.38E 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-127	2.77E 00	9.51E-01	6.10E-01	1.96E 00	7.07E 00	1.00E 04	5.62E 04
Te-129M	1.92E 04	6.85E 03	3.04E 03	6.33E 03	5.03E 04	1.76E 06	1.82E 05
Te-129	9.77E-02	3.50E-02	2.38E-02	7.14E-02	2.57E-01	2.93E 03	2.55E 04
Te-131M	1.34E 02	5.92E 01	5.07E 01	9.77E 01	4.00E 02	2.06E 05	3.08E 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-132	4.81E 02	2.72E 02	2.63E 02	3.17E 02	1.77E 03	3.77E 05	1.38E 05
I-130	8.18E 03	1.64E 04	8.44E 03	1.85E 06	2.45E 04	0.00E-01	5.11E 03
I-131	4.81E 04	4.81E 04	2.73E 04	1.62E 07	7.88E 04	0.00E-01	2.84E 03
I-132	2.12E 03	4.07E 03	1.88E 03	1.94E 05	6.25E 03	0.00E-01	3.20E 03
I-133	1.66E 04	2.03E 04	7.70E 03	3.85E 06	3.38E 04	0.00E-01	5.48E 03
I-134	1.17E 03	2.16E 03	9.95E 02	5.07E 04	3.30E 03	0.00E-01	9.55E 02

TABLE A.5-4 (Cont'd)

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-135	4.92E 03	8.73E 03	4.14E 03	7.92E 05	1.34E 04	0.00E-01	4.44E 03
Cs-134	6.51E 05	1.01E 06	2.25E 05	0.00E-01	3.30E 05	1.21E 05	3.85E 03
Cs-136	6.51E 04	1.71E 05	1.16E 05	0.00E-01	9.55E 04	1.45E 04	4.18E 03
Cs-137	9.07E 05	8.25E 05	1.26E 05	0.00E-01	2.82E 05	1.04E 05	3.62E 03
Cs-138	6.33E 02	8.40E 02	5.55E 02	0.00E-01	6.22E 02	6.81E 01	2.70E 02
Ba-139	1.84E 00	9.84E-04	5.36E-02	0.00E-01	8.62E-04	5.77E 03	5.77E 04
Ba-140	7.40E 04	6.48E 01	4.33E 03	0.00E-01	2.11E 01	1.74E 06	1.02E 05
Ba-141	1.96E-01	1.09E-04	6.36E-03	0.00E-01	9.47E-05	2.92E 03	2.75E 02
Ba-142	4.99E-02	3.60E-05	2.79E-03	0.00E-01	2.91E-05	1.64E 03	2.74E 00
La-140	6.44E 02	2.25E 02	7.55E 01	0.00E-01	0.00E-01	1.83E 05	2.26E 05
La-142	1.29E 00	4.11E-01	1.29E-01	0.00E-01	0.00E-01	8.70E 03	7.59E 04
Ce-141	3.92E 04	1.95E 04	2.90E 03	0.00E-01	8.55E 03	5.44E 05	5.66E 04
Ce-143	3.66E 02	1.99E 02	2.87E 01	0.00E-01	8.36E 01	1.15E 05	1.27E 05
Ce-144	6.77E 06	2.12E 06	3.61E 05	0.00E-01	1.17E 06	1.20E 07	3.89E 05
Pr-143	1.85E 04	5.55E 03	9.14E 02	0.00E-01	3.00E 03	4.33E 05	9.73E 04
Pr-144	5.96E-02	1.85E-02	3.00E-03	0.00E-01	9.77E-03	1.57E 03	1.97E 02
Nd-147	1.08E 04	8.73E 03	6.81E 02	0.00E-01	4.81E 03	3.28E 05	8.21E 04
W-187	1.63E 01	9.66E 00	4.33E 00	0.00E-01	0.00E-01	4.11E 04	9.10E 04
Np-239	4.66E 02	3.34E 01	2.35E 01	0.00E-01	9.73E 01	5.81E 04	6.40E 04

TABLE A-5-3

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
INFANT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E-01	6.47E 02	6.47E 02	6.47E 02	6.47E 02	6.47E 02	6.47E 02
C-14	2.65E 04	5.31E 03	5.31E 03	5.31E 03	5.31E 03	5.31E 03	5.31E 03
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-01	0.00E-01	0.00E-01	1.61E 04
Cr-51	0.00E-01	0.00E-01	8.95E 01	5.75E 01	1.32E 01	1.28E 04	3.57E 02
Mn-54	0.00E-01	2.53E 04	4.98E 03	0.00E-01	4.98E 03	1.00E 06	7.06E 03
Mn-56	0.00E-01	1.54E 00	2.21E-01	0.00E-01	1.10E 00	1.25E 04	7.17E 04
Fe-55	1.97E 04	1.17E 04	3.33E 03	0.00E-01	0.00E-01	8.69E 04	1.09E 03
Fe-59	1.36E 04	2.35E 04	9.48E 03	0.00E-01	0.00E-01	1.02E 06	2.49E 04
Co-58	0.00E-01	1.22E 03	1.82E 03	0.00E-01	0.00E-01	7.77E 05	1.11E 04
Co-60	0.00E-01	8.02E 03	1.18E 04	0.00E-01	0.00E-01	4.51E 06	3.19E 04
Ni-63	3.39E 05	2.04E 04	1.16E 04	0.00E-01	0.00E-01	2.09E 05	2.42E 03
Ni-65	2.39E 00	2.84E-01	1.23E-01	0.00E-01	0.00E-01	8.12E 03	5.01E 04
Cu-64	0.00E-01	1.88E 00	7.74E-01	0.00E-01	3.98E 00	9.30E 03	1.50E 04
Zn-65	1.93E 04	6.26E 04	3.11E 04	0.00E-01	3.25E 04	6.47E 05	5.14E 04
Zn-69	5.39E-02	9.67E-02	7.18E-03	0.00E-01	4.02E-02	1.47E 03	1.32E 04
Br-83	0.00E-01	0.00E-01	3.81E 02	0.00E-01	0.00E-01	0.00E-01	1.40E-15
Br-84	0.00E-01	0.00E-01	4.00E 02	0.00E-01	0.00E-01	0.00E-01	1.40E-15

TABLE A.5-5 (Cont'd)

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
INFANT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Br-85	0.00E-01	0.00E-01	2.04E 01	0.00E-01	0.00E-01	0.00E-01	1.40E-15
Rb-86	0.00E-01	1.90E 05	8.82E 04	0.00E-01	0.00E-01	0.00E-01	3.04E 03
Rb-88	0.00E-01	5.57E 02	2.87E 02	0.00E-01	0.00E-01	0.00E-01	3.39E 02
Rb-89	0.00E-01	3.21E 02	2.06E 02	0.00E-01	0.00E-01	0.00E-01	6.82E 01
Sr-89	3.98E 05	0.00E-01	1.14E 04	0.00E-01	0.00E-01	2.03E 06	6.40E 04
Sr-90	4.09E 07	0.00E-01	2.59E 06	0.00E-01	0.00E-01	1.12E 07	1.31E 05
Sr-91	9.56E 01	0.00E-01	3.46E 00	0.00E-01	0.00E-01	5.26E 04	7.34E 04
Sr-92	1.05E 01	0.00E-01	3.91E-01	0.00E-01	0.00E-01	2.38E 04	1.40E 05
Y-90	3.29E 03	0.00E-01	8.82E 01	0.00E-01	0.00E-01	2.69E 05	1.04E 05
Y-91M	4.07E-01	0.00E-01	1.39E-02	0.00E-01	0.00E-01	2.79E 03	2.35E 03
Y-91	5.88E 05	0.00E-01	1.57E 04	0.00-E01	0.00E-01	2.45E 06	7.03E 04
Y-92	1.64E 01	0.00E-01	4.61E-01	0.00E-01	0.00E-01	2.45E 04	1.27E 05
Y-93	1.50E 02	0.00E-01	4.07E 00	0.00E-01	0.00E-01	7.64E 04	1.67E 05
Zr-95	1.15E 05	2.79E 04	2.03E 04	0.00E-01	3.11E 04	1.75E 06	2.17E 04
Zr-97	1.50E 02	2.56E 01	1.17E 01	0.00E-01	2.59E 01	1.10E 05	1.40E 05
Nb-95	1.57E 04	6.43E 03	3.78E 03	0.00E-01	4.72E 03	4.79E 05	1.27E 04
Mo-99	0.00E-01	1.65E 02	3.23E 01	0.00E-01	2.65E 02	1.35E 05	4.87E 04
Tc-99M	1.40E-04	2.88E-03	3.72E-02	0.00E-01	3.11E-02	8.11E 02	2.03E 03

TABLE A.5-5 (Cont'd)

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
INFANT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Tc-101	6.51E-05	8.23E-05	8.12E-04	0.00E-01	9.79E-04	5.84E 02	8.44E 02
Ru-103	2.02E 03	0.00E-01	6.79E 02	0.00E-01	4.24E 03	5.52E 05	1.61E 04
Ru-105	1.22E 00	0.00E-01	4.10E-01	0.00E-01	8.99E-01	1.57E 04	4.84E 04
Ru-106	8.68E 04	0.00E-01	1.09E 04	0.00E-01	1.07E 05	1.16E 07	1.64E 05
Ag-110M	9.98E 03	7.22E 03	5.00E 03	0.00E-01	1.09E 04	3.67E 06	3.30E 04
Te-125M	4.76E 03	1.99E 03	6.58E 02	1.62E 03	0.00E-01	4.47E 05	1.29E 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-127	2.23E 00	9.53E-01	4.89E-01	1.85E 00	4.86E 00	1.03E 04	2.44E 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-129	7.88E-02	3.47E-02	1.88E-02	6.75E-02	1.75E-01	3.00E 03	2.63E 04
Te-131M	1.07E 02	5.50E 01	3.63E 01	8.93E 01	2.65E 02	1.99E 05	1.19E 05
Te-131	1.74E-02	8.22E-03	5.00E-03	1.58E-02	3.99E-02	2.06E 03	8.22E 03
Te-132	3.72E 02	2.37E 02	1.76E 02	2.79E 02	1.03E 03	3.40E 05	4.41E 04
I-130	6.36E 03	1.39E 04	5.57E 03	1.60E 06	1.53E 04	0.00E-01	1.99E 03
I-131	3.79E 04	4.44E 04	1.96E 04	1.48E 07	5.18E 04	0.00E-01	1.06E 03
I-132	1.69E 03	3.54E 03	1.26E 03	1.69E 05	3.95E 03	0.00E-01	1.90E 03
I-133	1.32E 04	1.92E 04	5.60E 03	3.56E 06	2.24E 04	0.00E-01	2.16E 03
I-134	9.21E 02	1.88E 03	6.65E 02	4.45E 04	2.09E 03	0.00E-01	1.29E 03

TABLE A.5-5 (Cont'd)

INHALATION PATHWAY FACTOR
MREM/YR uCi/M^3
INFANT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-135	3.86E 03	7.60E 03	2.77E 03	6.96E 05	8.47E 03	0.00E-01	1.83E 03
Cs-134	3.96E 05	7.03E 05	7.45E 04	0.00E-01	1.90E 05	7.97E 04	1.33E 03
Cs-136	4.83E 04	1.35E 05	5.29E 04	0.00E-01	5.64E 04	1.18E 04	1.43E 03
Cs-137	5.49E 05	6.12E 05	4.55E 04	0.00E-01	1.72E 05	7.13E 04	1.33E 03
Cs-138	5.05E 02	7.81E 02	3.98E 02	0.00E-01	4.10E 02	6.54E 01	8.76E 02
Ba-139	1.48E 00	9.84E-04	4.30E-02	0.00E-01	5.92E-04	5.95E 03	5.10E 04
Ba-140	5.60E 04	5.60E 01	2.90E 03	0.00E-01	1.34E 01	1.60E 06	3.84E 04
Ba-141	1.57E-01	1.08E-04	4.97E-03	0.00E-01	6.50E-05	2.97E 03	4.75E 03
Ba-142	3.98E-02	3.30E-05	1.96E-03	0.00E-01	1.90E-05	1.55E 03	6.93E 02
La-140	5.05E 02	2.00E 02	5.15E 01	0.00E-01	0.00E-01	1.68E 05	8.48E 04
La-142	1.03E 00	3.77E-01	9.04E-02	0.00E-01	0.00E-01	8.22E 03	5.95E 04
Ce-141	2.77E 04	1.67E 04	1.99E 03	0.00E-01	5.25E 03	5.17E 05	2.16E 04
Ce-143	2.93E 02	1.93E 02	2.21E 01	0.00E-01	5.64E 01	1.16E 05	4.97E 04
Ce-144	3.19E 06	1.21E 06	1.76E 05	0.00E-01	5.38E 05	9.84E 06	1.48E 05
Pr-143	1.40E 04	5.24E 03	6.99E 02	0.00E-01	1.97E 03	4.33E 05	3.72E 04
Pr-144	4.79E-02	1.85E-02	2.41E-03	0.00E-01	6.72E-03	1.61E 03	4.28E 03
Nd-147	7.94E 03	8.13E 03	5.00E 02	0.00E-01	3.15E 03	3.22E 05	3.12E 04
W-187	1.30E 01	9.02E 00	3.12E 00	0.00E-01	0.00E-01	3.96E 05	3.56E 04
Np-239	3.71E 02	3.32E 01	1.88E 01	0.00E-01	6.62E 01	5.95E 04	2.49E 04

