

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

SUPPLEMENTAL INFORMATION

SECOND HALF 1983

1. Regulator Limits

a. Fission and Activation Gases:

(1) Instantaneous -

$$\frac{Q_1}{0.13} + \frac{Q_2}{1.46} \leq 1$$

Q₁ = release rate from building exhaust vents in Ci/sec.

Q₂ = release rate from main stack in Ci/sec.

(2) Quarterly - ≤ 0.10 Ci/sec. as average

b. & c. Iodines and particulates, half-lives >8 days

(1) Instantaneous -

$$\frac{Q_3}{0.33} + \frac{Q_4}{44} \leq 1$$

Q₃ = release rate from building exhaust vents in uCi/sec.

Q₄ = release rate from main stack in uCi/sec.

(2) Quarterly - ≤ 0.80 mCi/sec as average

d. Liquid effluent: 1×10^{-7} uCi/ml (ref. 10 CFR 20, Appendix B, note 3C, Table II, column 2).

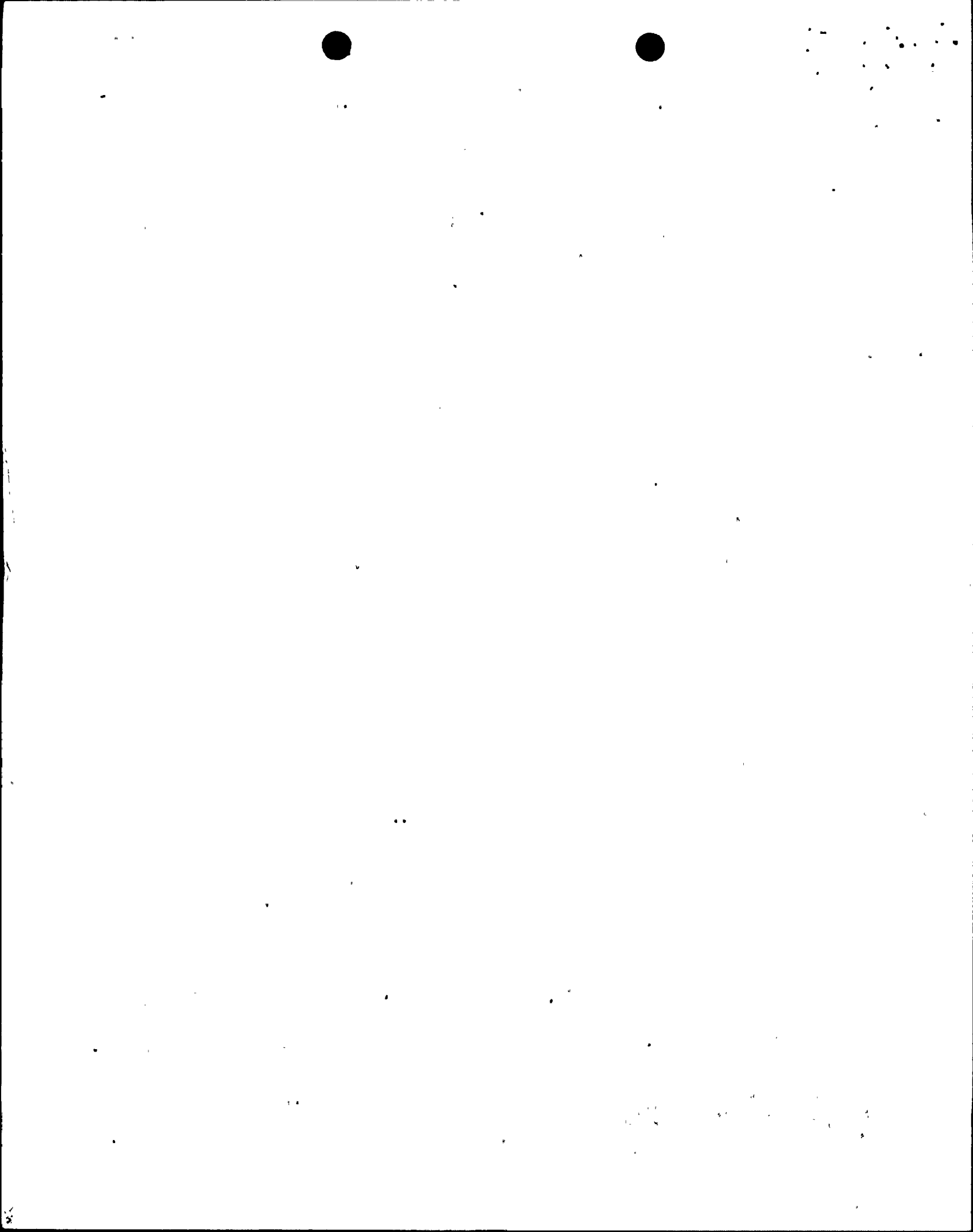
e. Tritium

(1) Liquid - $\leq 3.0E-3$ uCi/cc (ref. 10 CFR 20, Table II, column 2).

(2) Airborne - $\leq 2.0E-7$ uCi/ml (ref. 10 CFR 20, Table I, column 2).

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EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

SUPPLEMENTAL INFORMATION (CONTINUED)

SECOND HALF 1983

2. Maximum Permissible Concentration
 - a. Fission and Activation Gases: Not Applicable
 - b. Iodines: Not Applicable
 - c. Particulates, half-lives >8 days: Not Applicable
 - d. Liquid effluents: sum of individual MPC ratios ≤ 1
(ref. 10 CFR 20, Appendix B, note 1)

