

# **Semi-Annual Radioactive Effluent Release Report**

**January 1, through June 30, 1985**

**Indiana & Michigan Electric Company  
Bridgman, Michigan**

**Docket Nos. 50-315 & 50-316**

**License Nos. DPR-58 & DPR-74**



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## I. INTRODUCTION

This report discusses the radioactive discharges from Units 1 and 2 of the Donald C. Cook Nuclear Plant during the first half of 1985, according to Section 6.9.1.9 of "Appendix A" Technical Specifications for the Facility Operating License.

### Unit 1:

During this reporting period, Unit 1 of the Donald C. Cook Nuclear Plant generated 1,761,840 Mwh Gross of electrical energy. The Monthly Operating Reports indicate that during the reporting period, Unit 1 was operating at a Unit Service Factor of 42.7% and at an average Unit Capacity Factor of 38.3%.

Unit 1 entered this reporting period in Mode 1 at 70% power. On January 11, the unit was removed from service for a scheduled ice condenser surveillance and maintenance outage. The primary maintenance item was to replace the pressurizer safety valves due to leakage problems. The unit was returned to service on January 29, 1985. Unit 1 was removed from service on April 6, 1985 for the ten-year Inservice Inspection and Cycle IX Refueling Outage. The unit remained out of service for the rest of the reporting period.

### Unit 2:

Unit 2 generated 4,439,930 Mwh Gross of electrical energy during the first months of 1985. During the reporting period, Unit 2 operated at an 92.9% Unit Service Factor and at an average Unit Capacity Factor of 93.1%.

Unit 2 entered this reporting period with the Reactor Coolant System, RCS, in Mode 5 and in the process of heating up. On January 3, 1985, approximately 8 hours after the reactor was critical, a loose parts event was detected in steam generators 22 and 23 and the reactor was shut down. Inspections of Steam Generators 22 and 23 revealed parts from broken control rod guide tube split pins. Following a thorough analysis of the event, Unit 2 was returned to service on January 12, 1985. On January 26, 1985, Unit 2 tripped due to a failure of vital instrument bus, CRID III inverter from a component short. The capacitor and diodes were replaced and the unit was returned to service on January 27, 1985. Unit 2 experienced no major shutdown during the rest of the reporting period.

## II. RADIOACTIVE RELEASES

Since a number of release points are common to both Units, the release data from both Units were combined to form this two-Unit, Semi-Annual Radioactive Release Report. Appendix 1 presents this information in accordance with Section 6.9.1.9 of Appendix A to the Facility Operating License (Environmental Technical Specifications). As in reports preceding this one, the effluents were well within the limits set forth in the Technical Specifications and Appendix I to 10 CFR Part 50.

## III. RADIOLOGICAL IMPACT ON MAN

Maximum individual doses were calculated using the measured effluents and meteorological data given in Appendices 1 and 2 of this report, respectively.

### Liquid Releases:

The liquid releases consisted of 29 Batch releases in the first quarter and 42 Batch releases in the second quarter of 1985. These releases were treated as continuous releases for the purpose of dose calculations. The estimated doses in millirems to individuals from the liquid pathways are given in Appendices 1.2 and 1.3.

### Gaseous Releases:

The gaseous releases consisted of 11 Batch releases in the first quarter and 11 Batch releases in the second quarter of 1985. Doses were estimated for the Batch and continuous releases during each of the two quarters using the measured meteorological data at the times of the releases. The estimated doses in millirems to individuals through the gaseous pathways are listed in Appendices 1.2 and 1.3.

## IV. METEOROLOGICAL DATA

Appendices 2.1 and 2.2 contain the cumulative joint-frequency distribution of wind speed and wind direction corresponding to various atmospheric stability classes for both quarters. The meteorological conditions during the first six months of 1985 are also furnished in Appendix 2.3.

## V. PROCESS CONTROL PROGRAM (PCP) CHANGES

The Radioactive Waste Process Control Manual 12 PMP 3150 PCP.001 was rewritten during the report period. This rewrite includes incorporation of change sheets 1 through 6, updated information, cement solidification of resin to meet the stable waste criteria and the equipment, processes and operations for packaging the



Unit 1 control rod guide tubes for disposal. PNSRC approval of the procedure is documented on the procedure cover sheet. These changes did not reduce the overall conformance of the solidified waste product to existing criteria for solid wastes.

VI. OFFSITE DOSE CALCULATION MANUAL CHANGES

The Offsite Dose Calculation Manual PMP 6010 OSD.001 was changed during the report period and these changes are included as Change Sheet Nos. 2-3. The reasons for the changes and PNSRC approval are documented on the cover sheet.

VII. CONCLUSIONS

Based on the information presented in this report, it is concluded that the Units performed their intended design function without causing any hazard to the health and safety of the general public.

APPENDIX 1.1

RADIOACTIVE RELEASE DATA



EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT -1ST HALF  
1985

Supplemental Information

Facility: D.C. Cook Plant  
Licensee: Indiana & Michigan Electric Company

1. Regulatory Limits

A. Noble Gases

The air dose in unrestricted areas due to noble gases released in gaseous effluents shall be limited to the following:

1. During any calendar quarter, to  $\leq 5$  mrad for gamma radiation and  $\leq 10$  mrad for beta radiation;
2. During any calendar year, to  $\leq 10$  mrad for gamma radiation and  $\leq 20$  mrad for beta radiation.

B. Iodines - Particulates

The dose to a member of the public from radioiodines, radioactive materials in particulate form, and radionuclides other than noble gases with half-lives greater than 8 days in gaseous effluents released to unrestricted areas shall be limited to the following:

1. During any calendar quarter to  $\leq 7.5$  mrem to any organ;
2. During any calendar year to  $\leq 15$  mrem to any organ.

C. Liquid Effluents

The dose or dose commitment to an individual from radioactive material in liquid effluents released to unrestricted areas shall be limited:

1. During any calendar quarter to  $\leq 1.5$  mrem to the total body and to  $\leq 5$  mrem to any organ, and:
2. During any calendar year to  $\leq 3$  mrem to the total body and to  $\leq 10$  mrem to any organ.

D. Total Dose

The dose or dose commitment to a real individual from all uranium fuel cycle sources is limited to  $\leq 25$  mrem to the total body or any organ (except the thyroid, which is limited to  $\leq 75$  mrem) over a period of 12 consecutive months.

2. Maximum Permissible Concentrations

A. Gaseous Effluents

The dose rate due to radioactive materials released in gaseous effluents from the site shall be limited to the following:

1. For noble gases:  $\leq 500$  mrem/yr to the total body and  $\leq 3000$  mrem/yr to the skin, and:
2. For all radioiodines and for all radioactive materials in particulate form and radionuclides (other than noble gases) with half-lives greater than 8 days:  $\leq 1500$  mrem/yr to any organ.

The above limits are provided to insure that radioactive material discharged in gaseous effluents will not result in the exposure of an individual in an unrestricted area to annual average concentrations exceeding the limits in 10 CFR Part 20, Appendix B, Table II.

B. Liquid Effluents

The concentration of radioactive material released at any time from the site 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  $2 \times 10^{-4}$   $\mu\text{Ci/ml}$  total activity.

3. Average Energy

The average energy ( $\bar{E}$ ) of the radionuclide mixture in releases of fission and activation gases is not applicable per Regulatory Guide 1.21 Appendix B Section A.3.

4. Measurements and Approximations of Total Radioactivity

A. Fission and Activation Gases

Sampled and analyzed on a 4096 channel analyzer and Ge(Li) detector.

B. Iodines

Sampled on an activated carbon filter or silver zeolite cartridge and analyzed on a 4096 channel analyzer and Ge(Li) detector.

C. Particulates

Sampled on a glass filter and analyzed on a 4096 channel analyzer and Ge(Li) detector.

D. Liquid Effluents

Sampled and analyzed on a 4096 channel analyzer and Ge(Li) detector.