TABLE A.5-6

GRASS-COW-MILK PATHWAY FACTOR
M^2-MREM/YR PER uCi/sec
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E-01	7.63E 02	7.63E 02	7.63E 02	7.63E 02	7.63E 02	7.63E 02
C-14	2.63E 08	5.27E 07	5.27E 07	5.27E 07	5.27E 07	5.27E 07	5.27E 07
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	6.60E 08	0.00E-01	0.00E-01	0. 00E-01	1.92E 09
Cr-51	0.00E-01	0.00E-01	2.86E 04	0.00E-01	6.30E 03	3.79E 04	7.19E 06
Mn-54	0.00E-01	8.41E 06	1.61E 06	0.00E-01	0.00E-01	0.00E-01	2.58E 07
Mn-56	0.00E-01	4.16E-03	7.38E-04	0.00E-01	5.28E-03	0.00E-01	1.33E-01
Fe-55	2.51E 07	1.73E 07	4.04E 06	0.00E-01	0.00E-01	9.67E 06	9.95E 06
Fe-59	2.97E 07	6.98E 07	2.68E 07	0.00E-01	0.00E-01	1.95E 07	2.33E 08
Co-58	0.00E-01	4.71E 06	1.06E 07	0.00E-01	0.00E-01	0.00E-01	9.56E 07
Co-60	0.00E-01	1.64E 07	3.62E 07	0.00E-01	0.00E-01	0.00E-01	3.08E 08
Ni-63	6.73E 09	4.71E 08	2.26E 08	0.00E-01	0.00E-01	0.00E-01	9.73E 07
Ni-65	4.63E-01	6.02E-02	2.75E-02	0.00E-01	0.00E-01	0.00E-01	1.53E 00
Cu-64	0.00E-01	2.39E 04	1.12E 04	0.00E-01	6.02E 04	0.00E-01	2.03E 06
Zn-65	1.37E 09	4.37E 09	1.97E 09	0.00E-01	2.92E 09	0.00E-01	2.75E 09
Zn-69	5.22E-12	9.99E-12	6.95E-13	0.00E-01	6.49E-12	0.00E-01	1.50E-12
Br-83	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Br-84	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01

TABLE A.5-6 (Cont'd)

GRASS-COW-MILK PATHWAY FACTOR
M^2•MREM/YR PER uCi/sec
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Br-85	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-86	0.00E-01	2.59E 09	1.21E 09	0.00E-01	0.00E-01	0.00E-01	5.12E 08
Rb-88	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-89	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Sr-89	1.45E 09	0.00E-01	4.16E 07	0.00E-01	0.00E-01	0.00E-01	2.33E 08
Sr-90	4.68E 10	0.00E-01	1.15E 10	0.00E-01	0.00E-01	0.00E-01	1.35E 09
Sr-91	2.87E 04	0.00E-01	1.16E 03	0.00E-01	0.00E-01	0.00E-01	1.37E 05
Sr-92	4.90E-01	0.00E-01	2.12E-02	0.00E-01	0.00E-01	0.00E-01	9.70E 00
Y-90	7.07E 01	0.00E-01	1.90E 00	0.00E-01	0.00E-01	0.00E-01	7.50E 05
Y-91M	6.03E-20	0.00E-01	2.34E-21	0.00E-01	0.00E-01	0.00E-01	1.77E-19
Y-91	8.59E 03	0.00E-01	2.30E 02	0.00E-01	0.00E-01	0.00E-01	4.73E 06
Y-92	5.59E-05	0.00E-01	1.63E-06	0.00E-01	0.00E-01	0.00E-01	9.79E-01
Y-93	2.33E-01	0.00E-01	6.44E-03	0.00E-01	0.00E-01	0.00E-01	7.39E 03
Zr-95	9.44E 02	3.03E 02	2.05E 02	0.00E-01	4.75E 02	0.00E-01	9.59E 05
Zr-97	4.33E-01	8.75E-05	4.00E-02	0.00E-01	1.32E-01	0.00E-01	2.71E 04
Nb-95	8.26E 04	4.59E 04	2.47E 04	0.00E-01	4.54E 04	0.00E-01	2.79E 08
Mo-99	0.00E-01	2.48E 07	4.71E 06	0.00E-01	5.61E 07	0.00E-01	5.74E 07
Tc-99M	3.33E 00	9.40E 00	1.20E 02	0.00E-01	1.43E 02	4.60E 00	5.56E 03

TABLE A.5-6 (Cont'd)

GRASS-COW-MILK PATHWAY FACTOR
M^2-MREM/YR PER uCi/sec
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Tc-101	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ru-103	1.02E 03	0.00E-01	4.38E 02	0.00E-01	3.88E 03	0.00E-01	1.19E 05
Ru-105	8.58E-04	0.00E-01	3.39E-04	0.00E-01	1.11E-02	0.00E-01	5.25E-01
Ru-106	2.04E 04	0.00E-01	2.58E 03	0.00E-01	3.94E 04	0.00E-01	1.32E 06
Ag-110M	5.82E 07	5.39E 07	3.20E 07	0.00E-01	1.06E 08	0.00E-01	2.20E 10
Te-125M	1.63E 07	5.90E 06	2.18E 06	4.90E 06	6.63E 07	0.00E-01	6.50E 07
Te-127M	4.58E 07	1.64E 07	5.53E 06	1.17E 07	1.86E 08	0.00E-01	1.54E 08
Te-127	6.54E 02	2.35E 02	1.41E 02	4.84E 02	2.66E 03	0.00E-01	5.16E 04
Te-129M	6.02E 07	2.25E 07	9.53E 06	2.07E 07	2.51E 08	0.00E-01	3.03E 08
Te-129	2.84E-10	1.07E-10	6.29E-11	2.18E-10	1.19E-09	0.00E-01	2.14E-11
Te-131M	3.61E 05	1.77E 05	1.47E 05	2.80E 05	1.79E 06	0.00E-01	1.73E 07
Te-131	3.67E-33	1.53E-33	1.16E-33	3.01E-33	1.61E-32	0.00E-01	0.00E-01
Te-132	2.40E 06	1.55E 06	1.46E 06	1.72E 06	1.50E 07	0.00E-01	7.35E 07
I-130	4.20E 05	1.24E 06	4.89E 05	1.05E 08	1.94E 06	0.00E-01	1.07E 06
I-131	2.96E 08	4.24E 08	2.43E 08	1.39E 11	7.26E 08	0.00E-01	1.12E 08
I-132	1.65E-01	4.41E-01	1.54E-01	1.54E 01	7.02E-01	0.00E-01	8.28E-02
I-133	3.87E 06	6.73E 06	2.05E 06	9.90E 08	1.18E 07	0.00E-01	6.05E 06
I-134	2.03E-12	5.52E-12	1.98E-12	9.57E-11	8.78E-12	0.00E-01	4.81E-15

TABLE A.5-6 (Cont'd)

GRASS-COW-MILK PATHWAY FACTOR
M^2-MREM/YR PER uCi/sec
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-135	1.29E 04	3.37E 04	1.24E 04	2.22E 06	5.40E 04	0.00E-01	3.80E 04
Cs-134	5.65E 09	1.35E 10	1.10E 10	0.00E-01	4.35E 09	1.45E 09	2.35E 08
Cs-136	2.61E 08	1.03E 09	7.42E 08	0.00E-01	5.73E 08	7.86E 07	1.17E 08
Cs-137	7.38E 09	1.01E 10	6.61E 09	0.00E-01	3.43E 09	1.14E 09	1.95E 08
Cs-138	9.16E-24	1.81E-23	8.97E-24	0.00E-01	1.33E-23	1.31E-24	7.72E-29
Ba-139	4.56E-08	3.25E-11	1.34E-09	0.00E-01	3.04E-11	1.84E-11	8.09E-08
Ba-140	2.69E 07	3.38E 04	1.76E 06	0.00E-01	1.15E 04	1.93E 04	5.54E 07
Ba-141	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ba-142	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
La-140	4.52E 00	2.28E 00	6.02E-01	0.00E-01	0.00E-01	0.00E-01	1.67E 05
La-142	9.39E-12	4.27E-12	1.06E-12	0.00E-01	0.00E-01	0.00E-01	3.12E-08
Ce-141	4.84E 03	3.28E 03	3.72E 02	0.00E-01	1.52E 03	0.00E-01	1.25E 07
Ce-143	4.16E 01	3.07E 04	3.40E 00	0.00E-01	1.35E 01	0.00E-01	1.15E 06
Ce-144	3.58E 05	1.50E 05	1.92E 04	0.00E-01	8.87E 04	0.00E-01	1.21E 08
Pr-143	1.58E 02	6.33E 01	7.83E 00	0.00E-01	3.66E 01	0.00E-01	6.92E 05
Pr-144	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Nd-147	9.46E 01	1.09E 02	6.55E 00	0.00E-01	6.40E 01	0.00E-01	5.25E 05
W-187	6.56E 03	5.49E 03	1.92E 03	0.00E-01	0.00E-01	0.00E-01	1.80E 06
Np-239	3.67E 00	3.61E-01	1.99E-01	0.00E-01	1.13E 00	0.00E-01	7.41E 04

TABLE A.5-7

GRASS-COW-MILK PATHWAY FACTOR
M^2•MREM/YR PER uCi/sec
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E-01	9.94E 02	9.94E 02	9.94E 02	9.94E 02	9.94E 02	9.94E 02
C-14	4.86E 08	9.72E 07	9.72E 07	9.72E 07	9.72E 07	9.72E 07	9.72E 07
Na-24	4.26E 06	4.26E 06	4.26E 06	4.26E 06	4.26E 06	4.26E 06	4.26E 06
P-32	3.15E 10	1.95E 09	1.22E 09	0.00E-01	0.00E-01	0.00E-01	2.65E 09
Cr-51	0.00E-01	0.00E-01	4.99E 04	2.77E 04	1.09E 04	7.13E 04	8.39E 06
Mn-54	0.00E-01	1.40E 07	2.78E 06	0.00E-01	4.18E 06	0.00E-01	2.87E 07
Mn-56	0.00E-01	7.37E-03	1.31E-03	0.00E-01	9.33E-03	0.00E-01	4.85E-01
Fe-55	4.45E 07	3.16E 07	7.36E 06	0.00E-01	0.00E-01	2.00E 07	1.37E 07
Fe-59	5.18E 07	1.21E 08	4.67E 07	0.00E-01	0.00E-01	3.81E 07	2.86E 08
Co-58	0.00E-01	7.94E 06	1.83E 07	0.00E-01	0.00E-01	0.00E-01	1.09E 08
Co-60	0.00E-01	2.78E 07	6.26E 07	0.00E-01	0.00E-01	0.00E-01	3.62E 08
Ni-63	1.18E 10	8.35E 08	4.01E 08	0.00E-01	0.00E-01	0.00E-01	1.33E 08
Ni-65	8.48E-01	1.08E-01	4.94E-02	0.00E-01	0.00E-01	0.00E-01	5.88E 00
Cu-64	0.00E-01	4.25E 04	2.00E 04	0.00E-01	1.08E 05	0.00E-01	3.30E 06
Zn-65	2.11E 09	7.31E 09	3.41E 09	0.00E-01	4.68E 09	0.00E-01	3.10E 09
Zn-69	9.62E-12	1.83E-11	1.28E-12	0.00E-01	1.20E-11	0.00E-01	3.38E-11
Br-83	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Br-84	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01

TABLE A.5-7 (Cont'd)