3. Average Energy - Not Applicable

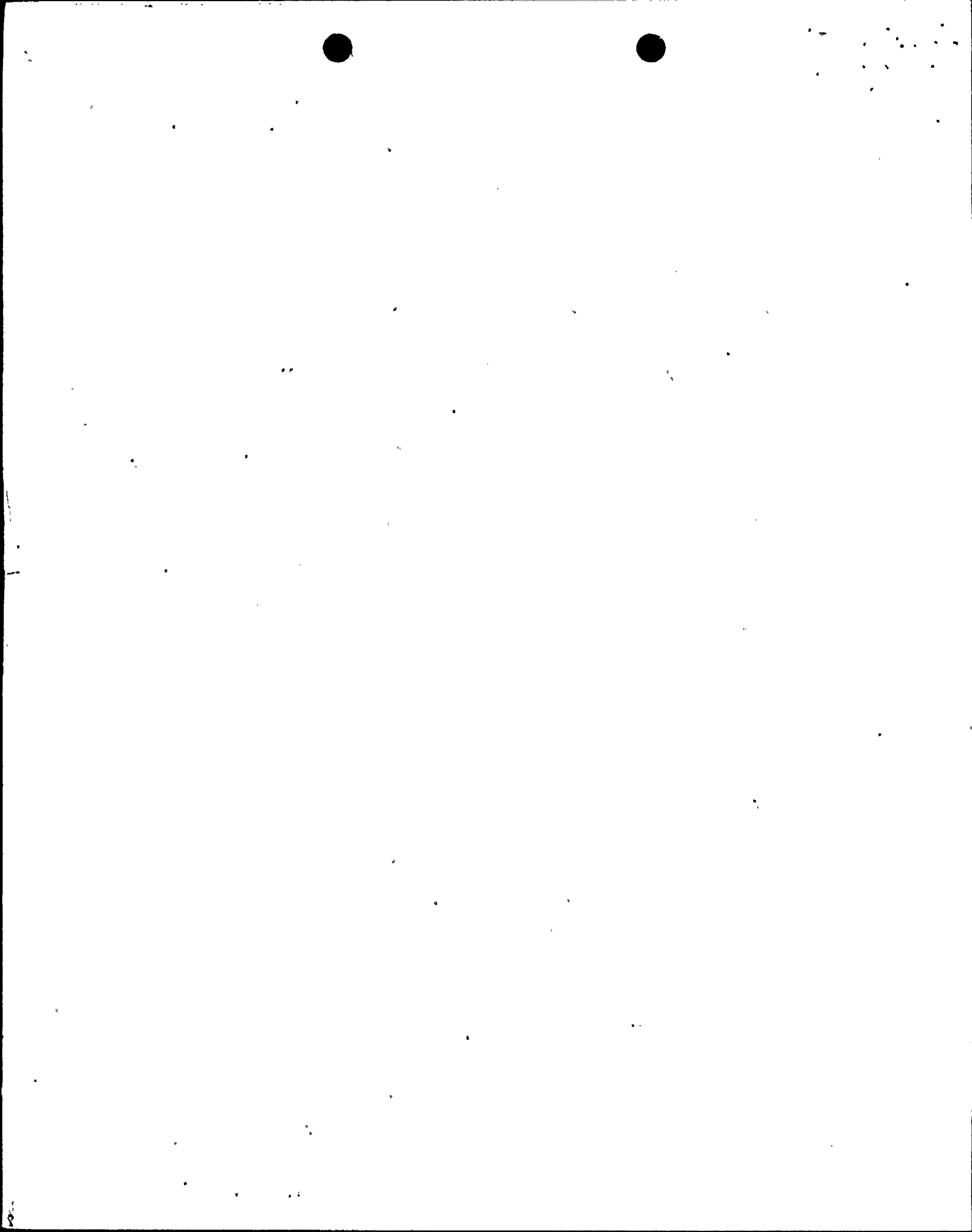
4. Measurements and Approximations of Total Radioactivity

a., b. & c. Fission and Activation Gases, Iodines, and Particulates:

Airborne effluent gaseous activity is continuously monitored and recorded; additionally, grab samples are taken and analyzed monthly to determine specific radionuclide activity concentrations. Stack and building vent effluent flow rates are calculated once a shift based on the configuration of operating exhaust fans. The flow rate data is consolidated weekly to determine the volume of airborne effluents released from the plant.

Charcoal and particulate samples are taken and analyzed at least weekly to determine specific activity concentrations. The total activity released from the plant is then calculated by taking weekly activity concentration values and multiplying them by the weekly airborne effluent volume.

Allowance is made for a plus or minus one sigma counting error associated with gamma isotopic analyses.



EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

SUPPLEMENTAL INFORMATION (CONTINUED)

SECOND HALF 1983

4. Measurements and Approximations of Total Radioactivity (Continued)

d. Liquid Effluents

Gross beta, gamma and total gamma isotopic activity concentrations are determined on each batch of liquid effluent prior to release. The total curie content of a released batch is determined by multiplying the highest of the above three activity concentrations by the total volume discharged. The total activity released during a month is then determined by summing the activity content of each batch discharged during the month.

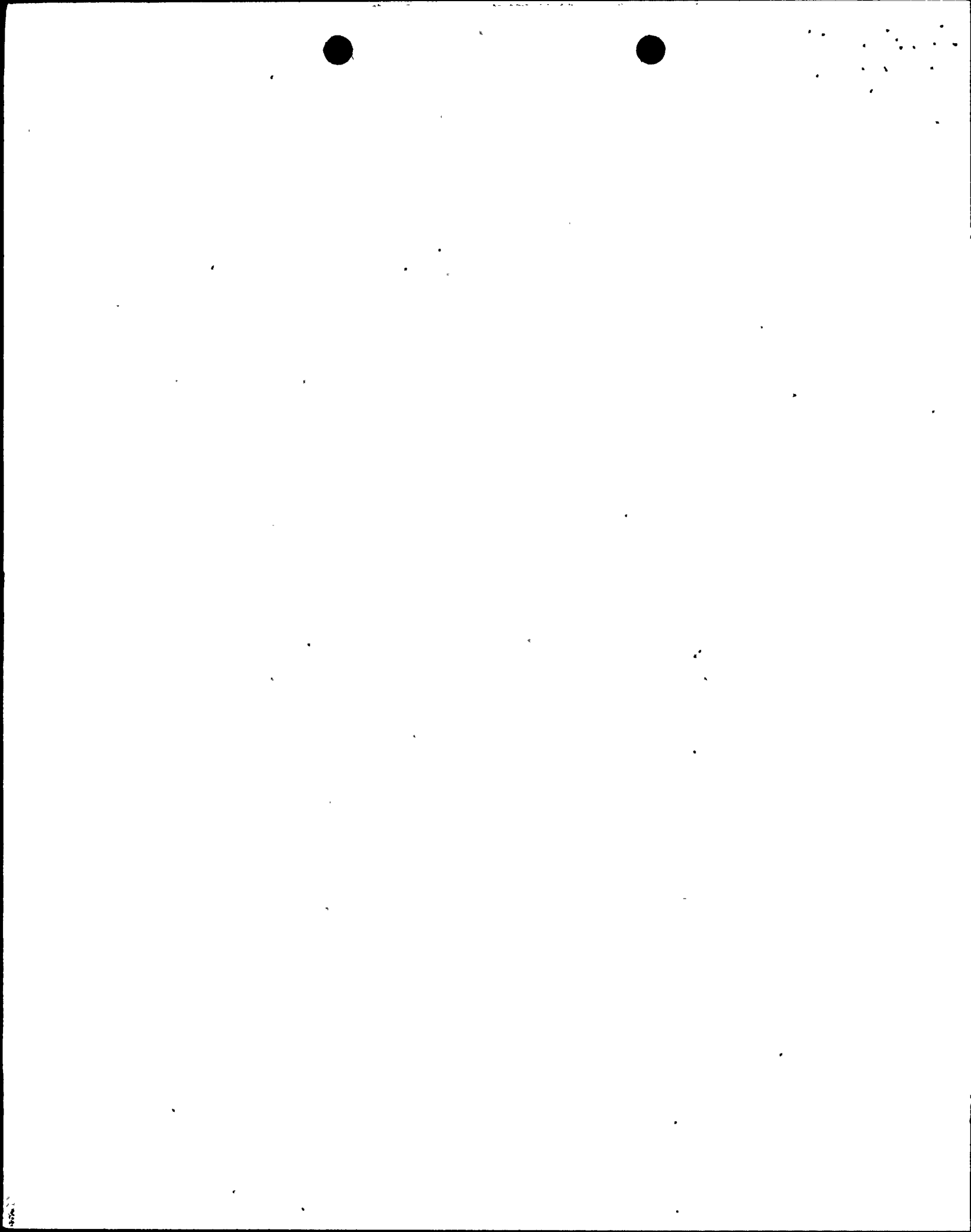
Allowance is made for plus or minus one sigma counting error associated with the total gamma isotopic analyses.