5. Batch Releases

A. Liquid

1. Number of batch releases:

29 releases in the 1st quarter, 1985  
42 releases in the 2nd quarter, 1985

2. Total time period for batch releases:

10,901 minutes

3. Maximum time for a batch release:

179 minutes

4. Average time period for batch release:

154 minutes

5. Minimum time period for a batch release:

136 minutes

6. Average stream flow during periods of release of effluent into a flowing stream:

832,535 gpm circulating water

B. Gaseous

1. Number of batch releases:

11 in 1st quarter, 1985  
11 in 2nd quarter, 1985

2. Total time period of batch releases:  
1617 minutes
3. Maximum time period for a batch release:  
93 minutes
4. Average time period for batch releases:  
74 minutes
5. Minimum time period for a batch release:  
58 minutes

6. Abnormal Releases

A. Liquid

1. Number of Releases:  

<u>1st</u> <u>Quarter</u>	<u>2nd</u> <u>Quarter</u>
0	0
2. Total activity released:  

<u>1st</u> <u>Quarter</u>	<u>2nd</u> <u>Quarter</u>
0	0

B. Gaseous

1. Number of Releases:  

<u>1st</u> <u>Quarter</u>	<u>2nd</u> <u>Quarter</u>
0	0
2. Total activity released:  

<u>1st</u> <u>Quarter</u>	<u>2nd</u> <u>Quarter</u>
0	0



EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT - 1ST HALF 1985

GASEOUS EFFLUENTS - ELEVATED RELEASE

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		1ST QUARTER	2ND QUARTER	1ST QUARTER	2ND QUARTER
1. FISSION GASES					
Krypton-85	Ci	3.65 E+2		2.50 E+1	1.91 E+1
Krypton-85M	Ci	1.67 E-1	9.07 E-2	4.71 E-1	
Krypton-87	Ci	1.16 E-1	8.56 E-2		
Krypton-88	Ci	3.03 E-1	1.43 E-1	5.97 E-1	
Xenon-133	Ci	2.01 E+3	8.41 E+2	4.91 E+2	9.98 E+2
Xenon-135	Ci	3.80 E+1	3.02 E+1	7.58 E 0	4.32 E 0
Xenon-135M	Ci	3.98 E-3	9.98 E-1		
Xenon-138	Ci	6.10 E-2	2.43 E-1		
Xenon-133M	Ci	8.99 E 0	7.22 E 0	3.94 E 0	1.38 E+1
Xenon-131M	Ci	1.94 E+1		2.06 E 0	1.68 E+1
Argon-41	Ci	1.30 E-1	4.28 E-1		
Total for Period	Ci	2.44 E+3	8.80 E+2	5.31 E+2	1.05 E+3
2. IODINES					
Iodine-131	Ci	1.83 E-2	7.85 E-2	3.25 E-3	7.37 E-4
Iodine-133	Ci	9.50 E-4	8.88 E-4	3.28 E-4	3.25 E-4
Iodine-135	Ci		7.71 E-5		
Total for Period	Ci	1.93 E-2	7.95 E-2	3.58 E-3	1.06 E-3
3. PARTICULATES					
Strontium-89	Ci				
Strontium-90	Ci				
Cesium-134	Ci	8.58 E-4	2.64 E-5	3.75 E-6	1.54 E-5
Cesium-137	Ci	8.63 E-4	7.00 E-5	5.74 E-6	1.68 E-5
Iron-59	Ci				
Cobalt-58	Ci	8.09 E-4	2.48 E-5	5.16 E-6	3.46 E-6
Cobalt-60	Ci	4.81 E-4	4.45 E-5	7.91 E-6	2.59 E-6
Manganese-54	Ci	2.71 E-5			
Zinc-65	Ci				
Mobybdenum-99	Ci				
Cerium-141	Ci				
Cerium-144	Ci				
Cesium-136	Ci	2.35 E-5			
Total for Period	Ci	3.06 E-3	1.66 E-4	2.26 E-5	3.83 E-5

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT - 1ST HALF 1985  
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	Units	1ST QUARTER	2ND QUARTER	Est. Total Error, %
A. FISSION AND ACTIVATION GASES				
1. Total release	Ci.	2.97 E+3	1.93 E+3	19.8
2. Average release rate for period.	μCi/sec	3.82 E+2	2.45 E+2	
3. Percent of Technical Specification (T/S 3.11.2.2) limit.	% Y B	2.42E0 4.29E0	2.02E0 2.92E0	
B. IODINES				
1. Total Iodine-131	Ci	2.16 E-2	7.92 E-2	3.0!
2. Average release rate for period.	μCi/Sec	2.78 E-3	1.01 E-2	
3. Percent of Technical Specification (T/S 3.11.2.3) limit.	%	5.49E0	1.73E+1	
C. PARTICULATES				
1. Particulates with half- lives > 8 days.	Ci	3.08 E-3	2.04 E-4	38.8
2. Average release rate for period.	μCi/sec	3.96 E-4	2.60 E-5	
3. Percent of Technical Specification (T/S 3.11.2.3) limit.	%	5.49E0	1.73E+1	
4. Gross alpha radioactivity.	Ci	<5.35 E-5	<5.47 E-5	
D. TRITIUM				
1. Total release.	Ci	1.05 E+1	9.86 E 0	1.0
2. Average release rate for period.	μCi/sec	1.35 E 0	1.25 E 0	
3. Percent of Technical Specification limit. (10 CFR 20)	%	9.94 E 0	5.47 E 0	



EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT - 1ST HALF 1985

LIQUID EFFLUENTS

Nuclides Released		BATCH MODE		CONTINUOUS MODE	
		1ST Quarter	2ND Quarter	1ST Quarter	2ND Quarter
Strontium-92	Ci	2.35 E-3			
Strontium-89	Ci	5.53 E-5	*		
Strontium-90	Ci	5.53 E-5	*		
Cesium-134	Ci	4.31 E-3	2.85 E-2	7.25 E-3	3.00 E-3
Cesium-137	Ci	2.92 E-2	2.58 E-2	8.03 E-3	4.38 E-3
Iodine-131	Ci	6.92 E-3	6.43 E-3	2.24 E-3	2.33 E-4
Iodine-135	Ci				1.77 E-4
Iron-55	Ci	3.34 E-3		7.95 E-2	
Cobalt-58	Ci	2.16 E-1	1.65 E-1	1.46 E-2	1.53 E-3
Cobalt-60	Ci	2.29 E-2	4.34 E-2	7.79 E-3	3.63 E-3
Iron-59	Ci	1.41 E-4			
Zinc-65	Ci	3.52 E-4	1.31 E-3		
Manganese-54	Ci	2.23 E-3	4.20 E-3	3.73 E-4	
Chromium-51	Ci	9.20 E-3	6.24 E-3		
Antimony-125	Ci		9.14 E-4		
Zirconium-Niobium-95	Ci	1.16 E-2	1.07 E-2	7.29 E-5	6.61 E-5
Molybdenum-99	Ci				
Technetium-99M	Ci				
Barium-Lanthanum-140	Ci				
Cerium-141	Ci				
Cesium-136	Ci		4.18 E-4	3.16 E-4	
Sodium-24	Ci				
Iodine-133	Ci	9.79 E-5		1.58 E-4	1.04 E-3
Cobalt-57	Ci	4.73 E-4	6.33 E-4		
Zirconium-97	Ci	8.15 E-5	7.34 E-5		
Silver-110M	Ci	2.16 E-3	4.55 E-3		
Cerium-144	Ci				
Tin-113	Ci	1.57 E-4	1.90 E-4		
Xenon-133	Ci	1.01 E 0	5.39 E-2	3.27 E-2	4.24 E-3
Xenon-131M	Ci		3.20 E-3		
Xenon-133M	Ci	6.25 E-3			
Xenon-135	Ci	2.00 E-2	3.60 E-5	1.76 E-4	1.53 E-2
Argon-41	Ci				

\*Strontium analysis results were unavailable at the time of submittal.