GRASS-COW-MILK PATHWAY FACTOR
M^2-MREM/YR PER uCi/sec
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Br-85	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-86	0.00E-01	4.73E 09	2.22E 09	0.00E-01	0.00E-01	0.00E-01	7.00E 08
Rb-88	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-89	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Sr-89	2.67E 09	0.00E-01	7.66E 07	0.00E-01	0.00E-01	0.00E-01	3.19E 08
Sr-90	6.61E 10	0.00E-01	1.63E 10	0.00E-01	0.00E-01	0.00E-01	1.86E 09
Sr-91	5.27E 04	0.00E-01	2.10E 03	0.00E-01	0.00E-01	0.00E-01	2.39E 05
Sr-92	8.96E-01	0.00E-01	3.82E-02	0.00E-01	0.00E-01	0.00E-01	2.28E 01
Y-90	1.30E 02	0.00E-01	3.50E 00	0.00E-01	0.00E-01	0.00E-01	1.07E 06
Y-91M	1.11E-19	0.00E-01	4.22E-21	0.00E-01	0.00E-01	0.00E-01	5.22E-18
Y-91	1.58E 04	0.00E-01	4.24E 02	0.00E-01	0.00E-01	0.00E-01	6.48E 06
Y-92	1.03E-04	0.00E-01	2.99E-06	0.00E-01	0.00E-01	0.00E-01	2.83E 00
Y-93	4.30E-01	0.00E-01	1.18E-02	0.00E-01	0.00E-01	0.00E-01	1.31E 04
Zr-95	1.65E 03	5.21E 02	3.58E 02	0.00E-01	7.65E 02	0.00E-01	1.20E 06
Zr-97	7.89E-01	1.56E-01	7.19E-02	0.00E-01	2.37E-01	0.00E-01	4.23E 04
Nb-95	1.41E 05	7.81E 04	4.30E 04	0.00E-01	7.57E 04	0.00E-01	3.34E 08
Mo-99	0.00E-01	4.47E 07	8.53E 06	0.00E-01	1.02E 08	0.00E-01	8.01E 07
Tc-99M	5.77E 00	1.61E 01	2.08E 02	0.00E-01	2.40E 02	8.93E 00	1.06E 04

TABLE A.5-7 (Cont'd)

GRASS-COW-MILK PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Tc-101	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ru-103	1.81E 03	0.00E-01	7.74E 02	0.00E-01	6.38E 03	0.00E-01	1.51E 05
Ru-105	1.57E-03	0.00E-01	6.08E-04	0.00E-01	1.98E-02	0.00E-01	1.27E 00
Ru-106	3.75E 04	0.00E-01	4.73E 03	0.00E-01	7.23E 04	0.00E-01	1.80E 06
Ag-110M	9.63E 07	9.11E 07	5.54E 07	0.00E-01	1.74E 08	0.00E-01	2.56E 10
Te-125M	3.00E 07	1.08E 07	4.02E 06	8.39E 06	0.00E-01	0.00E-01	8.86E 07
Te-127M	8.44E 07	2.99E 07	1.00E 07	2.01E 07	3.42E 08	0.00E-01	2.10E 08
Te-127	1.21E 03	4.29E 02	2.61E 02	8.36E 02	4.91E 03	0.00E-01	9.35E 04
Te-129M	1.10E 08	4.09E 07	1.74E 07	3.55E 07	4.61E 08	0.00E-01	4.13E 08
Te-129	5.23E-10	1.95E-10	1.27E-10	3.74E-10	2.20E-09	0.00E-01	2.86E-09
Te-131M	6.57E 05	3.15E 05	2.63E 05	4.74E 05	3.29E 06	0.00E-01	2.53E 07
Te-131	6.70E-33	2.76E-33	2.09E-33	5.16E-33	2.93E-32	0.00E-01	5.50E-34
Te-132	4.29E 06	2.72E 06	2.56E 06	2.87E 06	2.61E 07	0.00E-01	8.61E 07
I-130	7.39E 05	2.14E 06	8.54E 05	1.74E 08	3.26E 06	0.00E-01	1.64E 06
I-131	5.37E 08	7.52E 08	4.04E 08	2.20E 11	1.30E 09	0.00E-01	1.49E 08
I-132	2.92E-01	7.65E-01	2.74E-01	2.58E 01	1.20E 00	0.00E-01	3.33E-01
I-133	7.07E 06	1.20E 07	3.66E 06	1.67E 09	2.10E 07	0.00E-01	9.08E 06
I-134	3.61E-12	9.58E-12	3.44E-12	1.60E-10	1.51E-11	0.00E-01	1.26E-13

TABLE A.5-7 (Cont'd)

GRASS-COW-MILK PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-135	2.28E 04	5.88E 04	2.18E 04	3.78E 06	9.28E 04	0.00E-01	6.51E 04
Cs-134	9.82E 09	2.31E 10	1.07E 10	0.00E-01	7.34E 09	2.80E 09	2.87E 08
Cs-136	4.44E 08	1.75E 09	1.17E 09	0.00E-01	9.52E 08	1.50E 08	1.41E 08
Cs-137	1.34E 10	1.78E 10	6.20E 09	0.00E-01	6.06E 09	2.35E 09	2.53E 08
Cs-138	1.66E-23	3.19E-23	1.60E-23	0.00E-01	2.36E-23	2.74E-24	1.45E-26
Ba-139	8.44E-08	5.94E-11	2.46E-09	0.00E-01	5.60E-11	4.09E-11	7.53E-07
Ba-140	4.85E 07	5.95E 04	3.13E 06	0.00E-01	2.02E 04	4.00E 04	7.48E 07
Ba-141	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ba-142	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
La-140	8.12E 00	3.99E 00	1.06E 00	0.00E-01	0.00E-01	0.00E-01	2.29E 05
La-142	1.69E-11	7.52E-12	1.87E-12	0.00E-01	0.00E-01	0.00E-01	2.29E-07
Ce-141	8.88E 03	5.93E 03	6.81E 02	0.00E-01	2.79E 03	0.00E-01	1.70E 07
Ce-143	7.64E 01	5.56E 04	6.21E 00	0.00E-01	2.49E 01	0.00E-01	1.67E 06
Ce-144	6.58E 05	2.72E 05	3.54E 04	0.00E-01	1.63E 05	0.00E-01	1.66E 08
Pr-143	2.90E 02	1.16E 02	1.44E 01	0.00E-01	6.73E 01	0.00E-01	9.55E 05
Pr-144	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Nd-147	1.82E 02	1.98E 02	1.19E 01	0.00E-01	1.16E 02	0.00E-01	7.15E 05
W-187	1.20E 04	9.78E 03	3.43E 03	0.00E-01	0.00E-01	0.00E-01	2.65E 06
Np-239	7.01E 00	6.61E-01	3.67E-01	0.00E-01	2.07E 00	0.00E-01	1.06E 05

TABLE A.5-8

GRASS-COW-MILK PATHWAY FACTOR
M^2-MREM/YR PER uCi/sec
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E-01	1.57E 03	1.57E 03	1.57E 03	1.57E 03	1.57E 03	1.57E 03
C-14	1.19E 09	2.39E 08	2.39E 08	2.39E 08	2.39E 08	2.39E 08	2.39E 08
Na-24	8.86E 06	8.86E 06	8.86E 06	8.86E 06	8.86E 06	8.86E 06	8.86E 06
P-32	7.77E 10	3.64E 09	3.00E 09	0.00E-01	0.00E-01	0.00E-01	2.15E 09
Cr-51	0.0E-01	0.00E-01	1.02E 05	5.65E 04	1.54E 04	1.03E 05	5.40E 06
Mn-54	0.00E-01	2.10E 07	5.59E 06	0.00E-01	5.88E 06	0.00E-01	1.76E 07
Mn-56	0.00E-01	1.29E-02	2.90E-03	0.00E-01	1.56E-02	0.00E-01	1.86E 00
Fe-55	1.12E 08	5.93 E07	1.84E 07	0.00E-01	0.00E-01	3.35E 07	1.10E 07
Fe-59	1.20E 08	1.94E 08	9.69E 07	0.00E-01	0.00E-01	5.64E 07	2.02E 08
Co-58	0.00E-01	1.21E 07	3.71E 07	0.00E-01	0.00E-01	0.00E-01	7.07E 07
Co-60	0.00E-01	4.32E 07	1.27E 08	0.00E-01	0.00E-01	0.00E-01	2.39E 08
Ni-63	2.96E 10	1.59E 09	1.01E 09	0.00E-01	0.00E-01	0.00E-01	1.07E 08
Ni-65	2.07E 00	1.95E-01	1.14E-01	0.00E-01	0.00E-01	0.00E-01	2.39E 01
Cu-64	0.00E-01	7.47E 04	4.51E 04	0.00E-01	1.81E 05	0.00E-01	3.51E 06
Zn-65	4.13E 09	1.10E 10	6.85E 09	0.00E-01	6.94E 09	0.00E-01	1.93E 09
Zn-69	2.36E-11	3.42E-11	3.16E-12	0.00E-01	2.07E-11	0.00E-01	2.15E-09
Br-83	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Br-84	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01

GRASS-COW-MILK PATHWAY FACTOR
M^2-MREM/YR PER uCi/sec
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Br-85	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-86	0.00E-01	8.77E 09	5.39E 09	0.00E-01	0.00E-01	0.00E-01	5.64E 08
Rb-88	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-89	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Sr-89	6.62E 09	0.00E-01	1.89E 08	0.00E-01	0.00E-01	0.00E-01	2.56E 08
Sr-90	1.12E 11	0.00E-01	2.83E 10	0.00E-01	0.00E-01	0.00E-01	1.50E 09
Sr-91	1.29E 05	0.00E-01	4.88E 03	0.00E-01	0.00E-01	0.00E-01	2.85E 05
Sr-92	2.19E 00	0.00E-01	8.78E-02	0.00E-01	0.00E-01	0.00E-01	4.15E 01
Y-90	3.32E 02	0.00E-01	8.91E 00	0.00E-01	0.00E-01	0.00E-01	9.07E 04
Y-91M	2.70E-19	0.00E-01	9.82E-21	0.00E-01	0.00E-01	0.00E-01	5.29E-16
Y-91	3.90E 04	0.00E-01	1.04E 01	0.00E-01	0.00E-01	0.00E-01	5.20E 06
Y-92	2.54E-04	0.00E-01	7.26E-06	0.00E-01	0.00E-01	0.00E-01	7.33E 00
Y-93	1.06E 00	0.00E-01	2.90E-02	0.00E-01	0.00E-01	0.00E-01	1.57E 04
Zr-95	3.83E 03	8.43E 02	7.50E 02	0.00E-01	1.21E 03	0.00E-01	8.79E 05
Zr-97	1.92E 00	2.77E-01	1.64E-01	0.00E-01	3.98E-01	0.00E-01	4.20E 04
Nb-95	3.18E 05	1.24E 05	8.85E 04	0.00E-01	1.16E 05	0.00E-01	2.29E 08
Mo-99	0.00E-01	8.14E 07	2.01E 07	0.00E-01	1.74E 08	0.00E-01	6.73E 07
Tc-99M	1.32E 01	2.59E 01	4.30E 02	0.00E-01	3.77E 02	1.32E 01	1.48E 04

GRASS-COW-MILK PATHWAY FACTOR
M^2•MREM/YR PER uCi/sec
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Tc-101	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ru-103	4.28E 03	0.00E-01	1.65E 03	0.00E-01	1.08E 04	0.00E-01	1.11E 05
Ru-105	3.83E-03	0.00E-01	1.39E-03	0.00E-01	3.36E-02	0.00E-01	2.50E 00
Ru-106	9.24E 04	0.00E-01	1.15E 04	0.00E-01	1.25E 05	0.00E-01	1.44E 06
Ag-110M	2.09E 08	1.41E 08	1.13E 08	0.00E-01	2.63E 08	0.00E-01	1.68E 10
Te-125M	7.38E 07	2.00E 07	9.84E 06	2.07E 07	0.00E-01	0.00E-01	7.12E 07
Te-127M	2.08E 08	5.60E 07	2.47E 07	4.97E 07	5.93E 08	0.00E-01	1.68E 08
Te-127	2.98E 03	8.03E 02	6.39E 02	2.06E 03	8.47E 03	0.00E-01	1.16E 05
Te-129M	2.71E 08	7.58E 07	2.54E 07	8.73E 07	7.97E 08	0.00E-01	3.31E 08
Te-129	1.29E-09	3.60E-10	3.06E-10	9.21E-10	3.78E-09	0.00E-01	8.03E-08
Te-131M	1.60E 06	5.53E 05	5.89E 05	1.14E 06	5.36E 06	0.00E-01	2.24E 07
Te-131	1.64E-32	5.01E-33	4.89E-33	1.26E-32	4.97E-32	0.00E-01	8.64E-32
Te-132	1.02E 07	4.54E 06	5.48E 06	6.61E 06	4.21E 07	0.00E-01	4.57E 07
I-130	1.73E 06	3.49E 06	1.80E 06	3.85E 08	5.22E 06	0.00E-01	1.63E 06
I-131	1.30E 09	1.31E 09	7.45E 08	4.33E 11	2.15E 09	0.00E-01	1.17E 08
I-132	6.91E-01	1.27E 00	5.84E-01	5.89E 01	1.94E 00	0.00E-01	1.49E 00
I-133	1.72E 07	2.12E 07	8.04E 06	3.95E 09	3.54E 07	0.00E-01	8.56E 06
I-134	8.55E-12	1.59E-11	7.31E-12	3.65E-10	2.43E-11	0.00E-01	1.05E-11