	<u>Value</u>		<u>Unit</u>
	<u>Third Quarter</u>	<u>Fourth Quarter</u>	
a. <u>Liquid</u>			
(1) Number of batches released	83	148	Each
(2) Total time period for batch releases	32933	57207	Minutes
(3) Maximum time period for a batch release	780	1515	Minutes
(4) Average time period for batch releases	396.78	386.53	Minutes
(5) Minimum time period for batch releases	169.8	60	Minutes
(6) Average stream flow during period of release of effluent into a flowing stream ¹	--	--	

b. Gaseous

None

¹To be supplied by others.



EFFLUENTS AND WASTE DISPOSAL SEMIANNUAL REPORT

SECOND HALF 1983

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	<u>Unit</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>% Error</u>
A. <u>Fission and Activation Products</u>				
1. Total Releases (1)	Curies	6.96E-01	1.90E+00	±1.50E+01
2. Average Diluted Conc. During Period	uCi/ml	5.80E-09	6.58E-09	
3. Percent of Applicable Limit	%	3.48E+00	9.50E+00	
B. <u>Tritium</u>				
1. Total Release	Curies	4.90E+00	9.28E+00	±5.00E+00
2. Average Diluted Conc. During Period	uCi/ml	4.08E-08	3.22E-08	
3. Percent of Applicable Limit (3E-03 uCi/ml)	%	1.36E-03	1.07E-03	...
C. <u>Dissolved and Entrained Gases</u>				
1. Total Release	Curies	<4.13E-02	1.86E-01	±2.80E+00
2. Average Diluted Conc. During Period	uCi/ml	3.44E-10	6.44E-10	
3. Percent of Applicable Limit (6E-06 uCi/ml)	%	5.74E-03	1.07E-02	
D. <u>Gross Alpha Radioactivity</u>				
1. Total Release	Curies	2.36E-04	1.44E-04	±1.70E+01
E. <u>Volume of Waste Release</u>				
(before dilution)	Liters	6.00E+06	1.48E+07	±5.00E+00
F. <u>Volume of Dilution Water for Period</u>				
	Liters	1.20E+11	2.89E+11	±1.00E+01

(1) Based on pre-release analyses which are not decay corrected.

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
LIQUID RELEASES FOR SECOND HALF 1983 BATCH MODE

<u>Isotope</u>	<u>Third (1) Quarter</u>	<u>Fourth (1) Quarter</u>
1. Strontium-89(3)	4.21E-03	1.33E-03
2. Strontium-90(3)	1.20E-03	6.19E-04
3. Cesium-134	1.60E-01	4.79E-01
4. Cesium-137	1.93E-01	5.96E-01
5. Iodine-131	6.04E-03	1.26E-02
6. Cobalt-58	2.79E-04	3.50E-04
7. Cobalt-60	4.24E-02	7.95E-02
8. Iron-59	< MDA	< MDA
9. Zinc-65	8.79E-02	4.45E-01
10. Manganese-54	1.76E-03	3.47E-03
11. Chromium-51	4.25E-03	2.66E-03
12. Zirconium-Niobium-95	7.21E-04	5.86E-04
13. Molybdenum-99	1.76E-03	2.71E-04
14. Technetium-99m	1.76E-03	2.71E-04
15. Barium-Lanthanum-140	< MDA	1.48E-04
16. Cerium-141(2)	3.41E-02	1.02E-01
17. Sodium-124	5.14E-02	2.94E-02
18. Fluorine-18	< MDA	< MDA
<u>Total for Period</u>	3.59E+00 5,91-01	1.75E+00 OK

(1) Quantities listed are in curies.

(2) Calculated by multiplying Cs134 by a factor of 0.2133. (Established by ratio CE141/CS134 in March 1979). A new ratio of 0.1570 was established in December 1982. For conservatism, use of 0.2133 factor will continue.

(3) Predicted estimation of release.

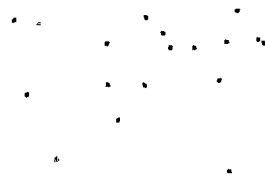


EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

LIQUID RELEASES FOR SECOND HALF 1983 BATCH MODE

<u>Isotope</u>	<u>Third(1) Quarter</u>	<u>Fourth(1) Quarter</u>
<u>Others (Not Required for Reg. Guide 1.21)</u>		
1. Xenon-133	2.16E-02	5.64E-02
2. Xenon-135	1.41E-02	4.22E-02
3. Iodine-133	6.76E-03	8.97E-03
4. Cesium-136	< MDA	< MDA
5. Manganese-56	< MDA	< MDA
6. Antimony-122	< MDA	< MDA
7. Antimony-124	< MDA	< MDA
8. Copper-64	< MDA	4.77E-03
9. Arsenic-76	< MDA	< MDA
10. Arsenic-74	< MDA	< MDA
11. Iodine-135	< MDA	3.22E-03
12. Bromine-82	< MDA	< MDA
13. Silver-110m	1.09E-03	2.26E-03
14. Antimony-125	1.18E-04	2.45E-03
15. Samarium-153	< MDA	< MDA

(1) Quantities listed are in curies.



EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

SECOND HALF 1983

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. Solid Waste Shipped Off-Site for burial or disposal (not irradiated fuel)

1. Type of Waste	<u>Unit</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>
a. Spent resin, filter sludges, etc.	m ³ Ci	224.73 1345	180.1 694.24
b. Dry compressible waste contaminated equip., etc.	#17H drums Ci	1730 (12975 ft ³) 287.0	668 (5010 ft ³) 79.05
c. Irradiated Components, control rods, etc.	NA	NA	NA
d. Other (describe) Boxes	Boxes Ci	338 (28411 ft ³) 20.7	240 (22888 ft ³) 24.64

2. Estimate of major nuclide composition (by type of waste)

	<u>Unit</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>
a. 1. Chromium-51	%	16.13 (217 / 1345)	16.28 (113 / 694)
2. Zinc-65	%	39.33 (529 / 1345)	46.60 (323.7 / 694)
3. Iodine-131	%	0.33 (4.48 / 1345)	0.90 (6.21 / 694)
4. Cesium-137	%	13.01 (175 / 1345)	9.82 (68.13 / 694)
5. Cesium-134	%	11.30 (152 / 1345)	8.52 (59.10 / 694)
6. Cobalt-58	%	0.88 (11.8 / 1345)	0.72 (5.27 / 694)
7. Cobalt-60	%	9.22 (124 / 1345)	8.15 (56.54 / 694)
8. Zirconium-95	%	0.20 (2.68 / 1345)	0.15 (1.10 / 694)
9. Niobium-95	%	0.07 (.926 / 1345)	0.56 (3.91 / 694)