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT - 1ST HALF 1985

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	UNIT	- BATCH		CONTINUOUS		Est. Total Error, %
		Quarter 1	Quarter 2	Quarter 1	Quarter 2	
A. FISSION AND ACTIVATION PRODUCTS						
1. Total Release (Not including Tritium, Alpha, Gases)	Ci	3.12 E-1	2.98 E-1	1.20 E-1	1.41 E-2	2.62
2. Average diluted concentration during period.	µCi/ml	2.60 E-8	1.33 E-8	1.58 E-10	2.54 E-11	
3. Percent of applicable Tech. Spec. 3.11.1.1 limit.	%	2.40 E-1	1.32 E-1	1.23 E-3	4.59 E-4	
B. TRITIUM						
Total Release	Ci	1.94 E+2	2.02 E+2	3.23 E-1	6.37 E 0	0.22
2. Average diluted concentration during period.	µCi/ml	1.62 E-5	9.02 E-6	4.26 E-10	1.15 E-8	
3. Percent of applicable Tech. Spec. 3.11.1.1 limit.	%	5.39 E-1	3.01 E-1	1.42 E-5	3.82 E-4	
C. DISSOLVED AND ENTRAINED GASES						
1. Total Release	Ci	1.04 E 0	5.71 E-2	3.29 E-2	1.95 E-2	4.46
2. Average diluted concentration during period.	µCi/ml	8.67 E-8	2.55 E-9	4.36 E-11	9.51 E-11	
3. Percent of applicable Tech. Spec. 3.11.1.1 limit.	%	4.33 E-2	1.27 E-3	2.17 E-5	1.75 E-5	

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12 THP 6040 PER.405  
ATTACHMENT IX

	<u>UNIT</u>	<u>BATCH</u>		<u>CONTINUOUS</u>		Est. Total Error, %
		Quarter 1	Quarter 2	Quarter 1	Quarter 2	
D. GROSS ALPHA RADIOACTIVITY						
1. Total Release	ci	<1.24 E-3	<1.45 E-3	NA	NA	NA
E. VOLUME OF WASTE RELEASED	Liters	2.24 E+6	3.17 E+6	1.94 E+8	2.16 E+8	2.00
F. VOLUME OF DILUTION WATER USED DURING PERIOD	Liters	1.20 E+10	2.24 E+10	7.58 E+11	5.56 E+11	3.48

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT-1ST HALF 1985

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. Solid Waste Shipped Offsite for Burial or Disposal

1. Type of Waste	Unit	6 month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m <sup>3</sup> Ci	1.66 E+2 7.96 E+2	1 E 0 4 E 0
b. Dry compressible waste, contaminated equipment, etc.	m <sup>3</sup> Ci	2.12 E+2 1.97 E 0	1 E 0 2 E 0
c. Irradiated components, control rods, etc.	m <sup>3</sup> Ci		
d. Other	m <sup>3</sup> Ci		

2. Estimate of Major Nuclide Composition

a.	CS-137	50 %
	CS-134	40 %
	CO-58	5 %
	CO-60	5 %
b.	CO-60	5 %
	CS-137	5 %
	CS-134	5 %
	CO-58	5 %
	CO-60	5 %

3. Solid Waste Disposition

No. of Shipments	Mode of Transportation	Destination
21	Truck	Barnwell, SC
4	Truck	Richland, WA

4. Type of Containers Used for Shipment

Resins - 7A  
Evaporator Bottoms/DAW non-compressible - Strong Tight  
DAW Compressible - 7A  
All were shipped marked Radioactive LSA

5. Solidification Agent

Evaporator bottoms are solidified in cement

RELEASE NUMBER	START DATE	STOP DATE	START TIME	STOP TIME	H-1	I-111	I-113	Xe-133	Xe-131m	Xe-135	Kr-85	Xe-131m	Co-58	Cs-137	Cs-134	Kr-85m	Kr-88
G-85-1	01-01-85	0136			4.47 E-4			2.30 E+1		1.03 E-2	3.25 E0	8.00 E-1		1.73 E-8			
G-85-2	01-03-85	0245			3.26 E-4			6.67 E0			3.39 E0	4.79 E-1	7.81 E-82,35 E-7	4.55 E-8			
G-85-3	01-04-85	0658			3.26 E-4			6.05 E0	7.38E-3		1.13 E0	3.21 E-1	4.64 E-8	4.00 E-8			
G-85-4	01-04-85	1023			3.23 E-3	1.02 E-4		2.97 E+1	1.12 E-1		1.27 E0			5.47 E-8			
G-85-5	01-04-85	1124			8.95 E-3			7.37 E-2		2.05 E-3	5.48 E-1		1.83 E-62,70 E-6				
G-85-6	01-04-85	1933			4.04 E-3	1.93 E-6	3.33 E-79,32 E+1		1.07 E0	1.93 E-1	1.46 E0		6.02 E-8	4.04 E-8			
G-85-7	01-05-85	0136			2.69 E-3	5.50 E-4	9.10 E-46,16 E+1		3.27 E-18,38 E-2	1.59 E0			9.91 E-8	5.29 E-8			
G-85-8	01-05-85	0253			1.98 E-3	1.21 E-5	1.96 E-46,59 E+1		3.65 E-1	5.20 E-2	3.24 E0		9.77 E-84,14 E-7	1.27 E-7			
G-85-9	01-05-85	1114			2.85 E-3	1.58 E-4	4.52 E-73,25 E+1		4.11 E-46,56 E-1				7.65 E-8		4.22 E-8		
G-85-10	01-05-85	1522			3.06 E-3	1.87 E-6	4.25 E-75,09 E+1		4.74 E-42,23 E-1	1.46 E0			2.54 E-7				
G-85-11	01-13-85	0540			9.90 E-3	2.96 E-3	3.26 E-68,99 E+1		1.02 E0	6.36 E0	2.24 E0		5.51 E-61,08 E-6	5.23 E-6	3.58 E-6	4.71 E-1	5.97 E-1
G-85-12	01-15-85	0640			9.14 E-4	1.87 E-6	8.96 E-8	5.43 E+6	1.56 E-1	3.40 E0			8.40 E-82,95 E-7	7.38 E-8	8.27 E-8		
G-85-13	01-15-85	0545															
G-85-14	02-02-85	0147			3.77 E-6	2.65 E-6	3.05 E-7	7.20 E0		1.98 E0	4.63 E-1	6.00 E-8	1.50 E-7	5.76 E-85,18 E-8			
G-85-15	02-02-85	0304			2.06 E-2	3.09 E-4	3.25 E-4	3.11 E+1	3.86 E-1	6.50 E-1		3.51 E-1	1.32 E-6	1.33 E-5	1.49 E-5		
G-85-16	04-07-85	2035			4.49 E-4	1.03 E-7		4.06 E0		1.65 E-2	1.92 E0	4.57 E-1	3.28 E-8	3.50 E-8	3.18 E-8		
G-85-17	04-08-85	0132			3.38 E-6	5.57 E-8		6.81 E0		4.27 E-3	1.50 E0	1.09 E-1	6.06 E-8		2.67 E-8		
G-85-18	04-08-85	0607			8.33 E-3	6.00 E-7		1.25 E+2	1.54 E0	4.75 E-1	2.54 E0	1.40 E0					
G-85-19	04-08-85	1959			2.09 E-2	1.45 E-6	2.32E-7	1.33 E+2	1.79 E0	6.28 E-1	1.81 E0	1.65 E0	2.28 E-7				
G-85-20	04-10-85	0040			7.07 E-2	1.81 E-6		2.52 E+2	6.01 E0	2.26 E0	3.23 E0	4.68 E0	1.24 E-7				
G-85-21	04-09-85	0152			8.13 E-3	6.35 E-7		6.21 E+1	8.51 E-1	9.80 E-2	6.10 E-18,58E-1	2.01 E-7	2.35 E-7	2.30 E-7	2.22 E-7		
G-85-22	04-10-85	1833			1.87 E-2	6.01 E-7		1.25 E+2	1.60 E0	1.89 E-18,21 E-1	1.59 E0			1.71 E-7	71 E-7		
G-85-23	04-11-85	0613															
G-85-24	04-11-85	0725															







EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT - 2ND HALF 1984  
REVISED