GRASS-COW-MILK PATHWAY FACTOR
M^2•MREM/YR PER uCi/sec
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-135	5.41E 04	9.73E 04	4.60E 04	8.62E 06	1.49E 05	0.00E-01	7.41E 04
Cs-134	2.27E 10	3.72E 10	7.84E 09	0.00E-01	1.15E 10	4.13E 09	2.00E 08
Cs-136	1.00E 09	2.76E 09	1.78E 09	0.00E-01	1.47E 09	2.19E 08	9.69E 07
Cs-137	3.22E 10	3.09E 10	4.55E 09	0.00E-01	1.01E 10	3.62E 09	1.93E 08
Cs-138	4.03E-23	5.60E-23	3.55E-23	0.00E-01	3.94E-23	4.24E-24	2.58E-23
Ba-139	2.07E-07	1.11E-10	6.01E-09	0.00E-01	9.67E-11	6.51E-11	1.20E-05
Ba-140	1.17E 08	1.03E 05	6.84E 06	0.00E-01	3.34E 04	6.12E 04	5.94E 07
Ba-141	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ba-142	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
La-140	1.94E 01	6.80E 00	2.29E 00	0.00E-01	0.00E-01	0.00E-01	1.89E 05
La-142	4.09E-11	1.30E-11	4.08E-12	0.00E-01	0.00E-01	0.00E-01	2.58E-06
Ce-141	2.19E 04	1.09E 04	1.62E 03	0.00E-01	4.78E 03	0.00E-01	1.36E 07
Ce-143	1.88E 02	1.02E 05	1.47E 01	0.00E-01	4.27E 01	0.00E-01	1.49E 06
Ce-144	1.62E 06	5.09E 05	8.66E 04	0.00E-01	2.82E 05	0.00E-01	1.33E 08
Pr-143	7.18E 02	2.16E 02	3.56E 01	0.00E-01	1.17E 02	0.00E-01	7.75E 05
Pr-144	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Nd-147	4.47E 02	3.62E 02	2.80E 01	0.00E-01	1.99E 02	0.00E-01	5.73E 05
W-187	2.91E 04	1.72E 04	7.73E 03	0.00E-01	0.00E-01	0.00E-01	2.42E 06
Np-239	1.72E 01	1.24E 00	8.70E-01	0.00E-01	3.58E 00	0.00E-01	9.16E 04

GRASS-COW-MILK PATHWAY FACTOR
M^2•MREM/YR PER uCi/sec
INFANT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E-01	2.38E 03	2.38E 03	2.38E 03	2.38E 03	2.83E 03	2.83E 03
C-14	2.34E 09	5.00E 08	5.00E 08	5.00E 08	5.00E 08	5.00E 08	5.00E 08
Na-24	1.54E 07	1.54E 07	1.54E 07	1.54E 07	1.54E 07	1.54E 07	1.54E 07
P-32	1.60E 11	9.42E 09	6.21E 09	0.00E-01	0.00E-01	0.00E-01	2.17E 09
Cr-51	0.00E-01	0.00E-01	1.61E 05	1.05E 05	2.30E 04	2.05E 05	4.70E 06
Mn-54	0.00E-01	3.90E 07	8.84E 06	0.00E-01	8.64E 06	0.00E-01	1.43E 07
Mn-56	0.00E-01	3.15E-02	5.43E-03	0.00E-01	2.71E-02	0.00E-01	2.86E 00
Fe-55	1.35E 08	8.72E 07	2.33E 07	0.00E-01	0.00E-01	4.26E 07	1.11E 07
Fe-59	2.24E 08	3.92E 08	1.54E 08	0.00E-01	0.00E-01	1.16E 08	1.87E 08
Co-58	0.00E-01	2.43E 07	6.05E 07	0.00E-01	0.00E-01	0.00E-01	6.04E 07
Co-60	0.00E-01	3.82E 07	2.08E 08	0.00E-01	0.00E-01	0.00E-01	2.10E 08
Ni-63	3.49E 10	2.16E 09	1.21E 09	0.00E-01	0.00E-01	0.00E-01	1.07E 08
Ni-65	4.39E 00	4.97E-01	2.26E-01	0.00E-01	0.00E-01	0.00E-01	3.78E 01
Cu-64	0.00E-01	1.86E 05	8.60E 04	0.00E-01	3.14E 05	0.00E-01	3.81E 06
Zn-65	5.55E 09	1.90E 10	8.78E 09	0.00E-01	9.23E 09	0.00E-01	1.61E 10
Zn-69	5.04E-11	9.07E-11	6.75E-12	0.00E-01	3.77E-11	0.00E-01	7.40E-09
Br-83	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Br-84	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01

TABLE A.5-9 (Cont'd)

GRASS-COW-MILK PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
INFANT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Br-85	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-86	0.00E-01	2.23E 10	1.10E 10	0.00E-01	0.00E-01	0.00E-01	5.70E 08
Rb-88	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-89	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Sr-89	1.26E 10	0.00E-01	3.61E 08	0.00E-01	0.00E-01	0.00E-01	2.59E 08
Sr-90	1.22E 11	0.00E-01	3.10E 10	0.00E-01	0.00E-01	0.00E-01	1.52E 09
Sr-91	2.69E 05	0.00E-01	9.75E 02	0.00E-01	0.00E-01	0.00E-01	3.19E 05
Sr-92	4.66E 00	0.00E-01	1.73E-01	0.00E-01	0.00E-01	0.00E-01	5.02E 01
Y-90	6.80E 02	0.00E-01	1.82E 01	0.00E-01	0.00E-01	0.00E-01	9.39E 05
Y-91M	5.72E-19	0.00E-01	1.95E-20	0.00E-01	0.00E-01	0.00E-01	1.91E-15
Y-91	7.33E 04	0.00E-01	1.95E 03	0.00E1-0	0.00E-01	0.00E-01	5.25E 06
Y-92	5.39E-04	0.00E-01	1.51E-05	0.00E-01	0.00E-01	0.00E-01	1.03E 01
Y-93	2.25E 00	0.00E-01	6.13E-02	0.00E-01	0.00E-01	0.00E-01	1.78E 04
Zr-95	6.81E 03	1.66E 03	1.18E 03	0.00E-01	1.79E 03	0.00E-01	8.26E 05
Zr-97	4.06E 00	6.98E-01	3.19E-01	0.00E-01	7.03E-01	0.00E-01	4.45E 04
Nb-95	5.94E 05	2.45E 05	1.41E 05	0.00E-01	1.75E 05	0.00E-01	2.06E 08
Mo-99	0.00E-01	2.08E 08	4.06E 07	0.00E-01	3.11E 08	0.00E-01	6.85E 07
Tc-99M	2.75E 01	5.68E 01	7.31E 02	0.00E-01	6.11E 02	2.97E 01	1.65E 04

TABLE A.5-9 (Cont'd)

GRASS-COW-MILK PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
INFANT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Tc-101	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ru-103	8.67E 03	0.00E-01	2.90E 03	0.00E-01	1.80E 04	0.00E-01	1.05E 05
Ru-105	8.07E-03	0.00E-01	2.72E-03	0.00E-01	5.93E-02	0.00E-01	3.21E 00
Ru-106	1.90E 05	0.00E-01	2.38E 04	0.00E-01	2.25E 05	0.00E-01	1.44E 06
Ag-110M	3.86E 08	2.82E 08	1.86E 08	0.00E-01	4.03E 08	0.00E-01	1.46E 10
Te-125M	1.51E 08	5.04E 07	2.04E 07	5.07E 07	0.00E-01	0.00E-01	7.18E 07
Te-127M	4.21E 08	1.40E 08	5.10E 07	1.22E 08	1.04E 09	0.00E-01	1.70E 08
Te-127	6.32E 03	2.12E 03	1.36E 03	5.15E 03	1.54E 04	0.00E-01	1.33E 05
Te-129M	5.57E 08	1.91E 08	8.58E 07	2.14E 08	1.39E 09	0.00e-01	3.33E 08
Te-129	2.74E-09	9.43E-10	6.39E-10	2.29E-09	6.81E-09	0.00E-01	2.19E-07
Te-131M	3.38E 06	1.36E 06	1.12E 06	2.76E 06	9.36E 06	0.00E-01	2.29E 07
Te-131	3.49E-32	1.29E-32	9.78E-33	3.11E-32	8.91E-32	0.00E-01	1.41E-30
Te-132	2.11E 07	1.05E 07	9.75E 06	1.54E 07	6.53E 07	0.00E-01	3.87E 07
I-130	3.55E 06	7.81E 06	3.14E 06	8.76E 08	8.58E 06	0.00E-01	1.68E 06
I-131	2.72E 09	3.21E 09	1.41E 09	1.05E 12	3.74E 09	0.00E-01	1.14E 08
I-132	1.43E 00	2.91E 00	1.04E 00	1.37E 02	3.25E 00	0.00E-01	2.36E 00
I-133	3.63E 07	5.28E 07	1.55E 07	9.61E 09	6.21E 07	0.00E-01	8.94E 06
I-134	1.77E-11	3.63E-11	1.29E-11	8.47E-10	4.06E-11	0.00E-01	3.76E-11

TABLE A.5-9 (Cont'd)

GRASS-COW-MILK PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
INFANT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-135	1.12E 05	2.24E 05	8.15E 04	2.00E 07	2.49E 05	0.00E-01	8.09E 04
Cs-134	3.65E 10	6.80E 10	6.87E 09	0.00E-01	1.75E 10	6.21E 09	1.85E 08
Cs-136	1.96E 09	5.76E 09	2.15E 09	0.00E-01	2.30E 09	4.70E 08	8.75E 07
Cs-137	5.15E 10	6.02E 10	4.27E 09	0.00E-01	1.62E 10	6.55E 09	1.88E 08
Cs-138	8.50E-23	1.38E-22	6.70E-23	0.00E-01	6.89E-23	1.08E-23	2.21E-22
Ba-139	4.41E-07	2.93E-10	1.28E-08	0.00E-01	1.76E-10	1.77E-10	2.80E-05
Ba-140	2.41E 08	2.41E 05	1.24E 07	0.00E-01	5.72E 04	1.48E 05	5.92E 07
Ba-141	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ba-142	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
La-140	4.06E 01	1.60E 01	4.12E 00	0.00E-01	0.00E-01	0.00E-01	1.88E 05
La-142	8.59E-11	3.15E-11	7.55E-12	0.00E-01	0.00E-01	0.00E-01	5.36E-06
Ce-141	4.34E 04	2.64E 04	3.11E 03	0.00E-01	8.16E 03	0.00E-01	1.37E 07
Ce-143	3.97E 02	2.63E 05	3.00E 01	0.00E-01	7.67E 01	0.00E-01	1.54E 06
Ce-144	2.33E 06	9.52E 05	1.30E 05	0.00E-01	3.85E 05	0.00E-01	1.33E 08
Pr-143	1.49E 03	5.56E 02	7.36E 01	0.00E-01	2.07E 02	0.00E-01	7.84E 05
Pr-144	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Nd-147	8.36E 02	9.10E 02	5.57E 01	0.00E-01	3.51E 02	0.00E-01	5.77E 05
W-187	6.12E 04	4.26E 04	1.47E 04	0.00E-01	0.00E-01	0.00E-01	2.50E 06
Np-239	3.65E 01	3.26E 00	1.84E 00	0.00E-01	1.50E 00	0.00E-01	9.43E 04

TABLE A.5-10

GRASS-COW-MEAT PATHWAY FACTOR
M²-MREM/YR PER uCi/sec
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E-01	3.25E 02	3.25E 02	3.25E 02	3.25E 02	3.25E 02	3.25E 02
C-14	2.41E 08	4.83E 07	4.83E 07	4.83E 07	4.83E 07	4.83E 07	4.83E 07
Na-24	1.36E-03	1.36E-03	1.36E-03	1.36E-03	1.36E-03	1.36E-03	1.36E-03
P-32	4.65E 09	2.89E 08	1.80E 08	0.00E-01	0.00E-01	0.00E-01	5.23E 08
Cr-51	0.00E-01	0.00E-01	7.05E 03	4.21E 03	1.55E 03	9.35E 03	1.77E 06
Mn-54	0.00E-01	9.18E 06	1.75E 06	0.00E-01	2.73E 06	0.00E-01	2.81E 07
Mn-56	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Fe-55	2.93E 08	2.02E 08	4.72E 07	0.00E-01	0.00E-01	1.13E 08	1.16E 08
Fe-59	2.65E 08	6.24E 08	2.39E 08	0.00E-01	0.00E-01	1.74E 08	2.08E 09
Co-58	0.00E-01	1.82E 07	4.09E 07	0.00E-01	0.00E-01	0.00E-01	2.70E 08
Co-60	0.00E-01	7.52E 07	1.66E 08	0.00E-01	0.00E-01	0.00E-01	1.41E 09
Ni-63	1.89E 10	1.32E 09	6.33E 08	0.00E-01	0.00E-01	0.00E-08	2.73E 08
Ni-65	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Cu-64	0.00E-01	2.73E-07	1.28E-07	0.00E-01	6.89E-07	0.00E-01	2.33E-05
Zn-65	3.56E 08	1.13E 09	5.12E 08	0.00E-01	7.57E 08	0.00E-01	7.13E 08
Zn-69	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Br-83	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Br-84	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01