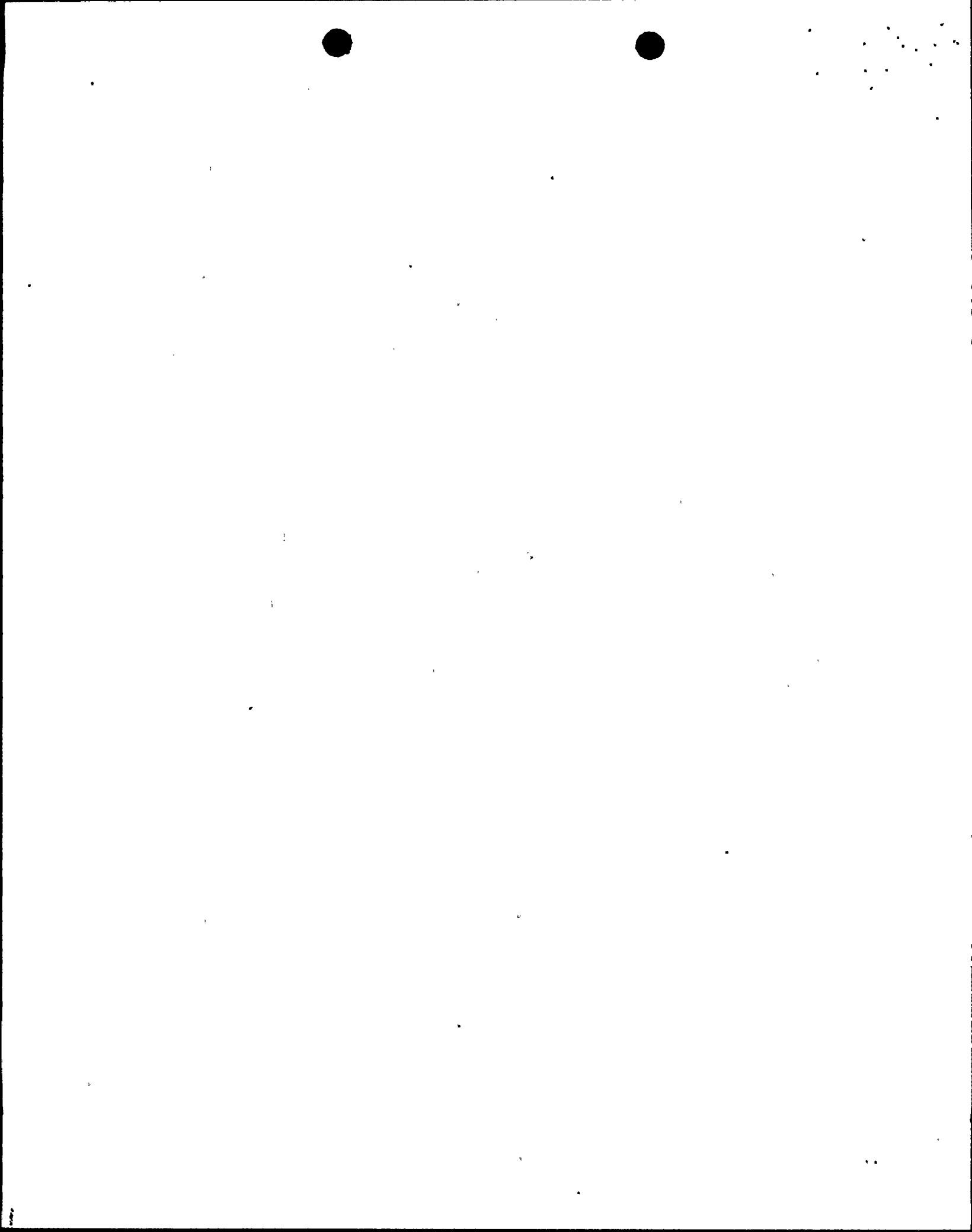
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

SECOND HALF 1983

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS (CONTINUED)

2. Estimate of major nuclide composition (by type of waste) (Continued)

	<u>Unit</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>
a. 10. Lanthanum-140	%	0.10 (1.40/ 1345)	0.02 (0.109/ 694)
11. Antimony-124	%	0.01 (0.190/1345)	0.00 (0.0 / 694)
12. Strontium-90	%	0.01 (0.192/1345)	0.01 (0.082/ 694)
13. Manganese-54	%	1.09 (14.7/ 1345)	1.12 (7.8 / 694)
14. Silver-110M	%	2.53 (34.0/ 1345)	1.97 (13.68/ 694)
15. Iron-59	%	0.05 (0.728/1345)	0.11 (0.80/ 694)
16. Other Nuclides	%	5.73 (77.12/1345)	4.98 (34.57/ 694)
b. 1. Chromium-51	%	7.63 (21.9/ 287)	25.63 (20.25/ 79)
2. Zinc-65	%	72.12 (207 / 287)	42.37 (33.48/ 79)
3. Iodine-131	%	0.86 (2.48/ 287)	0.59 (0.46/ 79)
4. Cesium-137	%	5.89 (16.9/ 287)	6.98 (5.51/ 79)
5. Cesium-134	%	4.01 (11.5/ 287)	6.15 (4.86/ 79)
6. Cobalt-58	%	0.46 (1.31/ 287)	0.49 (0.387/ 79)
7. Cobalt-60	%	6.31 (18.1/ 287)	6.32 (4.99/ 79)
8. Zirconium-95	%	0.17 (0.494/287)	0.15 (0.119/ 79)
9. Niobium-95	%	0.08 (0.236/34.1)	0.53 (0.423/ 79)



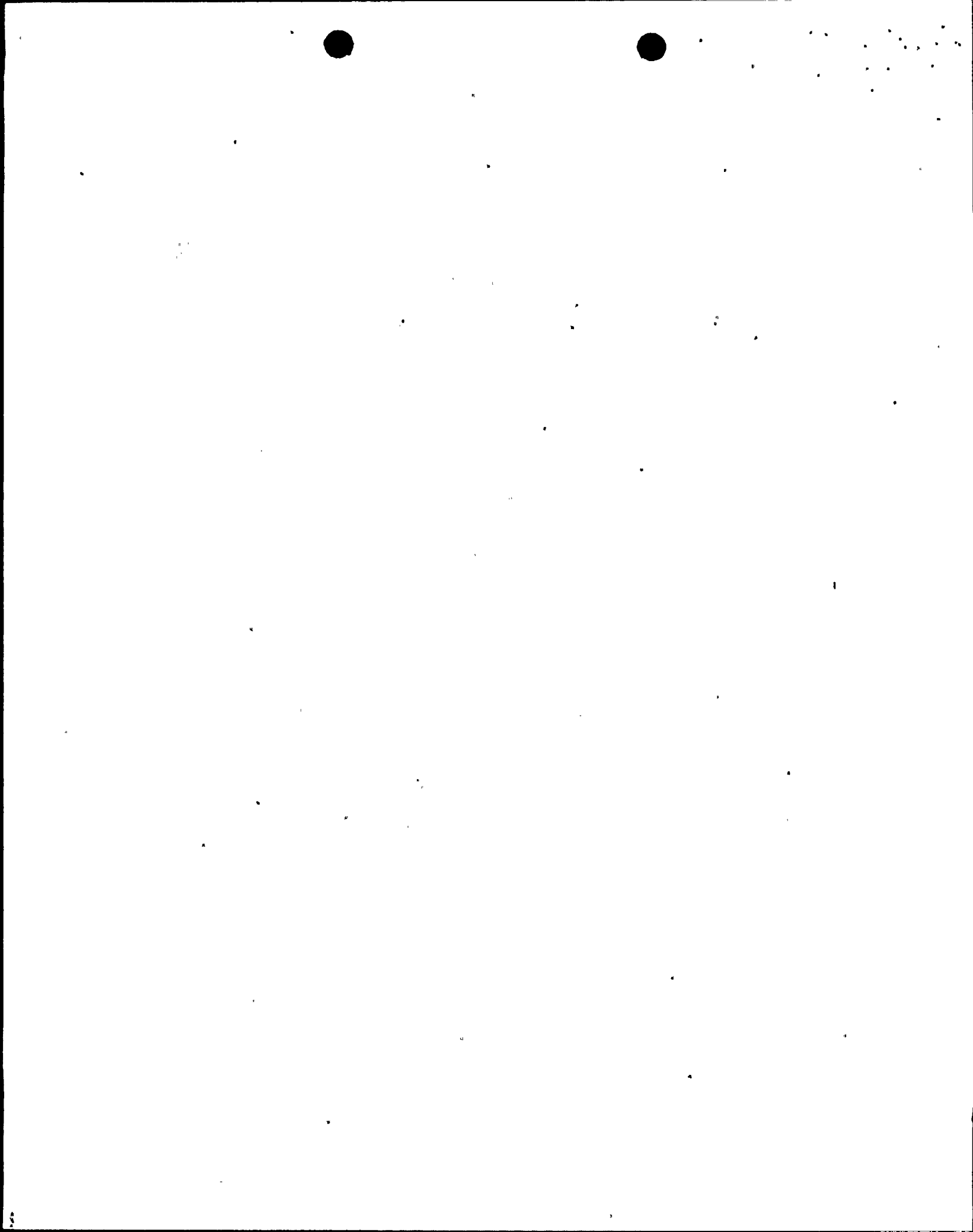
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