LIQUID EFFLUENTS

Nuclides Released	BATCH MODE		CONTINUOUS MODE	
	3RD Quarter	4TH Quarter	3RD Quarter	4TH Quarter
Strontium - 92	Ci 1.74 E-3	2.25 E-3		
Strontium-89	Ci 1.13 E-5	2.63 E-5		2.29 E-4
Strontium-90	Ci 1.31 E-5	4.57 E-6		
Cesium-134	Ci 6.85 E-3	3.78 E-2	2.12 E-3	2.28 E-3
Cesium-137	Ci 1.53 E-2	4.85 E-2	5.74 E-3	2.96 E-3
Iodine-131	Ci 2.04 E-3	2.71 E-3	1.18 E-3	3.23 E-5
Strontium - 85	Ci	3.48 E-5		
Iron - 55	Ci 9.84 E-4	3.97 E-4		9.19 E-3
Cobalt-58	Ci 6.30 E-2	5.36 E-2	4.39 E-2	7.63 E-3
Cobalt-60	Ci 4.43 E-2	5.28 E-2	1.72 E-2	9.47 E-3
Iron-59	Ci 5.69 E-5			
Zinc-65	Ci 7.31 E-4	5.34 E-4		
Manganese-54	Ci 1.79 E-3	2.21 E-3	2.92 E-4	3.32 E-4
Chromium-51	Ci 2.86 E-3	2.51 E-3		
Antimony - 124	Ci	1.71 E-5		
Antimony - 125	Ci	3.11 E-4		8.34 E-5
Zirconium-Niobium-95	Ci 3.14 E-3	2.79 E-3	8.47 E-4	6.77 E-4
Molybdenum-99	Ci			
Technetium-99M	Ci			
Barium-Lanthanum-140	Ci			
Cerium-141	Ci			
Tin - 113	Ci 1.01 E-4			
Cesium-136	Ci			
Sodium-24	Ci			
Iodine-133	Ci		8.00 E-4	2.90 E-5
Cobalt-57	Ci 7.42 E-5	2.32 E-4		
Zirconium-97	Ci 7.36 E-5	4.31 E-5		
Silver-110M	Ci 4.94 E-3	5.48 E-3		
Cerium-144	Ci			
Krypton - 85	Ci 6.46 E-3	1.91 E-2		
Xenon-133	Ci 6.77 E-3	2.77 E-3	5.22 E-2	5.56 E-3
Xenon-131M	Ci 5.27 E-4			
Xenon-133M	Ci 1.13 E-1	2.20 E-2		
Xenon-135	Ci 2.30 E-1	5.06 E-3	1.49 E-5	1.49 E-5
Argon-41	Ci			
Krypton - 85m	Ci 7.72 E-4			

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT - 2ND HALF 1984  
REVISED

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	UNIT	- BATCH		CONTINUOUS		Est. Total Error, %
		Quarter 3	Quarter 4	Quarter 3	Quarter 4	
A. FISSION AND ACTIVATION PRODUCTS						
1. Total Release (Not including Tritium, Alpha, Gases)	Ci	2.18 E-1	2.88 E-1	7.21E-2	3.29 E-2	5.91
2. Average diluted concentration during period.	µCi/ml	7.45 E-9	1.46 E-8	8.43E-11	3.83 E-11	
3. Percent of applicable limit.	%	3.69 E-2	9.30 E-2	7.41E-4	1.21E-4	
B. TRITIUM						
Total Release	Ci	4.32 E+2	5.59E+2	6.44E-1	7.06E-1	0.24
2. Average diluted concentration during period.	µCi/ml	1.47 E-5	2.84E-5	7.53E-10	8.21E-10	
3. Percent of applicable limit.	%	4.91 E-1	9.46E-1	2.51E-5	2.74E-5	
C. DISSOLVED AND ENTRAINED GASES						
1. Total Release	Ci	7.12 E 0	2.82 E 0	5.22E-2	5.57E-3	5.54
2. Average diluted concentration during period.	µCi/ml	2.43 E-7	1.43E-7	6.11E-11	6.48E-12	
3. Percent of applicable limit.	%	1.22 E-1	7.16E-2	3.05E-5	3.24E-6	

APPENDIX 1.2

SUMMARY OF MAXIMUM INDIVIDUAL DOSES  
FOR FIRST QUARTER OF 1985

The following distances were used in the calculation of the maximum individual doses:

<u>SECTOR - DIRECTION</u>	<u>SITE BOUNDARY (METERS)</u>	<u>NEAREST RESIDENCE (METERS)</u>
B - NNE	617	814
C - NE	789	1052
D - ENE	1497	1852
E - E	1274	1705
F - ESE	972	1628
G - SE	629	914
H - SSE	594	1093
J - S	594	863
K - SSW	629	770

SUMMARY OF MAXIMUM INDIVIDUAL DOSES - 1ST QUARTER  
1985

EFFLUENT	APPLICABLE ORGAN	ESTIMATED DOSE (MREM)	AGE GROUP	LOCATION DIST DIR (M)(Toward)	% OF APPLICABLE LIMIT	Quarterly LIMIT (MR)
Liquid	Total Body	1.18 E-1	Adult	Receptor 1	7.87 E 0	1.5
Liquid	Liver	1.72 E-1	Teen	Receptor 1	3.44 E 0	5.0
Noble Gas	Air Dose (Gamma-mrad)	1.21 E-1	All	594 S	2.42 E 0	5.0
Noble Gas	Air Dose (Beta-mrad)	4.29 E-1	All	594 S	4.29 E 0	10.0
Noble Gas	Total Body	2.85 E-2	All	814 NNE	5.70 E-1	Yearly 5.0
Noble Gas	Skin	1.00 E-1	All	814 NNE	6.67 E-1	Yearly 15.0
Iodines and Particulates	Thyroid	4.12 E-1	Child	914 SE	5.49 E 0	7.5

FOR RECEPTOR NUMBER 1

TOTAL LIQUID DOSE ACCUMULATIONS(REM)  
 START DATE 85 1 1 1 END DATE 85 33124  
 BONE LIVER T.BODY THYRD KIDNEY LUNG GI-LLI SKIN

WATER									
ADULT	7.2E-07	5.0E-06	5.5E-06	0.4E-06	5.1E-06	4.0E-06	5.0E-06	0.0E+00	
TEEN	7.0E-07	4.4E-06	3.0E-06	6.5E-06	3.7E-06	3.4E-06	4.0E-06	0.0E+00	
CHILD	2.0E-06	0.5E-06	6.0E-06	1.4E-05	7.0E-06	5.6E-06	6.0E-06	0.0E+00	
INFANT	2.1E-06	0.0E-06	6.7E-06	1.0E-05	6.0E-06	6.5E-06	6.5E-06	0.0E+00	
SHORE									
ADULT	1.1E-07	1.1E-07	1.1E-07	1.1E-07	1.1E-07	1.1E-07	1.1E-07	1.2E-07	
TEEN	6.0E-07	6.0E-07	5.0E-07	6.0E-07	5.0E-07	5.0E-07	5.0E-07	6.0E-07	
CHILD	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.4E-07	
INFANT	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	
FW SPT FISH									
ADULT	1.1E-04	1.6E-04	1.1E-04	4.3E-06	5.5E-05	1.0E-05	0.0E-05	0.0E+00	
TEEN	1.1E-04	1.7E-04	6.3E-05	4.0E-06	5.6E-05	2.2E-05	6.2E-05	0.0E+00	
CHILD	1.4E-04	1.5E-04	2.5E-05	4.1E-06	4.9E-05	1.7E-05	2.2E-05	0.0E+00	
INFANT	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	

ENTER: [RETURN] CONTINUE. [SO] START OVER. [EX] EXIT



11

TOTAL LIQUID DOSE ACCUMULATIONS(MG)  
 START DATE 05 1 1 END DATE 05 3124  
 BONE LIVER T. BODY THYRD KIDNEY LUNG 01-LL1 SKIN  
 TOTAL 1.1E-04 1.7E-04 1.2E-04 1.3E-05 6.0E-05 2.3E-05 0.4E-05 1.2E-07  
 ADULT 1.1E-04 1.7E-04 6.0E-05 1.1E-05 8.1E-05 2.6E-05 6.7E-05 6.0E-07  
 TEEN 1.4E-04 1.6E-04 3.2E-05 1.0E-05 5.5E-05 2.4E-05 2.0E-05 1.4E-07  
 CHILD 2.1E-06 9.0E-06 6.7E-06 1.0E-05 6.0E-06 6.5E-06 6.5E-06 0.0E+00  
 INFANT