TABLE A.5-10 (Cont'd)

GRASS-COW-MEAT PATHWAY FACTOR
M^2-MREM/YR PER uCi/sec
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Br-85	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-86	0.00E-01	4.87E 08	2.27E 08	0.00E-01	0.00E-01	0.00E-01	9.61E 07
Rb-88	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-89	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Sr-89	3.02E 08	0.00E-01	8.66E 06	0.00E-01	0.00E-01	0.00E-01	4.84E 07
Sr-90	1.24E 10	0.00E-01	3.05E 09	0.00E-01	0.00E-01	0.00E-01	3.59E 08
Sr-91	1.43E-10	0.00E-01	5.73E-12	0.00E-01	0.00E-01	0.00E-01	6.76E-10
Sr-92	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Y-90	1.07E 02	0.00E-01	2.86E 00	0.00E-01	0.00E-01	0.00E-01	1.13E 06
Y-91M	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Y-91	1.13E 06	0.00E-01	3.03E 04	0.00E-01	0.00E-01	0.00E-01	6.23E 08
Y-92	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Y-93	6.59E-12	0.00E-01	1.82E-13	0.00E-01	0.00E-01	0.00E-01	2.09E-07
Zr-95	1.87E 06	6.01E 05	4.07E 05	0.00E-01	9.43E 05	0.00E-01	1.90E 09
Zr-97	2.08E-05	4.19E-06	1.92E-06	0.00E-01	6.33E-06	0.00E-01	1.30E 00
Nb-95	2.30E 06	1.28E 06	6.88E 05	0.00E-01	1.26E 06	0.00E-01	7.76E 09
Mo-99	0.00E-01	9.99E 04	1.90E 04	0.00E-01	2.26E 05	0.00E-01	2.32E 05
Tc-99M	4.50E-21	1.27E-20	1.62E-19	0.00E-01	1.93E-19	6.23E-21	7.53E-18

TABLE A.5-10 (Cont'd)

GRASS-COW-MEAT PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Tc-101	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ru-103	1.05E 08	0.00E-01	4.53E 07	0.00E-01	4.01E 08	0.00E-01	1.23E 10
Ru-105	5.87E-28	0.00E-01	2.32E-28	0.00E-01	7.58E-27	0.00E-01	3.59E-25
Ru-106	2.80E 09	0.00E-01	3.54E 08	0.00E-01	5.40E 09	0.00E-01	1.81E 11
Ag-110M	6.68E 06	6.18E 06	3.67E 06	0.00E-01	1.22E 07	0.00E-01	2.52E 09
Te-125M	3.59E 08	1.30E 08	4.81E 07	1.08E 08	1.46E 09	0.00E-01	1.43E 09
Te-127M	1.12E 09	3.99E 08	1.36E 08	2.85E 08	4.53E 09	0.00E-01	3.74E 09
Te-127	2.14E-10	7.68E-11	4.63E-11	1.58E-10	8.71E-10	0.00E-01	1.69E-08
Te-129M	1.13E 09	4.23E 08	1.80E 08	3.90E 08	4.73E 09	0.00E-01	5.71E 09
Te-129	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Te-131M	4.52E 02	2.21E 02	1.84E 02	3.50E 02	2.24E 03	0.00E-01	2.20E 04
Te-131	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Te-132	1.42E 06	9.19E 05	8.63E 05	1.01E 06	8.85E 06	0.00E-01	4.35E 07
I-130	2.12E-06	6.26E-06	2.47E-06	5.30E-04	9.76E-06	0.00E-01	5.39E-06
I-131	1.07E 07	1.54E 07	8.81E 06	5.04E 09	2.64E 07	0.00E-01	4.06E 06
I-132	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
I-133	3.67E-01	6.38E-01	1.94E-01	9.37E 01	1.11E 00	0.00E-01	5.73E-01
I-134	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01

TABLE A.5-10 (Cont'd)

GRASS-COW-MEAT PATHWAY FACTOR
M^2-MREM/YR PER uCi/sec
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-135	4.47E-17	1.17E-16	4.32E-17	7.73E-15	1.88E-16	0.00E-01	1.32E-16
Cs-134	6.58E 08	1.56E 09	1.28E 09	0.00E-01	5.06E 08	1.68E 08	2.74E 07
Cs-136	1.18E 07	4.66E 07	3.35E 07	0.00E-01	2.59E 07	3.55E 06	5.24E 06
Cs-137	8.72E 08	1.19E 09	7.81E 08	0.00E-01	4.05E 08	1.35E 08	2.31E 07
Cs-138	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ba-139	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ba-140	2.87E 07	3.61E 04	1.88E 06	0.00E-01	1.23E 04	2.07E 04	5.92E 07
Ba-141	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ba-142	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
La-140	3.76E-02	1.89E-02	5.00E-03	0.00E-01	0.00E-01	0.00E-01	1.39E 03
La-142	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ce-141	1.40E 04	9.50E 03	1.08E 03	0.00E-01	4.41E 03	0.00E-01	3.63E 07
Ce-143	2.01E-02	1.49E 01	1.65E-03	0.00E-01	6.55E-03	0.00E-01	5.56E 02
Ce-144	1.46E 06	6.09E 05	9.83E 04	0.00E-01	3.61E 05	0.00E-01	4.93E 08
Pr-143	2.10E 04	8.41E 03	1.04E 03	0.00E-01	4.86E 03	0.00E-01	9.19E 07
Pr-144	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Nd-147	7.17E 03	8.29E 03	4.96E 02	0.00E-01	4.84E 03	0.00E-01	3.98E 07
W-187	2.17E-02	1.81E-02	6.33E-03	0.00E-01	0.00E-01	0.00E-01	5.93E 00
Np-239	2.59E-01	2.55E-02	1.40E-02	0.00E-01	7.94E-02	0.00E-01	5.22E 03

TABLE A.5-11

GRASS-COW-MEAT PATHWAY FACTOR
M² MREM/YR PER uCi/sec
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E-01	1.94E 02	1.94E 02	1.94E 02	1.94E 02	1.94E 02	1.94E 02
C-14	2.04E 08	4.08E 07	4.08E 07	4.08E 07	4.08E 07	4.08E 07	4.08E 07
Na-24	1.09E-03	1.09E-03	1.09E-03	1.09E-03	1.09E-03	1.09E-03	1.09E-03
P-32	3.93E 09	2.44E 08	1.52E 08	0.00E-01	0.00E-01	0.00E-01	3.30E 08
Cr-51	0.00E-01	0.00E-01	5.64E 03	3.13E 03	1.24E 03	8.05E 03	9.47E 05
Mn-54	0.00E-01	7.00E 06	1.39E 06	0.00E-01	2.09E 06	0.00E-01	1.44E 07
Mn-56	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Fe-55	2.38E 08	1.69E 08	3.93E 07	0.00E-01	0.00E-01	1.07E 08	7.30E 07
Fe-59	2.12E 08	4.95E 08	1.91E 08	0.00E-01	0.00E-01	1.56E 08	1.17E 09
Co-58	0.00E-01	1.41E 07	3.24E 07	0.00E-01	0.00E-01	0.00E-01	1.94E 08
Co-60	0.00E-01	5.83E 07	1.31E 08	0.00E-01	0.00E-01	0.00E-01	7.60E 08
Ni-63	1.52E 10	1.07E 09	5.15E 08	0.00E-01	0.00E-01	0.00E-01	1.71E 08
Ni-65	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Cu-64	0.00E-01	2.23E-07	1.05E-07	0.00E-01	5.64E-07	0.00E-01	1.73E-05
Zn-65	2.50E 08	8.69E 08	4.05E 08	0.00E-01	5.56E 08	0.00E-01	3.68E 08
Zn-69	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Br-83	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Br-84	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01

TABLE A.5-11 (Cont'd)

GRASS-COW-MEAT PATHWAY FACTOR
M2, MREM/YR PER uCi/sec
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Br-85	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-86	0.00E-01	4.07E 08	1.91E 08	0.00E-01	0.00E-01	0.00E-01	6.02E 07
Rb-88	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-89	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-07
Sr-89	2.55E 08	0.00E-01	7.29E 06	0.00E-01	0.00E-01	0.00E-01	3.03E 07
Sr-90	8.05E 09	0.00E-01	1.99E 09	0.00E-01	0.00E-01	0.00E-01	2.26E 08
Sr-91	1.19E-10	0.00E-01	4.75E-12	0.00E-01	0.00E-01	0.00E-01	5.41E-10
Sr-92	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Y-90	8.98E 01	0.00E-01	2.42E 00	0.00E-01	0.00E-01	0.00E-01	7.41E 05
Y-91M	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Y-91	9.54E 05	0.00E-01	2.56E 04	0.00E-01	0.00E-01	0.00E-01	3.91E 08
Y-92	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Y-93	5.56E-12	0.00E-01	1.53E-13	0.00E-01	0.00E-01	0.00E-01	1.70E-07
Zr-95	1.50E 06	4.73E 05	3.26E 05	0.00E-01	6.96E 05	0.00E-01	1.09E 09
Zr-97	1.73E-05	3.42E-06	1.58E-06	0.00E-01	5.19E-06	0.00E-01	9.27E-01
Nb-95	1.80E 06	9.96E 05	5.48E 05	0.00E-01	9.66E 05	0.00E-01	4.26E 09
Mo-99	0.00E-01	8.26E 04	1.58E 04	0.00E-01	1.89E 05	0.00E-01	1.48E 05
Tc-99M	3.58E-21	9.97E-21	1.29E-19	0.00E-01	1.49E-19	5.54E-21	6.55E-18

TABLE A.5-11 (Cont'd)

GRASS-COW-MEAT PATHWAY FACTOR
M² MREM/YR PER uCi/sec
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Tc-101	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ru-103	8.56E 07	0.00E-01	3.66E 07	0.00E-01	3.02E 08	0.00E-01	7.15E 09
Ru-105	4.91E-28	0.00E-01	1.91E-28	0.00E-01	6.91E-27	0.00E-01	3.96E-25
Ru-106	2.36E 09	0.00E-01	2.97E 08	0.00E-01	4.55E 09	0.00E-01	1.13E 11
Ag-110M	5.06E 06	4.79E 06	2.91E 06	0.00E-01	9.13E 06	0.00E-01	1.35E 09
Te-125M	3.03E 08	1.09E 08	4.05E 07	8.47E 07	0.00E-01	0.00E-01	8.94E 08
Te-127M	9.42E 08	3.34E 08	1.12E 08	2.24E 08	3.82E 09	0.00E-01	2.35E 09
Te-127	1.81E-10	6.43E-11	3.91E-11	1.25E-10	7.35E-10	0.00E-01	1.40E-08
Te-129M	9.50E 08	3.53E 08	1.50E 08	3.07E 08	3.97E 09	0.00E-01	3.57E 09
Te-129	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Te-131M	3.77E 02	1.81E 02	1.51E 02	2.72E 02	1.88E 03	0.00E-01	1.45E 04
Te-131	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Te-132	1.16E 06	7.36E 05	6.93E 05	7.76E 05	7.06E 06	0.00E-01	2.33E 07
I-130	1.71E-06	4.94E-06	1.97E-06	4.03E-04	7.61E-06	0.00E-01	3.80E-06
I-131	8.93E 06	1.25E 07	6.72E 06	3.65E 09	2.15E 07	0.00E-01	2.47E 06
I-132	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
I-133	3.07E-01	5.20E-01	1.59E-01	7.26E 01	9.12E-01	0.00E-01	3.93E-01
I-134	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01

TABLE A.5-11 (Cont'd)

GRASS-COW-MEAT PATHWAY FACTOR
M-R MREM/YR PER uCi/sec
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-135	3.64E-17	9.37E-17	3.47E-17	6.03E-15	1.48E-16	0.00E-01	1.04E-16
Cs-134	5.23E 08	1.23E 09	5.71E 08	0.00E-01	3.91E 08	1.49E 08	1.53E 07
Cs-136	9.20E 06	3.62E 07	2.43E 07	0.00E-01	1.97E 07	3.11E 06	2.91E 06
Cs-137	7.24E 08	9.63E 08	3.36E 08	0.00E-01	3.28E 08	1.27E 08	1.37E 07
Cs-138	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ba-139	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ba-140	2.38E 07	2.91E 04	1.53E 06	0.00E-01	9.88E 03	1.96E 04	3.67E 07
Ba-141	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ba-142	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
LA-140	3.09E-02	1.52E-02	4.04E-03	0.00E-01	0.00E-01	0.00E-01	8.72E 02
La-142	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ce-141	1.18E 04	7.88E 03	9.05E 02	0.00E-01	3.71E 03	0.00E-01	2.25E 07
Ce-143	1.69E-02	1.23E 01	1.38E-03	0.00E-01	5.53E-03	0.00E-01	3.70E 02
Ce-144	1.23E 06	5.08E 05	6.60E 04	0.00E-01	3.04E 05	0.00E-01	3.09E 08
Pr-143	1.77E 04	7.05E 03	8.78E 02	0.00E-01	4.10E 03	0.00E-01	5.81E 07
Pr-144	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Nd-147	6.32E 03	6.87E 03	4.11E 02	0.00E-01	4.03E 03	0.00E-01	2.48E 07
W-187	1.81E-02	1.48E-02	5.18E-03	0.00E-01	0.00E-01	0.00E-01	4.00E 00
Np-239	2.26E-01	2.13E-02	1.19E-02	0.00E-01	6.70E-07	0.00E-01	3.43E 03