SECOND HALF 1983

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS (CONTINUED)

2. Estimate of major nuclide composition (by type of waste) (continued)

	<u>Unit</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>
b. 10. Lanthanum-140	%	0.54 (1.54/ 287)	0.03 (0.024/ 79)
11. Antimony-124	%	0.02 (0.712/ 187)	0.0 (0.0 / 79)
12. Strontium-90	%	0.25 (0.715/ 287)	0.008 (0.006/ 79)
13. Manganese-54	%	0.78 (2.23/ 287)	1.0 (0.79/ 79)
14. Silver-110M	%	0.82 (2.34/ 287)	2.03 (1.6 / 79)
15. Iron-59	%	0.05 (0.150/ 287)	0.28 (0.221/ 79)
16. Other Nuclides	%	0.58 (1.67/ 287)	7.45 (5.883/ 79)
c. Irradiated Components, Control Rods, etc.			None
d. 1. Chromium-51	%	16.23 (3.36 / 20.7)	9.74 (2.397 / 24.6)
2. Zinc-65	%	63.77 (13.2 / 20.7)	59.6 (14.67 / 24.6)
3. Iodine-131	%	1.66 (0.344/ 20.7)	0.68 (0.166 / 24.6)
4. Cesium-137	%	7.78 (1.61 / 20.7)	8.72 (2.144 / 24.6)
5. Cesium-134	%	5.99 (1.24 / 20.7)	7.48 (1.841 / 24.6)
6. Cobalt-58	%	0.67 (0.138/ 20.7)	0.41 (0.10 / 24.6)
7. Cobalt-60	%	8.94 (1.85 / 20.7)	8.10 (1.98 / 24.6)
8. Zirconium-95	%	0.11 (0.0237/20.7)	0.002 (0.0006/ 24.6)
9. Niobium-95	%	0.02 (.00327/20.7)	0.008 (0.002 / 24.6)



EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

SECOND HALF 1983

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS (CONTINUED)

2. Estimate of major nuclide composition (by type of waste) (continued)

	<u>Unit</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>
d. 10. Lanthanum-140	%	0.73 (0.152/ 20.7)	0.11 (0.027/ 24.6)
11. Antimony-124	%	0.04 (.00749/20.7)	0.0 (0.0 / 24.6)
12. Strontium-90	%	0.01 (.00222/ 20.7)	0.01 (0.002/24.6)
13. Manganese-54	%	0.97 (0.200/ 20.7)	0.88 (0.22 / 24.6)
14. Silver-110M	%	1.59 (0.329/ 20.7)	0.66 (0.163/ 24.6)
15. Iron-59	%	0.03 (.00609/ 20.7)	0.12 (0.029/ 24.6)
16. Other Nuclides	%	3.22 (0.667/ 20.7)	2.43 (0.60 / 24.6)

3. Solid Waste Disposition

<u>Number of Shipments</u>		<u>Mode of Transportation</u>	<u>Destination</u>
<u>Third Quarter</u>	<u>Fourth Quarter</u>		
56	41	Sole Use Truck	Barnwell, SC
44	27	Sole Use Truck	Richland, WA

B. Irradiated Fuel Shipments (disposition)

<u>Number of Shipments</u>		<u>Mode of Transportation</u>	<u>Destination</u>
<u>Third Quarter</u>	<u>Fourth Quarter</u>		
NA	NA	NA	NA



EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

SECOND HALF 1983⁽¹⁾

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

<u>Summation of All Releases</u>	<u>Unit</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>% Error</u>
A. Fission and Activation Gases				
1. Total Releases	Ci	3.96E+04	<2.01E+05	±7.6E+00
2. Avg. release rate for period	uCi/sec.	5.04E+03	<2.56E+04	
3. Percent of technical specification limit	%	1.01E+01	5.11E+01	
B. Iodines				
1. Total Iodine-131	Ci	6.08E-03	1.29E-02	±1.22E+01
2. Avg. release rate for period	uCi/sec.	7.74E-04	1.64E-03	
3. Percent of technical specification limit	%	1.93E-01	4.10E-01	
C. Particulates				
1. Particulate with half-lives >8 days	Ci	8.14E-03	<5.69E-03	±1.05E+01
2. Avg. release rate for period	uCi/sec.	1.04E-03	<7.24E-04	
3. Percent of technical specification limit	%	2.59E-01	1.81E-01	
4. Gross alpha radioactivity	Ci	<3.35E-06	<2.02E-04	
D. Tritium				
1. Total release	Ci	1.16E+01	2.68E+00	±3.00E+00
2. Avg. release rate for period	uCi/sec.	1.48E+00	3.41E-01	
3. Percent of technical specification limit	%	1.27E+00	3.68E-01	
4. Ground level releases	Ci	1.11E+01	2.59E+00	
5. Elevated release	Ci	5.47E-01	9.25E-02	