ENTER: (N) RECEPTOR NUMBER (1-5)  
 (X) EXIT  
 (RETURN) GO BACK TO PREVIOUS OPTION

DOSE TYPE  
 ENTER: [GA] GAMMA  
 [BE] BETA  
 [RETURN] GO BACK TO PREVIOUS OPTION

GA  
 DATES OF TOTAL AIR DOSE ACCUMULATION ARE FROM 05 1 1 0 TO 05 33124 0

DOSE ACCUMULATION FOR GAMMA		RAD		
**DIRECTION FROM N				
1.2145E-04	1.4724E-05	6.5442E-06	3.7264E-06	2.5472E-06
1.2003E-06	4.3051E-07	2.0261E-07	1.2401E-07	7.3003E-08
**DIRECTION FROM NNE				
4.0211E-05	5.4360E-06	2.5015E-06	1.4650E-06	1.0102E-06
5.0015E-07	1.0037E-07	0.1240E-08	5.7304E-08	3.5337E-08
**DIRECTION FROM NE				
1.0551E-04	1.2374E-05	5.4006E-06	3.1297E-06	2.1223E-06
0.0530E-07	3.4253E-07	1.5006E-07	0.6003E-08	5.6371E-08
**DIRECTION FROM ENE				
6.5066E-05	7.0727E-06	3.6567E-06	2.1327E-06	1.4717E-06
7.1055E-07	2.6301E-07	1.2704E-07	0.6616E-08	4.0105E-08
**DIRECTION FROM E				
1.3331E-04	1.6641E-05	7.7654E-06	4.5750E-06	3.1820E-06
1.5610E-06	5.0463E-07	2.0250E-07	1.0606E-07	1.1501E-07
**DIRECTION FROM ESE				
0.1647E-05	1.0037E-05	4.0115E-06	2.0445E-06	1.0524E-06
0.3107E-07	3.3062E-07	1.6100E-07	1.0005E-07	6.0655E-08
**DIRECTION FROM SE				
1.2010E-04	1.4310E-05	6.6401E-06	3.9220E-06	2.7236E-06
1.3315E-06	5.0550E-07	2.4050E-07	1.5000E-07	0.7742E-08
**DIRECTION FROM SSE				
0.0034E-05	1.0502E-05	4.0200E-06	2.0230E-06	1.0665E-06
0.7006E-07	3.6061E-07	1.0140E-07	1.1530E-07	7.1610E-08
**DIRECTION FROM S				
7.5750E-05	0.0015E-06	4.4074E-06	2.6705E-06	1.0035E-06
0.6517E-07	3.0644E-07	1.0417E-07	1.2506E-07	7.0403E-08
**DIRECTION FROM SSW				
1.2254E-04	1.4046E-05	7.1410E-06	4.2006E-06	3.0001E-06
1.4005E-06	5.0500E-07	2.0164E-07	1.0602E-07	1.1710E-07
**DIRECTION FROM SW				
1.4201E-04	1.7150E-05	7.0163E-06	4.5370E-06	3.1353E-06
1.5204E-06	5.6400E-07	2.7357E-07	1.7213E-07	1.0502E-07
**DIRECTION FROM WSW				
1.6603E-04	1.0240E-05	0.2262E-06	4.7505E-06	3.2505E-06
1.5556E-06	5.6573E-07	2.7004E-07	1.6014E-07	1.0213E-07
**DIRECTION FROM W				
1.1717E-04	1.3060E-05	6.2126E-06	3.5674E-06	2.4425E-06
1.1610E-06	4.1013E-07	1.0073E-07	1.2345E-07	7.3002E-08
**DIRECTION FROM WNW				
0.7327E-05	1.0603E-05	4.7601E-06	2.7340E-06	1.0627E-06
0.7420E-07	3.1163E-07	1.4030E-07	0.2447E-08	5.5427E-08
**DIRECTION FROM NW				
5.0313E-05	7.5045E-06	3.4053E-06	1.0670E-06	1.3453E-06
6.3602E-07	2.2004E-07	1.0000E-07	6.7000E-08	4.0003E-08
**DIRECTION FROM NNW				
5.0744E-05	6.7006E-06	3.0100E-06	1.7366E-06	1.2006E-06
5.0602E-07	2.1002E-07	1.0600E-07	6.7001E-08	4.1000E-08

DISTANCES USED IN CALCULATIONS  
 504.0 2416.0 4020.0 5630.0 7240.0  
 12067.0 24135.0 40225.0 56315.0 80500.0  
 ENTER: [RETURN] WHEN READY TO CONTINUE

DOSE TYPE  
 ENTER: (GA) GAMMA  
 (BE) BETA  
 (RETURN) GO BACK TO PREVIOUS OPTION

BE  
 DATES OF TOTAL AIR DOSE ACCUMULATION ARE FROM 05 1 1 0 TO 05 33124 0

DOSE ACCUMULATION FOR BETA RAD

**DIRECTION FROM N				
4.2030E-04	5.2142E-05	2.3101E-05	1.3201E-05	0.0271E-06
4.2066E-06	1.5203E-06	7.2020E-07	4.4304E-07	2.6305E-07
**DIRECTION FROM NNE				
1.5221E-04	1.7000E-05	7.0102E-06	4.5640E-06	3.1627E-06
1.5407E-06	5.7467E-07	2.7706E-07	1.7340E-07	1.0636E-07
**DIRECTION FROM NE				
3.3706E-04	3.0600E-05	1.7555E-05	1.0001E-05	6.7011E-06
3.1401E-06	1.0030E-06	5.0743E-07	3.0033E-07	1.7006E-07
**DIRECTION FROM ENE				
2.4125E-04	2.0300E-05	1.3510E-05	7.0000E-06	5.4405E-06
2.6270E-06	0.7612E-07	4.7363E-07	2.0066E-07	1.0236E-07
**DIRECTION FROM E				
5.0141E-04	6.2703E-05	2.0273E-05	1.7271E-05	1.2011E-05
5.0020E-06	2.2447E-06	1.1040E-06	7.0211E-07	4.3301E-07
**DIRECTION FROM ESE				
3.1002E-04	3.7534E-05	1.6022E-05	0.7640E-06	6.6036E-06
3.1607E-06	1.1412E-06	5.4226E-07	3.3620E-07	2.0000E-07
**DIRECTION FROM SE				
4.5223E-04	5.3001E-05	2.5067E-05	1.4777E-05	1.0250E-05
5.0130E-06	1.0020E-06	0.9573E-07	5.0513E-07	3.6700E-07
**DIRECTION FROM SSE				
3.2450E-04	3.0756E-05	1.7720E-05	1.0320E-05	7.1710E-06
3.5255E-06	1.3320E-06	6.5240E-07	4.1300E-07	2.5620E-07
**DIRECTION FROM S				
2.6504E-04	3.1601E-05	1.5460E-05	0.4107E-06	6.6002E-06
3.4160E-06	1.3743E-06	6.0106E-07	4.4614E-07	2.0413E-07
**DIRECTION FROM SSW				
4.1011E-04	5.0504E-05	2.4160E-05	1.4520E-05	1.0102E-05
5.0604E-06	1.0707E-06	0.0373E-07	6.2066E-07	3.0401E-07
**DIRECTION FROM SW				
5.2143E-04	6.2736E-05	2.0507E-05	1.6527E-05	1.1404E-05
5.5143E-06	2.0404E-06	0.0600E-07	6.1051E-07	3.7705E-07
**DIRECTION FROM WSW				
5.0002E-04	5.0736E-05	2.6303E-05	1.5210E-05	1.0420E-05
4.0724E-06	1.0046E-06	0.6376E-07	6.3066E-07	3.2500E-07
**DIRECTION FROM W				
4.2067E-04	5.0440E-05	2.2523E-05	1.2007E-05	0.0105E-06
4.1670E-06	1.4003E-06	7.0450E-07	4.3620E-07	2.6000E-07
**DIRECTION FROM WNW				
3.7170E-04	4.0531E-05	1.7054E-05	1.0202E-05	6.0050E-06
3.2613E-06	1.1521E-06	5.4560E-07	3.3077E-07	2.0003E-07
**DIRECTION FROM NW				
2.5077E-04	2.0244E-05	1.2506E-05	7.2440E-06	4.0256E-06
2.3163E-06	0.2400E-07	3.0021E-07	2.4102E-07	1.4460E-07
**DIRECTION FROM NNW				
2.510E-04	2.4120E-05	1.0731E-05	6.1545E-06	4.2417E-06
2.0563E-06	7.6071E-07	3.7017E-07	2.3447E-07	1.4410E-07

DISTANCES USED IN CALCULATIONS  
 504.0 2416.0 4020.0 5630.0 7240.0  
 12067.0 24135.0 40225.0 56315.0 80500.0  
 ENTER: (RETURN) WHEN READY TO CONTINUE