TABLE A.5-12

GRASS-COW-MEAT PATHWAY FACTOR
M² MREM/YR PER uCi/sec
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E-01	2.34E 02	2.34E 02	2.34E 02	2.34E 02	2.34E 02	2.34E 02
C-14	3.83E 08	7.67E 07	7.67E 07	7.67E 07	7.67E 07	7.67E 07	7.67E 07
Na-24	1.73E-03	1.73E-03	1.73E-03	1.73E-03	1.73E-03	1.73E-03	1.73E-03
P-32	7.41E 09	3.47E 08	2.86E 08	0.00E-01	0.00E-01	0.00E-01	2.05E 08
Cr-51	0.00E-01	0.00E-01	8.79E 03	4.88E 03	1.33E 03	8.91E 03	4.66E 05
Mn-54	0.00E-01	8.01E 06	2.13E 06	0.00E-01	2.25E 06	0.00E-01	6.72E 06
Mn-56	1.19E-10	0.00E-01	4.75E-12	0.00E-01	0.00E-01	0.00E-01	5.41E-10
Fe-55	4.57E 08	2.42E 08	7.50E 07	0.00E-01	0.00E-01	1.37E 08	4.49E 07
Fe-59	3.76E 08	6.09E 08	3.03E 08	0.00E-01	0.00E-01	1.76E 08	6.34E 08
Co-58	0.00E-01	1.64E 07	5.03E 07	0.00E-01	0.00E-01	0.00E-01	9.58E 07
Co-60	0.00E-01	6.93E 07	2.04E 08	0.00E-01	0.00E-01	0.00E-01	3.84E 08
Ni-63	2.91E 10	1.56E 09	9.91E 08	0.00E-01	0.00E-01	0.00E-01	1.05E 08
Ni-65	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Cu-64	0.00E-01	3.00E-07	1.81E-07	0.00E-01	7.24E-07	0.00E-01	1.41E-05
Zn-65	3.75E 08	1.00E 09	6.22E 08	0.00E-01	6.30E 08	0.00E-01	1.76E 08
Zn-69	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Br-83	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Br-84	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01

TABLE A.5-12 (Cont'd)

GRASS-COW-MEAT PATHWAY FACTOR
M^{2}e MREM/YR PER uCi/sec
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Br-85	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-86	0.00E-01	5.77E 08	3.55E 08	0.00E-01	0.00E-01	0.00E-01	3.71E 07
Rb-88	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-89	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Sr-89	4.82E 08	0.00E-01	1.38E 07	0.00E-01	0.00E-01	0.00E-01	1.87E 07
Sr-90	1.04E 10	0.00E-01	2.64E 09	0.00E-01	0.00E-01	0.00E-01	1.40E 08
Sr-91	2.24E-10	0.00E-01	8.45E-12	0.00E-01	0.00E-01	0.00E-01	4.94E-10
Sr-92	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Y-90	1.70E 02	0.00E-01	4.55E 00	0.00E-01	0.00E-01	0.00E-01	4.84E 05
Y-91M	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Y-91	1.80E 06	0.00E-01	4.82E 02	0.00E-01	0.00E-01	0.00E-01	2.40E 08
Y-92	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Y-93	1.04E-11	0.00E-01	2.87E-13	0.00E-01	0.00E-01	0.00E-01	1.56E-07
Zr-95	2.66E 06	5.86E 05	5.21E 05	0.00E-01	8.38E 05	0.00E-01	6.11E 08
Zr-97	3.22E-05	4.65E-06	2.74E-06	0.00E-01	6.68E-06	0.00E-01	7.05E-01
Nb-95	3.10E 06	1.21E 06	8.63E 05	0.00E-01	1.13E 06	0.00E-01	2.23E 09
Mo-99	0.00E-01	1.15E 05	2.84E 04	0.00E-01	2.45E 05	0.00E-01	9.51E 04
Tc-99M	6.27E-21	1.23E-20	2.04E-19	0.00E-01	1.79E-19	6.24E-21	7.00E-18

TABLE A.5-12 (Cont'd)

GRASS-COW-MEAT PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Tc-101	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ru-103	1.55E 08	0.00E-01	5.95E 07	0.00E-01	3.90E 08	0.00E-01	4.00E 09
Ru-105	9.16E-28	0.00E-01	3.32E-28	0.00E-01	8.05E-27	0.00E-01	5.98E-25
Ru-106	4.44E 09	0.00E-01	5.54E 08	0.00E-01	5.99E 09	0.00E-01	6.90E 10
Ag-100M	8.34E 06	5.67E 06	4.53E 06	0.00E-01	1.06E 07	0.00E-01	6.74E 08
Te-125M	5.69E 08	1.54E 08	7.59E 07	1.60E 08	0.00E-01	0.00E-01	5.49E 08
Te-127M	1.77E 09	4.78E 08	2.11E 08	4.24E 08	5.06E 09	0.00E-01	1.44E 09
Te-127	3.41E-10	9.20E-11	7.32E-11	2.36E-10	9.71E-10	0.00E-01	1.33E-08
Te-129M	1.79E 09	5.00E 08	1.68E 08	5.77E 08	5.26E 09	0.00E-01	2.16E 09
Te-129	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Te-131M	7.01E 02	2.43E 02	2.58E 02	4.99E 02	2.35E 03	0.00E-01	9.84E 03
Te-131M	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Te-132	2.12E 06	9.39E 05	1.13E 06	1.37E 06	8.72E 06	0.00E-01	9.46E 06
I-130	3.05E-06	6.17E-06	3.18E-06	6.80E-04	9.22E-06	0.00E-01	2.89E-06
I-131	1.66E 07	1.67E 07	9.47E 06	5.51E 09	2.74E 07	0.00E-01	1.48E 06
I-132	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
I-133	5.70E-01	7.04E-01	2.66E-01	1.31E 02	1.17E 00	0.00E-01	2.84E-01
I-134	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01

TABLE A.5-12 (Cont'd)

GRASS-COW-MEAT PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-135	6.59E-17	1.19E-16	5.61E-17	1.05E-14	1.82E-16	0.00E-01	9.04E-17
Cs-134	9.22E 08	1.51E 09	3.19E 08	0.00E-01	4.69E 08	1.68E 08	8.16E 06
Cs-136	1.59E 07	4.36E 07	2.82E 07	0.00E-01	2.32E 07	3.46E 06	1.53E 06
Cs-137	1.33E 09	1.28E 09	1.88E 08	0.00E-01	4.16E 08	1.50E 08	7.99E 06
Cs-138	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ba-139	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ba-140	4.39E 07	3.84E 04	2.56E 06	0.00E-01	1.25E 04	2.29E 04	2.22E 07
Ba-141	0.00E 01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ba-142	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
La-140	5.66E-02	1.98E-02	6.66E-03	0.00E-01	0.00E-01	0.00E-01	5.51E-02
La-142	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Ce-141	2.22E 04	1.11E 04	1.64E 03	0.00E-01	4.86E 03	0.00E-01	1.38E 07
Ce-143	3.18E-02	1.72E 01	2.50E-03	0.00E-01	7.23E-03	0.00E-01	2.52E 02
Ce-144	2.32E 06	7.26E 05	1.24E 05	0.00E-01	4.02E 05	0.00E-01	1.89E 08
Pr-143	3.34E 04	1.00E 04	1.66E 03	0.00E-01	5.43E 03	0.00E-01	3.60E 07
Pr-144	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Nd-147	1.19E 04	9.60E 03	7.43E 02	0.00E-01	5.27E 03	0.00E-01	1.52E 07
W-187	3.36E-02	1.99E-02	8.94E-03	0.00E-01	0.00E-01	0.00E-01	2.80E 00
Np-239	4.26E-01	3.06E-02	2.15E-02	0.00E-01	8.84E-02	0.00E-01	2.26E-03

TABLE A.5-13

VEGETATION PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E-01	2.26E 03	2.26E 03	2.26E 03	2.26E 03	2.26E 03	2.26E 03
C-14	2.38E 08	4.55E 07	4.55E 07	4.55E 07	4.55E 07	4.55E 07	4.55E 07
Na-24	2.69E 05	2.69E 05	2.69E 05	2.69E 05	2.69E 05	2.69E 05	2.69E 05
P-32	1.40E 09	8.73E 07	5.42E 07	0.00E-01	0.00E-01	0.00E-01	1.58E 08
Cr-51	0.00E-01	0.00E-01	4.64E 04	2.78E 04	1.02E 04	6.16E 04	1.17E 07
Mn-54	0.00E-01	3.13E 08	5.97E 07	0.00E-01	9.31E 07	0.00E-01	9.58E 08
Mn-56	0.00E-01	1.59E 01	2.82E 00	0.00E-01	2.02E 01	0.00E-01	5.08E 02
Fe-55	2.09E 08	1.45E 08	3.37E 07	0.00E-01	0.00E-01	8.06E 07	8.29E 07
Fe-59	1.26E 08	2.96E 08	1.14E 08	0.00E-01	0.00E-01	8.28E 07	9.83E 08
Co-58	0.00E-01	3.07E 07	6.89E 07	0.00E-01	0.00E-01	0.00E-01	6.23E 08
Co-60	0.00E-01	1.67E 08	3.69E 08	0.00E-01	0.00E-01	0.00E-01	3.14E 09
Ni-63	1.04E 10	7.28E 08	3.49E 08	0.00E-01	0.00E-01	0.00E-01	1.50E 08
Ni-65	6.93E 01	9.01E 00	4.11E 00	0.00E-01	0.00E-01	0.00E-01	2.28E 02
Cu-64	0.00E-01	9.21E 03	4.32E 03	0.00E-01	2.32E 04	0.00E-01	7.85E 05
Zn-65	3.17E 08	1.01E 09	4.56E 08	0.00E-01	6.75E 08	0.00E-01	6.36E 08
Zn-69	8.77E-06	1.68E-05	1.17E-06	0.00E-01	1.09E-05	0.00E-01	2.52E-06
Br-83	0.00E-01	0.00E-01	3.11E 00	0.00E-01	0.00E-01	0.00E-01	4.48E 00
Br-84	0.00E-01	0.00E-01	2.49E-11	0.00E-01	0.00E-01	0.00E-01	1.96E-16

TABLE A.5-13 (Cont'd)

VEGETATION PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Br-85	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-86	0.00E-01	2.19E 08	1.02E 08	0.00E-01	0.00E-01	0.00E-01	4.33E 07
Rb-88	0.00E-01	3.47E-22	1.84E-22	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-89	0.00E-01	1.41E-26	9.88E-27	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Sr-89	9.97E 09	0.00E-01	2.86E 08	0.00E-01	0.00E-01	0.00E-01	1.60E 09
Sr-90	6.05E 11	0.00E-01	1.48E 11	0.00E-01	0.00E-01	0.00E-01	1.75E 10
Sr-91	3.03E 05	0.00E-01	1.22E 04	0.00E-01	0.00E-01	0.00E-01	1.44E 06
Sr-92	4.27E 02	0.00E-01	1.85E 01	0.00E-01	0.00E-01	0.00E-01	8.46E 03
Y-90	1.33E 04	0.00E-01	3.56E 02	0.00E-01	0.00E-01	0.00E-01	1.41E 08
Y-91M	5.24E-09	0.00E-01	2.03E-10	0.00E-01	0.00E-01	0.00E-01	1.54E-08
Y-91	5.11E 06	0.00E-01	1.37E 05	0.00E-01	0.00E-01	0.00E-01	2.81E 09
Y-92	9.16E-01	0.00E-01	2.68E-02	0.00E-01	0.00E-01	0.00E-01	1.60E 04
Y-93	1.74E 02	0.00E-01	4.81E 00	0.00E-01	0.00E-01	0.00E-01	5.52E 06
Zr-95	1.18E 06	3.77E 05	2.55E 05	0.00E-01	5.92E 05	0.00E-01	1.20E 09
Zr-97	3.37E 02	6.81E 01	3.11E 01	0.00E-01	1.03E 02	0.00E-01	2.11E 07
Nb-95	1.43E 05	7.93E 04	4.26E 04	0.00E-01	7.84E 04	0.00E-01	4.81E 08
Mo-99	0.00E-01	6.15E 06	1.17E 06	0.00E-01	1.39E 07	0.00E-01	1.43E 07
Tc-99M	3.10E 00	8.77E 00	1.12E 02	0.00E-01	1.33E 02	4.30E 00	5.19E 03