(1) Reporting period - 182 days

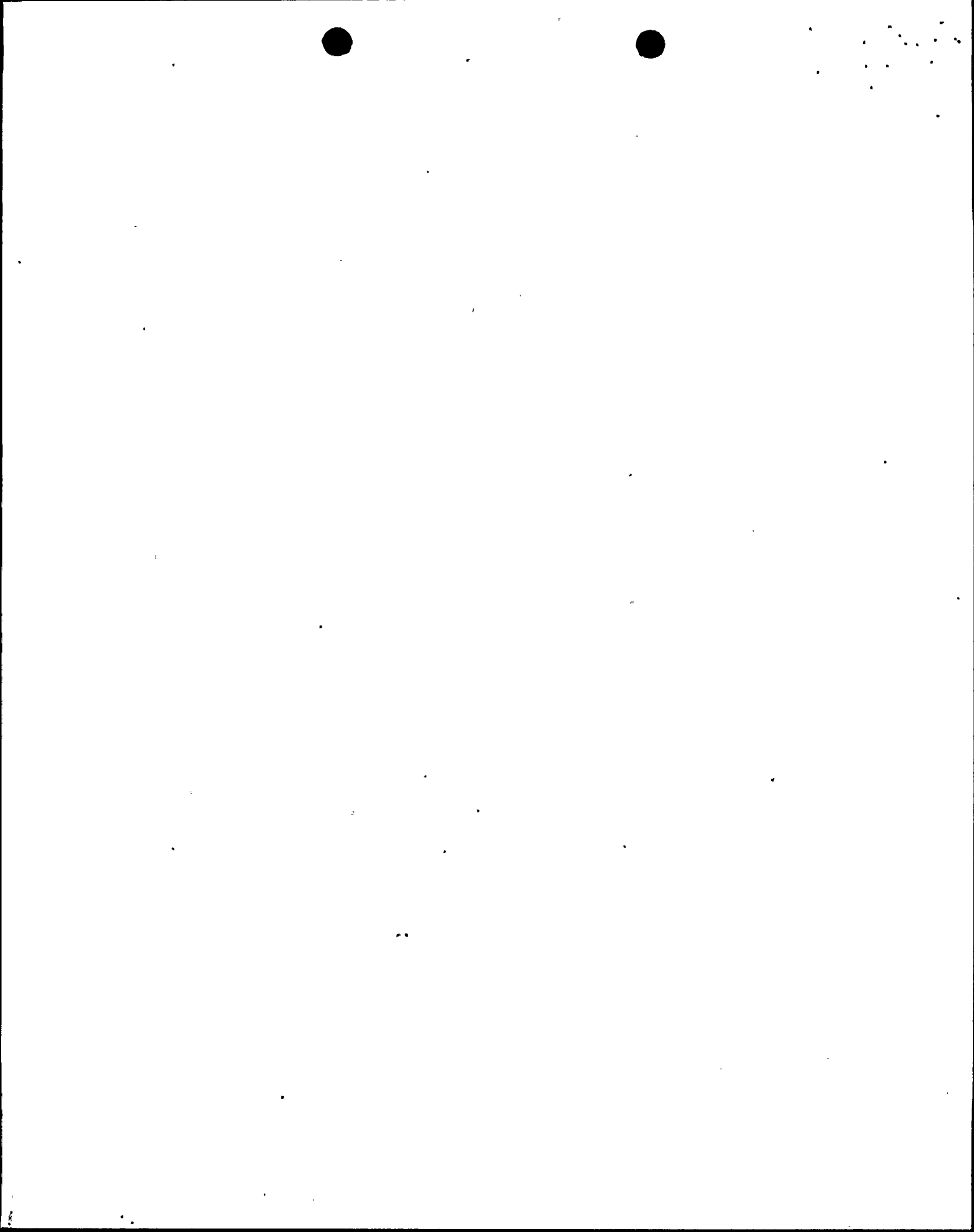


EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

SECOND HALF 1983

GASEOUS EFFLUENTS - ELEVATED RELEASE

	<u>Unit</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>
1. <u>Fission Gases</u>			
Krypton-85	Ci	2.04E+03	< MDA
Krypton-85m	Ci	5.82E+03	1.71E+04
Krypton-87	Ci	3.20E+03	<1.35E+04
Krypton-88	Ci	1.07E+04	2.10E+04
Xenon-133	Ci	1.54E+04	1.44E+05
Xenon-135	Ci	8.19E+02	4.65E+03
Xenon-135m	Ci	< MDA	< MDA
Xenon-138	Ci	< MDA	< MDA
Others (specify)			
Argon-41	Ci	8.94E+02	<1.66E+02
Unidentified	Ci	NA	NA
<u>Total for Period</u>	Ci	3.88E+04	<2.00E+05
2. <u>Iodines</u>			
Iodine-131	Ci	5.62E-03	1.13E-02
Iodine-133	Ci	1.24E-02	<1.34E-02
Iodine-135	Ci	< MDA	< MDA
<u>Total for Period</u>	Ci	1.80E-02	<2.47E-02



EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

·SECOND HALF 1983

GASEOUS EFFLUENTS - ELEVATED RELEASE (Continued)

	<u>Unit</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>
3. <u>Particulates</u>			
Strontium-89 ⁽¹⁾	Ci	2.64E-05	2.82E-04
Strontium-90 ⁽¹⁾	Ci	8.47E-06	6.17E-07
Cesium-134	Ci	< MDA	< MDA
Cesium-137	Ci	< MDA	< MDA
Barium-140	Ci	4.11E-05	< MDA
Zirconium-95	Ci	< MDA	< MDA
Niobium-95	Ci	< MDA	< MDA
Cobalt-58	Ci	< MDA	< MDA
Manganese-54	Ci	3.76E-05	<1.64E-04
Zinc-65	Ci	< MDA	< MDA
Iron-59	Ci	< MDA	< MDA
Cobalt-60	Ci	< MDA	< MDA
Others (specify)			
Lanthanum-140	Ci	< MDA	< MDA
<u>Total for Period</u>	Ci	3.51E-04	<4.47E-04
4. <u>Tritium</u>	Ci	5.47E-01	9.25E-02