THIS IS TOTAL ACCUMULATION  
INDIVIDUAL DOSES (REM) DUE TO GASEOUS EFFLUENT  
FOR DATES 05 1 1 THRU 05 33124

T.BODY GI-TRCT BONE LIVER KIDNEY THYRD LUNG SKIN

PLUME PATHWAY, DIST GP= 1, 814. METERS, WINDS TOWARD NNE  
ADULT 2.0E-05 2.0E-05 2.0E-05 2.0E-05 2.0E-05 2.0E-05 2.0E-05 3.0E-05 1.0E-04  
TEEN 2.0E-05 2.0E-05 2.0E-05 2.0E-05 2.0E-05 2.0E-05 2.0E-05 3.0E-05 1.0E-04  
CHILD 2.0E-05 2.0E-05 2.0E-05 2.0E-05 2.0E-05 2.0E-05 2.0E-05 3.0E-05 1.0E-04  
INFNT 2.0E-05 2.0E-05 2.0E-05 2.0E-05 2.0E-05 2.0E-05 2.0E-05 3.0E-05 1.0E-04

GROUND PATHWAY, DIST GP= 1, 814. METERS, WINDS TOWARD NNE  
ADULT 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 8.5E-06  
TEEN 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 8.5E-06  
CHILD 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 8.5E-06  
INFNT 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 7.3E-06 8.5E-06

VEGET PATHWAY, DIST GP= 1, 814. METERS, WINDS TOWARD NNE  
ADULT 3.4E-06 8.1E-07 2.0E-06 4.6E-06 1.0E-06 8.5E-06 4.0E-07 7.0E-07  
TEEN 2.0E-06 8.1E-07 3.0E-06 5.0E-06 2.0E-06 7.1E-06 8.3E-07 9.0E-07  
CHILD 2.3E-06 5.3E-07 9.1E-06 1.1E-05 3.0E-06 1.1E-04 1.2E-06 1.4E-06  
INFNT 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06

MEAT PATHWAY, DIST GP= 1, 7725. METERS, WINDS TOWARD NNE  
ADULT 0.3E-00 5.7E-00 5.0E-00 1.1E-00 4.5E-00 2.3E-07 1.1E-00 4.3E-11  
TEEN 4.0E-00 3.1E-00 4.0E-00 8.6E-00 3.6E-00 1.7E-07 1.0E-00 2.5E-11  
CHILD 3.0E-00 1.6E-00 8.0E-00 1.1E-00 4.4E-00 2.5E-07 1.2E-00 3.1E-11  
INFNT 0.0E-00 0.0E-00 0.0E-00 0.0E-00 0.0E-00 0.0E-00 0.0E-00 0.0E-00

COW PATHWAY, DIST GP= 1, 8845. METERS, WINDS TOWARD NNE  
ADULT 5.0E-00 7.4E-00 5.6E-00 0.6E-00 5.7E-00 5.0E-06 0.6E-00 0.5E-11  
TEEN 7.3E-00 9.6E-00 1.0E-07 1.7E-07 1.0E-07 9.4E-06 1.7E-08 1.2E-10  
CHILD 7.3E-00 7.4E-00 2.4E-07 2.0E-07 1.6E-07 1.0E-06 2.6E-08 2.0E-10  
INFNT 9.0E-00 7.2E-00 4.1E-07 5.6E-07 2.7E-07 4.5E-05 4.6E-08 3.0E-10

GOAT PATHWAY, DIST GP= 1, 3845. METERS, WINDS TOWARD NNE  
ADULT 1.0E-07 1.0E-00 1.5E-07 2.5E-07 1.1E-07 7.1E-06 2.6E-08 1.0E-10  
TEEN 1.0E-07 1.3E-00 2.6E-07 4.4E-07 2.0E-07 1.1E-05 5.1E-08 2.5E-10  
CHILD 1.5E-07 1.0E-00 6.1E-07 7.4E-07 3.2E-07 2.2E-05 7.7E-08 4.0E-10  
INFNT 1.0E-07 1.0E-00 1.0E-06 1.4E-06 5.3E-07 5.4E-05 1.4E-07 6.1E-10

[NHAL PATHWAY, DIST GP= 1, 814. METERS, WINDS TOWARD NNE  
ADULT 5.0E-00 2.2E-00 4.7E-00 8.0E-00 6.6E-00 8.6E-06 2.2E-07 4.4E-00  
TEEN 5.3E-00 2.1E-00 6.5E-00 1.1E-07 8.0E-08 1.1E-05 3.1E-07 4.4E-00  
CHILD 3.6E-00 1.1E-00 8.0E-00 1.0E-07 8.2E-08 1.2E-05 2.6E-07 3.0E-00  
INFNT 2.1E-00 4.5E-00 6.0E-00 7.0E-00 5.2E-08 1.1E-05 1.7E-07 2.2E-00  
ENTER: [SO] START OVER  
[EX] EXIT  
[RETURN] CONTINUE

THIS IS TOTAL ACCUMULATION  
INDIVIDUAL DOSES(REM) DUE TO GASEOUS EFFLUENT  
FOR DATES 85 1 1 1 THRU 85 33124

1. BODY GI-TRCT BONE LIVER KIDNEY THYRD LUNG SKIN

PLUME PATHWAY, DIST GP= 1, 1852. METERS. WINDS TOWARD NE  
ADULT 2.1E-05 2.1E-05 2.1E-05 2.1E-05 2.1E-05 2.1E-05 2.2E-05 7.7E-05  
TEEN 2.1E-05 2.1E-05 2.1E-05 2.1E-05 2.1E-05 2.1E-05 2.2E-05 7.7E-05  
CHILD 2.1E-05 2.1E-05 2.1E-05 2.1E-05 2.1E-05 2.1E-05 2.2E-05 7.7E-05  
INFNT 2.1E-05 2.1E-05 2.1E-05 2.1E-05 2.1E-05 2.1E-05 2.2E-05 7.7E-05

GROUND PATHWAY, DIST GP= 1, 1852. METERS. WINDS TOWARD NE  
ADULT 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 9.4E-06  
TEEN 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 9.4E-06  
CHILD 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 9.4E-06  
INFNT 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 9.4E-06

VEGET PATHWAY, DIST GP= 1, 1852. METERS. WINDS TOWARD NE  
ADULT 3.5E-06 9.2E-07 2.7E-06 4.7E-06 1.0E-06 0.2E-06 4.0E-07 4.5E-06  
TEEN 3.5E-06 9.2E-07 4.1E-06 7.0E-06 2.6E-06 7.6E-06 5.5E-07 5.2E-06  
CHILD 2.4E-06 6.8E-07 0.3E-06 1.1E-06 4.0E-06 1.2E-06 1.3E-06 8.0E-06  
INFNT 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06 8.0E-06

MEAT PATHWAY, DIST GP= 1, 7726. METERS. WINDS TOWARD NE  
ADULT 1.3E-08 1.0E-08 0.4E-08 1.7E-08 7.1E-08 3.0E-07 1.7E-08 3.0E-11  
TEEN 6.4E-08 5.4E-08 7.7E-08 1.4E-08 5.6E-08 2.0E-07 1.6E-08 1.0E-11  
CHILD 4.0E-08 2.7E-08 1.4E-08 1.7E-08 7.0E-08 4.2E-07 1.0E-08 2.2E-11  
INFNT 8.0E-08 8.0E-08 8.0E-08 8.0E-08 8.0E-08 8.0E-08 8.0E-08 8.0E-08

COW PATHWAY, DIST GP= 1, 8845. METERS. WINDS TOWARD NE  
ADULT 1.1E-07 1.2E-08 8.0E-08 1.5E-07 0.2E-08 0.0E-06 1.3E-08 6.0E-11  
TEEN 1.2E-07 1.6E-08 1.5E-07 2.6E-07 1.6E-07 1.5E-05 2.7E-08 8.7E-11  
CHILD 1.2E-07 1.2E-08 3.0E-07 4.5E-07 2.6E-07 3.1E-05 4.0E-08 1.4E-10  
INFNT 1.6E-07 1.2E-08 6.5E-07 8.0E-07 4.4E-07 7.4E-05 7.2E-08 2.1E-10