TABLE A.5-13 (Cont'd)

VEGETATION PATHWAY FACTOR
M^2 - MREM/YR PER uCi/sec
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Tc-101	8.34E-31	1.20E-30	1.18E-29	0.00E-01	2.16E-29	6.14E-31	0.00E-01
Ru-103	4.76E 06	0.00E-01	2.05E 06	0.00E-01	1.82E 07	0.00E-01	5.56E 08
Ru-105	5.39E 01	0.00E-01	2.13E 01	0.00E-01	6.97E 02	0.00E-01	3.30E 04
Ru-106	1.93E 08	0.00E-01	2.44E 07	0.00E-01	3.72E 08	0.00E-01	1.25E 10
Ag-100M	1.05E 07	9.75E 06	5.79E 06	0.00E-01	1.92E 07	0.00E-01	3.98E 09
Te-125M	9.66E 07	3.50E 07	1.29E 07	2.90E 07	3.93E 08	0.00E-01	3.86E 08
Te-127M	3.49E 08	1.25E 08	4.26E 07	8.93E 07	1.42E 09	0.00E-01	1.17E 09
Te-127	5.66E 03	2.03E 03	1.23E 03	4.20E 03	2.31E 04	0.00E-01	4.47E 05
Te-129M	2.51E 08	9.38E 07	3.98E 07	8.63E 07	1.05E 09	0.00E-01	1.27E 09
Te-129	7.65E-04	2.87E-04	1.86E-04	5.87E-04	3.22E-03	0.00E-01	5.77E-04
Te-131M	9.12E 05	4.46E 05	3.72E 05	7.07E 05	4.52E 06	0.00E-01	4.43E 07
Te-131	1.51E-15	6.32E-16	4.78E-16	1.24E-15	6.63E-15	0.00E-01	2.14E-16
Te-132	4.30E 06	2.78E 06	2.61E 06	3.07E 06	2.68E 07	0.00E-01	1.32E 08
I-130	3.95E 05	1.16E 06	4.57E 05	9.81E 07	1.81E 06	0.00E-01	9.97E 05
I-131	8.08E 07	1.16E 08	6.62E 07	3.79E 10	1.98E 08	0.00E-01	3.05E 07
I-132	5.77E 01	1.54E 02	5.40E 01	5.40E 03	2.46E 02	0.00E-01	2.90E 01
I-133	2.09E 06	3.63E 06	1.11E 06	5.33E 08	6.33E 06	0.00E-01	3.26E 06
I-134	9.69E-05	2.63E-04	9.42E-05	4.56E-03	4.19E-04	0.00E-01	2.30E-07

TABLE A.5-13 (Cont'd)

VEGETATION PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
ADULT (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-135	3.90E 04	1.02E 05	3.77E 04	6.74E 06	1.64E 05	0.00E-01	1.15E 05
Cs-134	4.67E 09	1.11E 10	9.08E 09	0.00E-01	3.59E 09	1.19E 09	1.94E 08
Cs-136	4.20E 07	1.66E 08	1.19E 08	0.00E-01	9.22E 07	1.26E 07	1.88E 07
Cs-137	6.36E 09	8.70E 09	5.70E 09	0.00E-01	2.95E 09	9.81E 08	1.68E 08
Cs-138	3.94E-11	7.78E-11	3.86E-11	0.00E-01	5.72E-11	5.65E-12	3.32E-16
Ba-139	2.90E-02	2.07E-05	8.50E-04	0.00E-01	1.93E-05	1.17E-05	5.15E-02
Ba-140	1.29E 08	1.61E 05	8.42E 06	0.00E-01	5.49E 04	9.25E 04	2.65E 08
Ba-141	1.28E-21	9.64E-25	4.31E-23	0.00E-01	8.96E-25	5.47E-25	6.01E-31
Ba-142	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
La-140	1.98E 03	9.99E 02	2.64E 02	0.00E-01	0.00E-01	0.00E-01	7.33E 07
La-142	1.42E-04	6.44E-05	1.61E-05	0.00E-01	0.00E-01	0.00E-01	4.70E-01
Ce-141	1.97E 05	1.33E 05	1.51E 04	0.00E-01	6.19E 04	0.00E-01	5.10E 08
Ce-143	9.98E 02	7.38E 05	8.17E 01	0.00E-01	3.25E 02	0.00E-01	2.76E 07
Ce-144	3.29E 07	1.38E 07	1.77E 06	0.00E-01	8.16E 06	0.00E-01	1.11E 10
Pr-143	6.26E 04	2.51E 04	3.11E 03	0.00E-01	1.45E 04	0.00E-01	2.74E 08
Pr-144	3.13E-26	1.30E-26	1.59E-27	0.00E-01	7.32E-27	0.00E-01	0.00E-01
Nd-147	3.36E 04	3.89E 04	2.32E 03	0.00E-01	2.27E 04	0.00E-01	1.87E 08
W-187	3.82E 04	3.20E 04	1.12E 04	0.00E-01	0.00E-01	0.00E-01	1.05E 07
Np-239	1.43E 03	1.40E 02	7.74E 01	0.00E-01	4.38E 02	0.00E-01	2.88E 07

TABLE A.5-14

VEGETATION PATHWAY FACTOR
M² MREM/YR PER uCi/sec
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E-01	2.59E 03	2.59E 03	2.59E 03	2.59E 03	2.59E 03	2.59E 03
C-14	3.69E 08	7.38E 07	7.38E 07	7.38E 07	7.38E 07	7.38E 07	7.38E 07
Na-24	2.39E 05	2.39E 05	2.39E 05	2.39E 05	2.39E 05	2.39E 05	2.39E 05
P-32	1.61E 09	9.96E 07	6.23E 07	0.00E-01	0.00E-01	0.00E-01	1.35E 08
Cr-51	0.00E-01	0.00E-01	6.17E 04	3.43E 04	1.35E 04	8.81E 04	1.04E 07
Mn-54	0.00E-01	4.54E 08	9.01E 07	0.00E-01	1.36E 08	0.00E-01	9.32E 08
Mn-56	0.00E-01	1.44E 01	2.55E 00	0.00E-01	1.82E 01	0.00E-01	9.45E 02
Fe-55	3.25E 08	2.31E 08	5.38E 07	0.00E-01	0.00E-01	1.46E 08	9.98E 07
Fe-59	1.79E 08	4.18E 08	1.62E 08	0.00E-01	0.00E-01	1.32E 08	9.90E 08
Co-58	0.00E-01	4.36E 07	1.01E 08	0.00E-01	0.00E-01	0.00E-01	6.01E 08
Co-60	0.00E-01	2.49E 08	5.60E 08	0.00E-01	0.00E-01	0.00E-01	3.24E 09
Ni-63	1.61E 10	1.13E 09	5.44E 08	0.00E-01	0.00E-01	0.00E-01	1.81E 08
Ni-65	6.45E 01	8.24E 00	3.76E 00	0.00E-01	0.00E-01	0.00E-01	4.47E 02
Cu-64	0.00E-01	3.34E 03	3.92E 03	0.00E-01	2.11E 04	0.00E-01	6.47E 05
Zn-65	4.24E 08	1.47E 09	6.86E 08	0.00E-01	9.42E 08	0.00E-01	6.23E 08
Zn-69	8.21E-06	1.56E 05	1.10E-06	0.00E-01	1.02E-05	0.00E-01	2.88E-05
Br-83	0.00E-01	0.00E-01	2.92E 00	0.00E-01	0.00E-01	0.00E-01	5.08E-17
Br-84	0.00E-01	0.00E-01	2.27E-11	0.00E-01	0.00E-01	0.00E-01	3.14E-28

TABLE A.5-14 (Cont'd)

VEGETATION PATHWAY FACTOR
M^2 • MREM/YR PER uCi/sec
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Br-85	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-86	0.00E-01	2.74E 08	1.29E 08	0.00E-01	0.00E-01	0.00E-01	4.05E 07
Rb-88	0.00E-01	3.21E-22	1.71E-22	0.00E-01	0.00E-01	0.00E-01	2.75E-29
Rb-89	0.00E-01	1.26E-26	8.94E-27	0.00E-01	0.00E-01	0.00E-01	1.94E-35
Sr-89	1.51E 10	0.00E-01	4.34E 08	0.00E-01	0.00E-01	0.00E-01	1.80E 09
Sr-90	7.51E 11	0.00E-01	1.85E 11	0.00E-01	0.00E-01	0.00E-01	2.11E 10
Sr-91	2.83E 05	0.00E-01	1.13E 04	0.00E-01	0.00E-01	0.00E-01	1.28E 06
Sr-92	3.98E 02	0.00E-01	1.70E 01	0.00E-01	0.00E-01	0.00E-01	1.01E 04
Y-90	1.24E 04	0.00E-01	3.34E 02	0.00E-01	0.00E-01	0.00E-01	1.02E 08
Y-91M	4.88E-09	0.00E-01	1.87E-10	0.00E-01	0.00E-01	0.00E-01	2.30E-07
Y-91	7.84E 06	0.00E-01	2.10E 05	0.00E-01	0.00E-01	0.00E-01	3.21E 09
Y-92	8.61E-01	0.00E-01	2.49E-02	0.00E-01	0.00E-01	0.00E-01	2.36E 04
Y-93	1.63E 02	0.00E-01	4.47E 00	0.00E-01	0.00E-01	0.00E-01	4.99E 06
Zr-95	1.72E 06	5.44E 05	3.74E 05	0.00E-01	7.99E 05	0.00E-01	1.25E 09
Zr-97	3.12E 02	6.18E 01	2.85E 01	0.00E-01	9.37E 01	0.00E-01	1.67E 07
Nb-95	1.93E 05	1.07E 05	5.88E 04	0.00E-01	1.04E 05	0.00E-01	4.57E 08
Mo-99	0.00E-01	5.65E 06	1.08E 06	0.00E-01	1.29E 07	0.00E-01	1.01E 07
Tc-99M	2.74E 00	7.64E 00	9.90E 01	0.00E-01	1.14E 02	4.24E 00	5.02E 03

TABLE A.5-14 (Cont'd)

VEGETATION PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Tc-101	7.76E-31	1.10E-30	1.08E-29	0.00E-01	2.00E-29	6.72E-31	0.00E-01
Ru-103	6.81E 06	0.00E-01	2.91E 06	0.00E-01	2.40E 07	0.00E-01	5.69E 08
Ru-105	5.01E 01	0.00E-01	1.94E 01	0.00E-01	6.32E 02	0.00E-01	4.04E 04
Ru-106	3.09E 08	0.00E-01	3.90E 07	0.00E-01	5.97E 08	0.00E-01	1.48E 10
Ag-110M	1.52E 07	1.43E 07	8.72E 06	0.00E-01	2.74E 07	0.00E-01	4.03E 09
Te-125M	1.48E 08	5.34E 07	1.98E 07	4.14E 07	0.00E-01	0.00E-01	4.39E 08
Te-127M	5.52E 08	1.96E 08	6.56E 07	1.31E 08	2.24E 09	0.00E-01	1.37E 09
Te-127	5.34E 03	1.89E 03	1.15E 03	3.68E 03	2.16E 04	0.00E-01	4.12E 05
Te-129M	3.62E 08	1.34E 08	5.73E 07	1.17E 08	1.51E 09	0.00E-01	1.36E 09
Te-129	7.16E-04	2.67E-04	1.74E-04	5.12E-04	3.01E-03	0.00E-01	3.92E-03
Te-131M	8.44E 05	4.05E 05	3.38E 05	6.09E 05	4.22E 06	0.00E-01	3.25E 07
Te-131	1.41E-15	45.80E-16	4.40E-16	1.08E-15	6.15E-15	0.00E-01	1.15E-16
Te-132	3.91E 06	2.48E 06	2.33E 06	2.61E 06	2.37E 07	0.00E-01	7.84E 07
I-130	3.51E 05	1.02E 06	4.05E 05	8.28E 07	1.56E 06	0.00E-01	7.80E 05
I-131	7.69E 07	1.08E 08	5.78E 07	3.14E 10	1.85E 08	0.00E-01	2.13E 07
I-132	5.20E 01	1.36E 02	4.89E 01	4.59E 03	2.14E 02	0.00E-01	5.93E 01
I-133	1.94E 06	3.29E 06	1.00E 06	4.59E 08	5.77E 06	0.00E-01	2.49E 06
I-134	8.76E-05	2.32E-04	8.34E-05	3.87E-03	3.66E-04	0.00E-01	3.06E-06

TABLE A.5-14 (Cont'd)