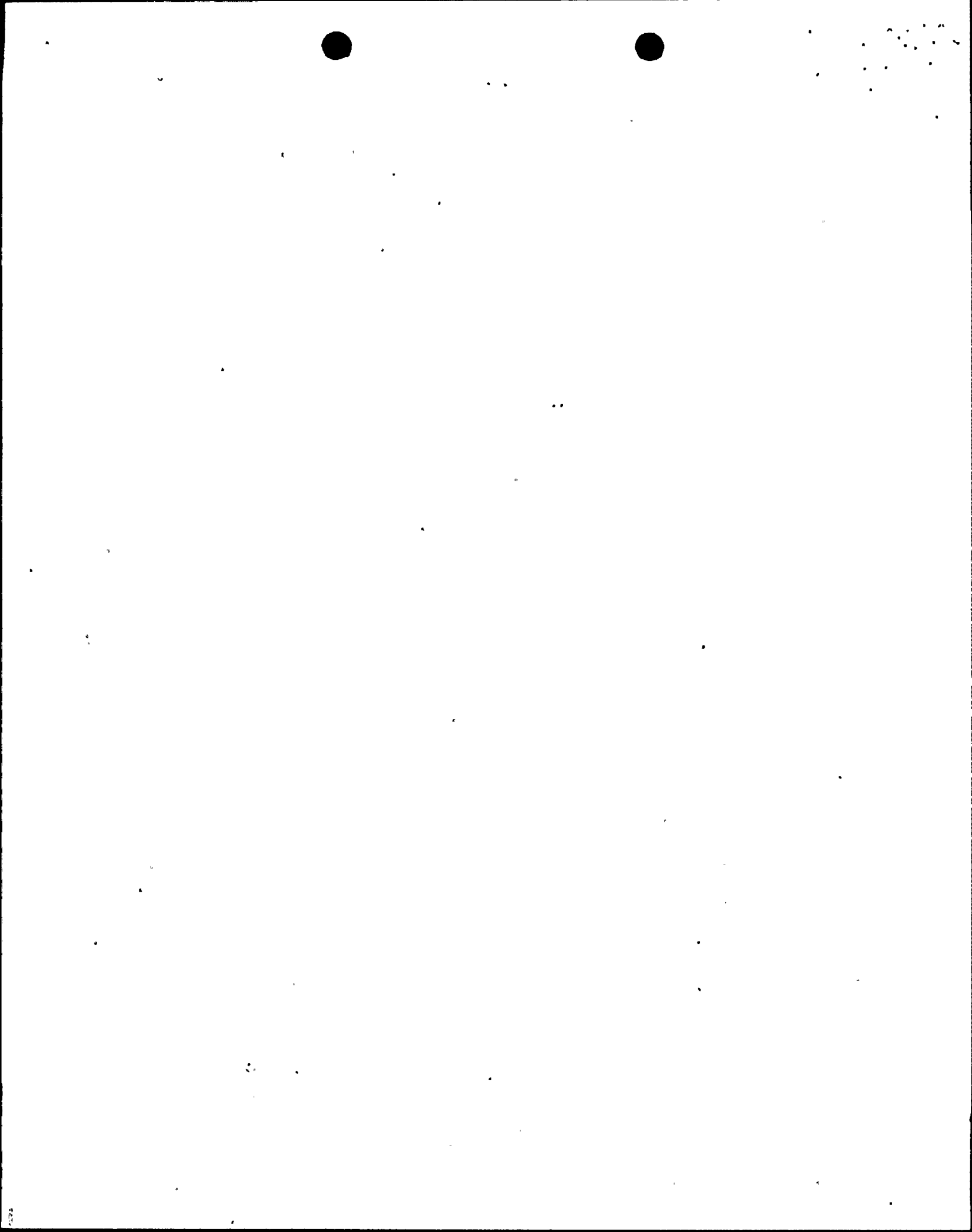
(1) Predicted estimation of release

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

SECOND HALF 1983

GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

	<u>Unit</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>
1. <u>Fission Gases</u>			
Krypton-85	Ci	< MDA	< MDA
Krypton-85m	Ci	< MDA	< MDA
Krypton-87	Ci	< MDA	< MDA
Krypton-88	Ci	< MDA	< MDA
Xenon-133	Ci	< MDA	4.24E+02
Xenon-135	Ci	3.55E+02	1.95E+02
Xenon-135m	Ci	3.59E+02	< MDA
Xenon-138	Ci	< MDA	< MDA
Others (specify)			
Argon-41	Ci	< MDA	< MDA
Unidentified	Ci	NA	NA
	<u>Total for Period</u>	7.14E+02	<6.18E+02
2. <u>Iodines</u>			
Iodine-131	Ci	4.63E-04	1.62E-03
Iodine-133	Ci	1.04E-03	<1.43E-03
Iodine-135	Ci	< MDA	< MDA
	<u>Total for Period</u>	1.50E-03	<3.05E-03



EFFLUENTS AND WASTE DISPOSAL SEMIANNUAL REPORT

SECOND HALF 1983

GASEOUS EFFLUENTS - GROUND LEVEL RELEASES (Continued)

	<u>Unit</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>
3. <u>Particulates</u>			
Strontium-89 ⁽¹⁾	Ci	2.21E-03	2.42E-05
Strontium-90 ⁽¹⁾	Ci	1.76E-04	5.24E-07
Cesium-134	Ci	3.45E-04	<5.73E-04
Cesium-137	Ci	4.60E-04	<7.15E-04
Barium-140	Ci	4.44E-05	< MDA
Zirconium-95	Ci	5.36E-05	< MDA
Niobium-95	Ci	3.19E-04	<1.26E-06
Cobalt-58	Ci	1.23E-05	< MDA
Manganese-54	Ci	1.32E-04	<7.65E-06
Zinc-65	Ci	1.20E-03	<2.52E-03
Iron-59	Ci	< MDA	< MDA
Cobalt-60	Ci	2.80E-03	1.41E-03
Others (specify)			
Lanthanum-140	Ci	3.43E-05	< MDA
<u>Total for Period</u>	Ci	7.79E-03	<5.25E-03
4. <u>Tritium</u>	Ci	1.11E+01	2.59E+00

(1) Predicted estimation of releases.

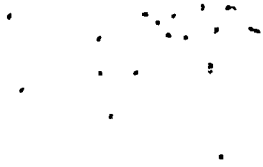


Table 10

Browns Ferry Nuclear Plant - Individual Doses From Gaseous Effluents

Third Quarter 1983

<u>Effluent</u>	<u>Pathway</u>	<u>Guideline*</u>	<u>Point</u>	<u>Dose</u>
Noble gases	γ Air dose	30	Max. Exp. ¹	0.18 mrad
	β Air dose	60	Max. Exp. ¹	0.34 mrad
	Total body ²	15	Residence ³	0.10 mrem
	Skin ²	45	Residence ³	0.16 mrem
Iodines/Particulates				
	Bone (critical organ)	45	Real Pathway ⁴	0.30 mrem

Breakdown of Iodine/Particulate Exposures (mrem)

	<u>Child</u>	<u>Adult</u>
Vegetable Ingestion	2.85×10^{-1}	1.20×10^{-1}
Beef Ingestion ⁵	9.59×10^{-4}	8.55×10^{-4}
Inhalation	4.42×10^{-4}	2.87×10^{-4}
Ground Contamination	1.33×10^{-2}	1.33×10^{-2}
Total	3.00×10^{-1}	1.34×10^{-1}

*The annual guidelines are defined by Appendix I to 10 CFR 50.

1. The maximum exposure point is at 6100 meters in the NW sector.
2. Dose from air submersion.
3. The maximum exposure point is at 7925 meters in the N sector.
4. Receptor is at 1750 meters in the NNW sector.
5. The maximum exposure point is at 1375 meters in the E sector.



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Table 11

Browns Ferry Nuclear Plant - Individual Doses From Gaseous Effluents

Fourth Quarter 1983

<u>Effluent</u>	<u>Pathway</u>	<u>Guideline*</u>	<u>Point</u>	<u>Dose</u>
Noble gases	γ Air dose	30	Max. Exp. ¹	0.39 mrad
	β Air dose	60	Max. Exp. ¹	0.85 mrad
	Total body ²	15	Residence ³	0.14 mrem
	Skin ²	45	Residence ³	0.24 mrem
Iodines/Particulates				
	Thyroid (critical organ)	45	Real Pathway ⁴	0.04 mrem

Breakdown of Iodine/Particulate Exposures (mrem)

	<u>Child</u>	<u>Adult</u>
Vegetable Ingestion	2.29×10^{-2}	1.09×10^{-2}
Beef Ingestion ⁵	2.73×10^{-4}	2.58×10^{-4}
Inhalation	7.37×10^{-4}	3.75×10^{-4}
Ground Contamination	<u>1.73×10^{-2}</u>	<u>1.73×10^{-2}</u>
Total	4.12×10^{-2}	2.88×10^{-2}

*The annual guidelines are defined by Appendix I to 10 CFR 50.