GOAT PATHWAY, DIST GP= 1, 8845. METERS. WINDS TOWARD NE  
ADULT 2.0E-07 1.7E-08 2.3E-07 4.0E-07 1.0E-07 1.2E-05 4.0E-08 1.4E-10  
TEEN 3.0E-07 2.2E-08 4.1E-07 7.0E-07 3.2E-07 1.0E-05 0.0E-08 1.9E-10  
CHILD 2.6E-07 1.7E-08 0.7E-07 1.2E-05 5.2E-07 3.7E-05 1.2E-07 2.1E-10  
INFNT 2.0E-07 1.6E-08 1.6E-06 2.3E-06 8.4E-07 8.0E-05 2.1E-07 4.2E-10

NPAL PATHWAY, DIST GP= 1, 1852. METERS. WINDS TOWARD NE  
ADULT 4.2E-08 1.6E-08 3.5E-08 5.0E-08 4.0E-08 6.5E-06 1.6E-07 2.5E-09  
TEEN 3.0E-08 1.5E-08 4.0E-08 7.0E-08 6.5E-08 8.0E-06 2.4E-07 2.5E-09  
CHILD 2.6E-08 1.2E-08 3.4E-08 7.3E-08 6.1E-08 8.0E-06 1.0E-07 2.2E-09  
INFNT 1.5E-08 3.0E-08 4.4E-08 5.0E-08 3.0E-08 8.1E-06 1.3E-07 1.3E-09

ENTER: :SOI START OVER  
:EX: EXIT  
:RETURN: CONTINUE



THIS IS TOTAL ACCUMULATION  
INDIVIDUAL DOSES(REM) DUE TO GASEOUS EFFLUENT  
FOR DATES 05 11 1 THRU 05 33124

T.BODY GI-TRCT BONE LIVER KIDNEY THYRD LUNG SKIN

PLUME PATHWAY, DIST GP= 1, 1852. METERS, WINDS TOWARD ENE  
ADULT 1.1E-05 1.1E-05 1.1E-05 1.1E-05 1.1E-05 1.1E-05 1.2E-05 3.0E-05  
TEEN 1.1E-05 1.1E-05 1.1E-05 1.1E-05 1.1E-05 1.1E-05 1.2E-05 3.0E-05  
CHILD 1.1E-05 1.1E-05 1.1E-05 1.1E-05 1.1E-05 1.1E-05 1.2E-05 3.0E-05  
INFNT 1.1E-05 1.1E-05 1.1E-05 1.1E-05 1.1E-05 1.1E-05 1.2E-05 3.0E-05

GROUND PATHWAY, DIST GP= 1, 1852. METERS, WINDS TOWARD ENE  
ADULT 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.0E-06  
TEEN 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.0E-06  
CHILD 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.0E-06  
INFNT 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.1E-06 5.0E-06

VEGET PATHWAY, DIST GP= 1, 1852. METERS, WINDS TOWARD ENE  
ADULT 2.0E-06 5.0E-07 3.3E-06 3.0E-06 1.0E-06 1.5E-04 3.0E-07 4.3E-09  
TEEN 2.0E-06 5.0E-07 3.3E-06 3.0E-06 1.0E-06 1.5E-04 3.0E-07 4.3E-09  
CHILD 2.0E-06 5.0E-07 3.3E-06 3.0E-06 1.0E-06 1.5E-04 3.0E-07 4.3E-09  
INFNT 8.0E-08 8.0E-08 8.0E-08 8.0E-08 8.0E-08 8.0E-08 8.0E-08 8.0E-08

MEAT PATHWAY, DIST GP= 1, 3652. METERS, WINDS TOWARD ENE  
ADULT 9.7E-08 5.0E-08 7.3E-08 1.3E-07 5.7E-08 5.0E-06 1.2E-08 2.0E-10  
TEEN 4.0E-08 2.7E-08 6.0E-08 1.0E-07 5.3E-08 4.2E-06 1.1E-08 1.2E-10  
CHILD 3.7E-08 1.4E-08 1.1E-07 1.3E-07 6.7E-08 6.3E-06 1.3E-08 1.4E-10  
INFNT 8.0E-08 8.0E-08 8.0E-08 8.0E-08 8.0E-08 8.0E-08 8.0E-08 8.0E-08

COW PATHWAY, DIST GP= 1, 8845. METERS, WINDS TOWARD ENE  
ADULT 2.6E-07 4.1E-08 2.3E-07 3.7E-07 3.0E-07 4.2E-05 2.7E-08 1.5E-10  
TEEN 3.0E-07 5.4E-08 4.1E-07 6.5E-07 5.3E-07 6.6E-05 5.4E-08 1.0E-10  
CHILD 3.5E-07 4.2E-08 9.7E-07 1.1E-06 8.7E-07 1.3E-04 8.2E-08 3.1E-10  
INFNT 5.4E-07 4.1E-08 1.7E-06 2.3E-06 1.5E-06 3.2E-04 1.4E-07 4.6E-10

GOAT PATHWAY, DIST GP= 1, 8845. METERS, WINDS TOWARD ENE  
ADULT 6.4E-07 5.5E-08 5.2E-07 8.0E-07 5.1E-07 5.0E-05 8.2E-08 3.0E-10  
TEEN 6.0E-07 7.2E-08 9.3E-07 1.6E-06 8.0E-07 7.0E-05 1.5E-07 4.0E-10  
CHILD 6.6E-07 5.6E-08 2.2E-06 2.6E-06 1.5E-06 1.6E-04 2.4E-07 6.2E-10  
INFNT 8.6E-07 5.5E-08 3.0E-06 5.2E-06 2.4E-06 3.0E-04 4.3E-07 9.5E-10

INHAL PATHWAY, DIST GP= 1, 1852. METERS, WINDS TOWARD ENE  
ADULT 2.4E-08 8.5E-09 2.0E-08 3.4E-08 3.4E-08 5.0E-06 5.4E-08 2.4E-09  
TEEN 2.3E-08 8.4E-09 2.0E-08 3.4E-08 3.4E-08 5.0E-06 5.4E-08 2.4E-09  
CHILD 1.0E-08 4.6E-09 3.7E-08 4.3E-08 4.3E-08 6.0E-06 6.3E-08 2.1E-09  
INFNT 1.1E-09 2.1E-09 2.5E-08 3.5E-08 2.7E-08 6.3E-06 4.1E-08 1.2E-09  
ENTER: 150; START OVER  
(EX) EXIT  
(RETURN) CONTINUE



THIS IS TOTAL ACCUMULATION  
INDIVIDUAL DOSES(REM) DUE TO GASEOUS EFFLUENT  
FOR DATES 05 1 1 1 THRU 05 33124

T.BODY GI-TRCT BONE LIVER KIDNEY THYRD LUNG SKIN

PLUME PATHWAY, DIST GP= 1, 1705. METERS, WINDS TOWARD E

ADULT	0.4E-06	0.4E-06	0.4E-06	0.4E-06	0.4E-06	0.4E-06	1.0E-05	3.6E-05
TEEN	0.4E-06	0.4E-06	0.4E-06	0.4E-06	0.4E-06	0.4E-06	1.0E-05	3.6E-05
CHILD	0.4E-06	0.4E-06	0.4E-06	0.4E-06	0.4E-06	0.4E-06	1.0E-05	3.6E-05
INFNT	0.4E-06	0.4E-06	0.4E-06	0.4E-06	0.4E-06	0.4E-06	1.0E-05	3.6E-05

GROUND PATHWAY, DIST GP= 1, 1705. METERS, WINDS TOWARD E

ADULT	5.2E-06	5.2E-06	5.2E-06	5.2E-06	5.2E-06	5.2E-06	5.2E-06	6.1E-06
TEEN	5.2E-06	5.2E-06	5.2E-06	5.2E-06	5.2E-06	5.2E-06	5.2E-06	6.1E-06
CHILD	5.2E-06	5.2E-06	5.2E-06	5.2E-06	5.2E-06	5.2E-06	5.2E-06	6.1E-06
INFNT	5.2E-06	5.2E-06	5.2E-06	5.2E-06	5.2E-06	5.2E-06	5.2E-06	6.1E-06

VEGET PATHWAY, DIST GP= 1, 1705. METERS, WINDS TOWARD E

ADULT	3.0E-06	5.1E-07	2.3E-06	4.0E-06	1.7E-06	7.6E-05	4.2E-07	3.2E-00
TEEN	2.5E-06	5.1E-07	3.5E-06	6.0E-06	2.3E-06	6.3E-05	7.3E-07	3.6E-00
CHILD	2.0E-06	3.3E-07	0.0E-00	0.7E-06	3.5E-06	0.6E-05	1.1E-06	5.6E-00
INFNT	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