VEGETATION PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
TEEN (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-135	3.52E 04	9.07E 04	3.36E 04	5.84E 06	1.43E 05	0.00E-01	1.01E 05
Cs-134	7.10E 09	1.67E 10	7.75E 09	0.00E-01	5.31E 09	2.03E 09	2.08E 08
Cs-136	4.28E 07	1.68E 08	1.13E 08	0.00E-01	9.16E 07	1.44E 07	1.35E 07
Cs-137	1.01E 10	1.35E 10	4.69E 09	0.00E-01	4.59E 09	1.78E 09	1.92E 08
Cs-138	3.64E-11	6.98E-11	3.49E-11	0.00E-01	5.15E-11	6.00E-12	3.17E-14
Ba-139	2.73E-02	1.92E-05	7.96E-04	0.00E-01	1.81E-05	1.32E-05	2.44E-01
Ba-140	1.38E 08	1.69E 05	8.91E 06	0.00E-01	5.74E 04	1.14E 05	2.13E 08
Ba-141	1.19E-21	8.90E-25	3.98E-23	0.00E-01	8.27E-25	6.10E-25	2.54E-27
Ba-142	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
La-140	1.81E 03	8.89E 02	2.37E 02	0.00E-01	0.00E-01	0.00E-01	5.11E 07
La-142	1.30E-04	5.78E-05	1.44E-05	0.00E-01	0.00E-01	0.00E-01	1.76E 00
Ce-141	2.83E 05	1.89E 05	2.17E 04	0.00E-01	8.90E 04	0.00E-01	5.41E 08
Ce-143	9.33E 02	6.79E 05	7.58E 01	0.00E-01	3.04E 02	0.00E-01	2.04E 07
Ce-144	5.27E 07	2.18E 07	2.83E 06	0.00E-01	1.30E 07	0.00E-01	1.33E 10
Pr-143	7.01E 04	2.80E 04	3.49E 03	0.00E-01	1.63E 04	0.00E-01	2.31E 08
Pr-144	2.93E-26	1.20E-26	1.49E-27	0.00E-01	6.88E-27	0.00E-01	3.23E-29
Nd-147	3.66E 04	3.98E 04	2.38E 03	0.00E-01	2.34E 04	0.00E-01	1.44E 08
W-187	3.56E 04	2.90E 04	1.02E 04	0.00E-01	0.00E-01	0.00E-01	7.84E 06
Np-239	1.39E 02	1.31E 02	7.26E 01	0.00E-01	4.10E 02	0.00E-01	2.10E 07

TABLE A.5-15

VEGETATION PATHWAY FACTOR
M^2-MREM/YR PER uCi/sec
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E-01	4.01E 03	4.01E 03	4.01E 03	4.01E 03	4.01E 03	4.01E 03
C-14	8.89E 08	1.78E 08	1.78E 08	1.78E 08	1.78E 08	1.78E 08	1.78E 08
Na-24	3.73E 05	3.73E 05	3.73E 05	3.73E 05	3.73E 05	3.73E 05	3.73E 05
P-32	3.73E 09	1.58E 08	1.30E 08	0.00E-01	0.00E-01	0.00E-01	9.30E 07
Cr-51	0.00E-01	0.00E-01	1.17E 05	6.50E 04	1.78E 04	1.19E 05	6.21E 06
Mn-54	0.00E-01	6.65E 08	1.77E 08	0.00E-01	1.86E 08	0.00E-01	5.58E 08
Mn-56	0.00E-01	1.88E 01	4.24E 00	0.00E-01	2.27E 01	0.00E-01	2.72E 03
Fe-55	8.00E 08	4.24E 08	1.31E 08	0.00E-01	0.00E-01	2.40E 08	7.86E 07
Fe-59	3.97E 08	6.43E 08	3.20E 08	0.00E-01	0.00E-01	1.86E 08	6.69E 08
Co-58	0.00E-01	6.44E 07	1.97E 08	0.00E-01	0.00E-01	0.00E-01	3.76E 08
Co-60	0.00E-01	3.78E 08	1.12E 09	0.00E-01	0.00E-01	0.00E-01	2.10E 09
Ni-63	3.95E 10	2.11E 09	1.34E 09	0.00E-01	0.00E-01	0.00E-01	1.42E 08
Ni-65	1.18E 02	1.11E 01	6.51E 00	0.00E-01	0.00E-01	0.00E-01	1.37E 03
Cu-64	0.00E-01	1.10E 04	6.65E 03	0.00E-01	2.66E 04	0.00E-01	5.16E 05
Zn-65	8.12E 08	2.16E 09	1.35E 09	0.00E-01	1.36E 09	0.00E-01	3.80E 08
Zn-69	1.51E-05	2.19E-05	2.02E-06	0.00E-01	1.33E-05	0.00E-01	1.38E-03
Br-83	0.00E-01	0.00E-01	5.38E 00	0.00E-01	0.00E-01	0.00E-01	3.14E-17
Br-84	0.00E-01	0.00E-01	3.85E-11	0.00E-01	0.00E-01	0.00E-01	1.94E-28

TABLE A.5-15 (Cont'd)

VEGETATION PATHWAY FACTOR
M^2•MREM/YR PER uCi/sec
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Br-85	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
Rb-86	0.00E-01	4.52E 08	2.78E 08	0.00E-01	0.00E-01	0.00E-01	2.91E 07
Rb-88	0.00E-01	4.43E-22	3.08E-22	0.00E-01	0.00E-01	0.00E-01	2.17E-23
Rb-89	0.00E-01	1.67E-26	1.48E-26	0.00E-01	0.00E-01	0.00E-01	1.45E-28
Sr-89	3.60E 10	0.00E-01	1.03E 09	0.00E-01	0.00E-01	0.00E-01	1.39E 09
Sr-90	1.24E 12	0.00E-01	3.15E 11	0.00E-01	0.00E-01	0.00E-01	1.67E 10
Sr-91	5.21E 05	0.00E-01	1.97E 04	0.00E-01	0.00E-01	0.00E-01	1.15E 06
Sr-92	7.29E 02	0.00E-01	2.92E 01	0.00E-01	0.00E-01	0.00E-01	1.38E 04
Y-90	2.30E 04	0.00E-01	6.17E 02	0.00E-01	0.00E-01	0.00E-01	6.56E 07
Y-91M	8.95E-09	0.00E-01	3.26E-10	0.00E-01	0.00E-01	0.00E-01	1.75E-05
Y-91	1.86E 07	0.00E-01	4.99E 03	0.00E-01	0.00E-01	0.00E-01	2.48E 09
Y-92	1.59E 00	0.00E-01	4.54E-02	0.00E-01	0.00E-01	0.00E-01	4.58E 04
Y-93	3.01E 02	0.00E-01	8.26E 00	0.00E-01	0.00E-01	0.00E-01	4.48E 06
Zr-95	3.86E 06	8.49E 05	7.56E 05	0.00E-01	1.22E 06	0.00E-01	8.85E 08
Zr-97	5.70E 02	8.24E 01	4.86E 01	0.00E-01	1.18E 02	0.00E-01	1.25E 07
Nb-95	4.11E 05	1.60E 05	1.14E 05	0.00E-01	1.50E 05	0.00E-01	2.96E 08
Mo-99	0.00E-01	7.71E 06	1.91E 06	0.00E-01	1.65E 07	0.00E-01	6.38E 06
Tc-99M	4.71E 00	9.24E 00	4.86E 01	0.00E-01	1.34E 02	4.69E 00	5.26E 03

TABLE A.5-15 (Cont'd)

VEGETATION PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
Tc-101	1.43E-30	1.49E-30	1.89E-29	0.00E-01	2.55E-29	7.90E-31	4.75E-30
Ru-103	1.53E 07	0.00E-01	5.88E 06	0.00E-01	3.85E 07	0.00E-01	3.96E 08
Ru-105	9.17E 01	0.00E-01	3.33E 01	0.00E-01	8.06E 02	0.00E-01	5.99E 04
Ru-106	7.45E 08	0.00E-01	9.30E 07	0.00E-01	1.01E 09	0.00E-01	1.16E 10
Ag-110M	3.21E 07	2.17E 07	1.73E 07	0.00E-01	4.04E 07	0.00E-01	2.58E 09
Te-125M	3.51E 08	9.50E 07	4.67E 07	9.84E 07	0.00E-01	0.00E-01	3.38E 08
Te-127M	1.32E 09	3.56E 08	1.57E 08	3.16E 08	3.77E 09	0.00E-01	1.07E 09
Te-127	9.85E 03	2.66E 03	2.11E 03	6.82E 03	2.80E 04	0.00E-01	3.85E 05
Te-129M	8.41E 08	2.35E 08	7.88E 07	2.71E 08	2.47E 09	0.00E-01	1.03E 09
Te-129	1.33E-03	3.70E-04	3.15E-04	9.46E-04	3.88E-03	0.00E-01	8.25E-02
Te-131M	1.54E 06	5.33E 05	5.68E 05	1.10E 06	5.16E 06	0.00E-01	2.16E 07
Te-131	2.59E-15	7.90E-16	7.71E-16	1.98E-15	7.84E-15	0.00E-01	1.36E-14
Te-132	7.00E 06	3.10E 06	3.74E 06	4.51E 06	2.88E 07	0.00E-01	3.12E 07
I-130	6.16E 05	1.24E 06	6.41E 05	1.37E 08	1.86E 06	0.00E-01	5.82E 05
I-131	1.43E 08	1.44E 08	8.17E 07	4.76E 10	2.36E 08	0.00E-01	1.28E 07
I-132	9.23E 01	1.70E 02	7.80E 01	7.87E 03	2.60E 02	0.00E-01	2.00E 02
I-133	3.53E 06	4.37E 06	1.65E 06	8.12E 08	7.28E 06	0.00E-01	1.76E 06
I-134	1.56E-04	2.89E-04	1.33E-04	6.65E-03	4.42E-04	0.00E-01	1.92E-04

TABLE A.5-15 (Cont'd)

VEGETATION PATHWAY FACTOR
M^2 MREM/YR PER uCi/sec
CHILD (RI FACTORS)

NUCLIDE	BONE	LIVER	T BODY	THYROID	KIDNEY	LUNG	GI-LLI
I-135	6.26E 04	1.13E 05	5.33E 04	9.98E 06	1.73E 05	0.00E-01	8.59E 04
Cs-134	1.60E 10	2.63E 10	5.55E 09	0.00E-01	8.15E 09	2.93E 09	1.42E 08
Cs-136	8.04E 07	2.21E 08	1.43E 08	0.00E-01	1.18E 08	1.76E 07	7.77E 06
Cs-137	2.39E 10	2.29E 10	3.38E 09	0.00E-01	7.46E 09	2.68E 09	1.43E 08
Cs-138	6.61E-11	9.20E-11	5.83E-11	0.00E-01	6.47E-11	6.96E-12	4.24E-11
Ba-139	5.04E-02	2.69E-05	1.46E-03	0.00E-01	2.35E-05	1.58E-05	2.91E 00
Ba-140	2.77E 08	2.43E 05	1.62E 07	0.00E-01	7.90E 04	1.45E 05	1.40E 08
Ba-141	2.20E-21	1.23E-24	7.16E-23	0.00E-01	1.07E-24	7.24E-24	1.25E-21
Ba-142	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
La-140	3.25E 03	1.14E 03	3.83E 02	0.00E-01	0.00E-01	0.00E-01	3.17E 07
La-142	2.36E-04	7.51E-05	2.35E-05	0.00E-01	0.00E-01	0.00E-01	1.49E 01
Ce-141	6.56E 05	3.27E 05	4.86E 04	0.00E-01	1.43E 05	0.00E-01	4.08E 08
Ce-143	1.72E 03	9.31E 05	1.35E 02	0.00E-01	3.91E 02	0.00E-01	1.36E 07
Ce-144	1.27E 08	3.98E 07	6.78E 06	0.00E-01	2.21E 07	0.00E-01	1.04E 10
Pr-143	1.46E 05	4.38E 04	7.23E 03	0.00E-01	2.37E 04	0.00E-01	1.57E 08
Pr-144	5.44E-26	1.68E-26	2.74E-27	0.00E-01	8.90E-27	0.00E-01	3.62E-23
Nd-147	7.24E 04	5.86E 04	4.54E 03	0.00E-01	3.22E 04	0.00E-01	9.29E 07
W-187	6.47E 04	3.83E 04	1.72E 04	0.00E-01	0.00E-01	0.00E-01	5.38E 07
Np-239	2.56E 03	1.84E 02	1.29E 02	0.00E-01	5.31E 02	0.00E-01	1.36E 07

KANSAS GAS AND ELECTRIC COMPANY

GLENN L. KOESTER
VICE PRESIDENT - NUCLEAR

February 28, 1986

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U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. R. D. Martin, Regional Administrator
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

KMLNRC 86-036
Re: Docket No. STN 50-482
Subj: Semiannual Radiological Effluent Release Report

Gentlemen:

Enclosed is the Wolf Creek Generating Station Semiannual Radiological Effluent Release Report covering the period from July 1, 1985, through December 31, 1985. This report is submitted pursuant to section 6.9.1.7 of the Wolf Creek Generating Station Unit 1 Technical Specifications.

Yours very truly,

Glenn L Koester

Glenn L. Koester
Vice President - Nuclear

GLK:see

cc: PO'Connor (2), w/a
JTaylor, w/a
JCummins, w/a

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