MEAT PATHWAY, DIST GP= 1, 6010. METERS, WINDS TOWARD E

ADULT	3.1E-00	1.5E-00	2.2E-00	4.0E-00	1.7E-00	0.0E-07	4.1E-00	5.0E-11
TEEN	1.5E-00	7.0E-00	1.0E-00	3.2E-00	1.3E-00	6.4E-07	3.7E-00	3.0E-11
CHILD	1.0E-00	4.0E-00	3.3E-00	4.1E-00	1.7E-00	0.6E-07	4.3E-00	3.6E-11
INFNT	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

CON PATHWAY, DIST GP= 1, 0045. METERS, WINDS TOWARD E

ADULT	2.1E-07	2.1E-00	1.7E-07	2.0E-07	1.7E-07	1.0E-05	2.6E-00	0.2E-11
TEEN	2.2E-07	2.0E-00	3.0E-07	5.1E-07	3.0E-07	2.0E-05	5.2E-00	1.2E-10
CHILD	2.2E-07	2.1E-00	7.2E-07	0.5E-07	5.0E-07	5.7E-05	7.0E-00	1.0E-10
INFNT	3.0E-07	2.1E-00	1.2E-06	1.7E-06	0.3E-07	1.4E-04	1.4E-07	2.0E-10

GCAT PATHWAY, DIST GP= 1, 0045. METERS, WINDS TOWARD E

ADULT	5.7E-07	3.1E-00	4.4E-07	7.7E-07	3.5E-07	2.2E-05	7.0E-00	1.0E-10
TEEN	5.7E-07	4.0E-00	7.0E-07	1.3E-06	6.1E-07	3.4E-05	1.6E-07	2.4E-10
CHILD	4.0E-07	3.1E-00	1.0E-06	2.3E-06	0.0E-07	6.6E-05	2.3E-07	3.0E-10
INFNT	5.6E-07	3.0E-00	3.1E-06	4.4E-06	1.6E-06	1.7E-04	4.1E-07	5.0E-10

INHAL PATHWAY, DIST GP= 1, 1705. METERS, WINDS TOWARD E

ADULT	2.3E-00	7.0E-00	1.0E-00	3.1E-00	2.6E-00	3.3E-06	5.5E-00	1.0E-00
TEEN	2.1E-00	6.0E-00	2.5E-00	4.2E-00	3.4E-00	4.1E-06	7.0E-00	1.0E-00
CHILD	1.4E-00	3.6E-00	3.4E-00	3.0E-00	3.2E-00	4.5E-06	6.4E-00	1.6E-00
INFNT	0.1E-00	1.6E-00	2.3E-00	3.1E-00	2.0E-00	4.1E-06	4.2E-00	0.0E-10

ENTER: [SO] START OVER  
[EX] EXIT  
[RETURN] CONTINUE

THIS IS TOTAL ACCUMULATION  
INDIVIDUAL COSEIS (REM) DUE TO GASEOUS EFFLUENT  
FOR DATES 05 1 1 THRU 05 33124

	Y. BODY	GI-TRCT	BONE	LIVER	KIDNEY	THYRD	LUNG	SKIN
PLUME	PATHWAY, DIST GP= 1, 1628. METERS, WINDS TOWARD ESE							
ADULT	8.1E-06	8.1E-06	8.1E-06	8.1E-06	8.1E-06	8.1E-06	8.1E-06	3.2E-05
TEEN	8.1E-06	8.1E-06	8.1E-06	8.1E-06	8.1E-06	8.1E-06	8.1E-06	3.2E-05
CHILD	8.1E-06	8.1E-06	8.1E-06	8.1E-06	8.1E-06	8.1E-06	8.1E-06	3.2E-05
INFNT	8.1E-06	8.1E-06	8.1E-06	8.1E-06	8.1E-06	8.1E-06	8.1E-06	3.2E-05
GROUND	PATHWAY, DIST GP= 1, 1628. METERS, WINDS TOWARD ESE							
ADULT	6.7E-06	6.7E-06	6.7E-06	6.7E-06	6.7E-06	6.7E-06	6.7E-06	7.0E-06
TEEN	6.7E-06	6.7E-06	6.7E-06	6.7E-06	6.7E-06	6.7E-06	6.7E-06	7.0E-06
CHILD	6.7E-06	6.7E-06	6.7E-06	6.7E-06	6.7E-06	6.7E-06	6.7E-06	7.0E-06
INFNT	6.7E-06	6.7E-06	6.7E-06	6.7E-06	6.7E-06	6.7E-06	6.7E-06	7.0E-06
VEGET	PATHWAY, DIST GP= 1, 1628. METERS, WINDS TOWARD ESE							
ADULT	3.8E-06	6.5E-07	2.0E-06	5.1E-06	2.1E-06	0.0E-05	5.3E-07	1.6E-00
TEEN	3.2E-06	6.4E-07	4.4E-06	7.5E-06	2.0E-06	0.1E-05	0.2E-07	1.8E-00
CHILD	2.5E-06	4.2E-07	1.0E-06	1.2E-06	4.4E-06	1.2E-04	1.4E-06	2.0E-00
INFNT	0.0E-00	0.0E-00	0.0E-00	0.0E-00	0.0E-00	0.0E-00	0.0E-00	0.0E-00
MEAT	PATHWAY, DIST GP= 1, 2434. METERS, WINDS TOWARD ESE							
ADULT	2.1E-07	1.0E-07	1.5E-07	2.0E-07	1.2E-07	6.1E-06	2.0E-00	1.2E-10
TEEN	0.0E-00	5.4E-08	1.3E-07	2.2E-07	0.2E-08	4.4E-06	2.5E-00	7.3E-11
CHILD	7.1E-08	2.6E-08	2.3E-07	2.0E-07	1.1E-07	6.7E-06	2.0E-00	8.0E-11
INFNT	0.0E-00	0.0E-00	0.0E-00	0.0E-00	0.0E-00	0.0E-00	0.0E-00	0.0E-00
CDW	PATHWAY, DIST GP= 1, 8045. METERS, WINDS TOWARD ESE							
ADULT	2.4E-07	2.5E-08	2.0E-07	3.4E-07	2.1E-07	2.2E-05	3.0E-00	4.3E-11
TEEN	2.5E-07	3.3E-08	3.6E-07	6.0E-07	3.6E-07	3.4E-05	6.1E-00	5.6E-11
CHILD	2.6E-07	2.1E-08	8.5E-07	1.0E-06	5.0E-07	6.0E-05	0.1E-00	8.0E-11
INFNT	3.5E-07	2.4E-08	1.5E-06	2.0E-06	0.0E-07	1.6E-04	1.6E-07	1.3E-10
GOAT	PATHWAY, DIST GP= 1, 8045. METERS, WINDS TOWARD ESE							
ADULT	6.7E-07	3.7E-08	5.1E-07	0.1E-07	4.1E-07	2.5E-05	0.1E-00	8.0E-11
TEEN	7.4E-07	4.0E-08	0.2E-07	1.6E-06	2.6E-06	8.1E-05	2.7E-07	1.0E-10
CHILD	3.6E-08	2.2E-08	2.6E-06	5.1E-06	1.0E-06	2.0E-04	4.0E-07	2.0E-10
INFNT	3.5E-08	3.6E-08	5.1E-06	5.1E-06	1.0E-06	2.0E-04	4.0E-07	2.0E-10
SOJ	START OVER							
CHI	X1							
IN	X1							
ETURN	CONTINUE							
PATHWAY	DIST GP= 1, 1628. METERS, WINDS TOWARD ESE							
ADULT	6.6E-00	2.0E-00	3.3E-08	2.7E-08	3.7E-06	5.0E-08	8.0E-10	0.0E-10
TEEN	5.3E-00	2.0E-00	4.1E-08	3.7E-08	4.5E-06	8.4E-08	0.0E-10	0.0E-10
CHILD	3.0E-00	2.7E-08	4.2E-08	3.4E-08	5.0E-06	6.0E-08	7.0E-10	0.0E-10
INFNT	1.2E-00	2.5E-08	3.3E-08	2.2E-08	4.6E-06	4.5E-08	4.6E-10	0.0E-10