1. The maximum exposure point is at 6100 meters in the NW sector.
2. Dose from air submersion.
3. The maximum exposure point is at 4425 meters in the WNW sector.
4. Receptor is at 3225 meters in the NW sector.
5. The maximum exposure point is at 2275 meters in the NW sector.

Table 12

Gaseous Effluent Doses - Population

RFN -- 3RD QUARTER 1983

SUMMATION OF POPULATION DOSES

	LIVER					BONE				
	INFANT	CHILD	TEEN	ADULT	TOTALS	INFANT	CHILD	TEEN	ADULT	TOTALS
SUBMERSION	7.10E-02	4.43E-01	2.82E-01	1.31E+00	2.10E+00	7.10E-02	4.43E-01	2.62E-01	1.31E+00	2.10E+00
GROUND	1.61E-03	1.01E-02	6.40E-03	2.96E-02	4.77E-02	1.61E-03	1.01E-02	6.40E-03	2.96E-02	4.77E-02
INHALATION	3.72E-03	3.51E-02	1.46E-02	4.91E-02	1.02E-01	4.31E-03	9.30E-04	4.13E-04	1.75E-03	3.14E-03
COW MILK	3.90E-04	1.37E-03	4.40E-04	1.72E-03	3.92E-03	9.39E-04	4.04E-03	1.06E-03	4.08E-03	1.01E-02
BEEF INGESTION	0.00E+00	3.25E-04	1.66E-04	1.01E-03	1.59E-03	0.00E+00	4.04E-04	1.62E-04	9.66E-04	1.53E-03
VEG INGESTION	0.00E+00	2.33E-04	1.21E-04	7.12E-04	1.37E-03	0.00E+00	3.52E-03	1.55E-03	9.24E-03	1.43E-02
TOTAL MAN-REM	7.67E-02	4.90E-01	3.04E-01	1.39E+00	2.26E+00	7.36E-02	4.62E-01	2.91E-01	1.35E+00	2.16E+00

RFN -- 4Q83

SUMMATION OF POPULATION DOSES

	THYROID					TOTAL BODY				
	INFANT	CHILD	TEEN	ADULT	TOTALS	INFANT	CHILD	TEEN	ADULT	TOTALS
SUBMERSION	1.37E-01	8.53E-01	5.43E-01	2.51E+00	4.05E+00	1.37E-01	8.53E-01	5.43E-01	2.51E+00	4.05E+00
GROUND	2.89E-03	1.80E-02	1.15E-02	5.31E-02	8.54E-02	2.89E-03	1.80E-02	1.15E-02	5.31E-02	8.54E-02
INHALATION	2.95E-04	3.02E-03	1.14E-03	4.35E-03	8.81E-03	2.81E-03	3.33E-02	1.06E-02	3.53E-02	8.21E-02
COW MILK	1.70E-02	4.36E-02	1.16E-02	4.39E-02	1.16E-01	8.48E-05	4.13E-04	2.13E-04	1.20E-03	1.91E-03
BEEF INGESTION	0.00E+00	5.43E-04	2.32E-04	1.42E-03	2.20E-03	0.00E+00	9.65E-05	3.89E-05	8.41E-04	1.03E-03
VEG INGESTION	0.00E+00	5.35E-03	2.30E-03	1.33E-02	2.09E-02	0.00E+00	8.12E-05	6.42E-05	5.42E-04	6.87E-04
TOTAL MAN-REM	1.57E-01	9.23E-01	5.69E-01	2.63E+00	4.28E+00	1.43E-01	9.05E-01	5.65E-01	2.61E+00	4.22E+00

Table 13

Liquid Effluent Doses
Browns Ferry Nuclear Plant Routine Releases

Third Quarter 1983

	BONE	GI TRACT	THYROID	TOTAL BODY	LIVER	SKIN
I. WASTEWATER TREATMENT PLANT						
A. U.S. PLYWOOD-CHAMPION PAPER						
A. MAXIMUM INDIVIDUAL CHILD (MREM)	1.0E-02	3.5E-04	4.4E-03	2.3E-03	1.1E-02	2.3E-03
B. MAXIMUM INDIVIDUAL ADULT (MREM)	4.2E-03	6.3E-04	5.2E-03	4.2E-03	5.6E-03	4.2E-03
C. TENNESSEE RIVER POPULATION (MAN-REM)	8.3E-02	6.3E-03	5.4E-02	5.1E-02	9.8E-02	5.1E-02
II. WASTEWATER TREATMENT PLANT						
A. WHEELER LAKE BELOW BFN						
A. MAXIMUM INDIVIDUAL CHILD (MREM)	2.2E-01	3.1E-03	4.9E-02	4.9E-02	2.7E-01	4.8E-02
B. MAXIMUM INDIVIDUAL ADULT (MREM)	1.7E-01	1.2E-02	2.2E-01	2.2E-01	3.1E-01	2.2E-01
C. TENNESSEE RIVER POPULATION (MAN-REM)	2.2E+01	1.1E+00	2.0E+01	2.0E+01	3.4E+01	2.0E+01
III. RECREATION AT						
A. WHEELER LAKE BELOW BFN						
A. SHORELINE INDIVIDUAL (MREM)	2.4E-02	2.0E-02	1.9E-02	2.1E-02	1.8E-02	2.5E-02
B. SHORELINE POPULATION (MAN-REM)	2.1E-01	1.9E-01	1.6E-01	1.9E-01	1.6E-01	2.2E-01
B. IN-WATER INDIVIDUAL (MREM)	6.4E-04	5.5E-04	5.2E-04	5.6E-04	4.8E-04	6.7E-04
C. IN-WATER POPULATION (MAN-REM)	5.7E-04	4.7E-04	3.5E-04	4.4E-04	3.7E-04	5.4E-04
C. ABOVE-WATER INDIVIDUAL (MREM)	5.3E-04	5.4E-04	5.1E-04	5.5E-04	4.7E-04	6.6E-04
D. ABOVE-WATER POPULATION (MAN-REM)	1.4E-03	1.1E-03	9.5E-04	1.1E-03	9.8E-04	1.4E-03
IV. TOTAL						
A. MAXIMUM INDIVIDUAL CHILD (MREM)	2.6E-01	2.5E-02	7.3E-02	7.3E-02	3.0E-01	7.7E-02
B. MAXIMUM INDIVIDUAL ADULT (MREM)	2.0E-01	3.4E-02	2.5E-01	2.5E-01	3.5E-01	2.5E-01
C. TENNESSEE RIVER POPULATION (MAN-REM)	2.2E+01	1.3E+00	2.9E+01	2.0E+01	3.5E+01	2.0E+01

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$1.02E-02 = 1.02 \times 10^{-2}$

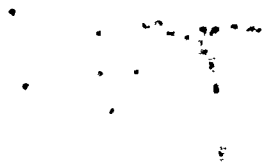


Table 14

Liquid Effluent Doses
Browns Ferry Nuclear Plant Routine Releases

Fourth Quarter 1983

	BO NE	GI TR ACT	THY ROID	TOT AL B ODY	LIV ER	SK IN
I. WATER INGESTION AT						
U.S. PLYWOOD-CHAMPION PAPER						
A. MAXIMUM INDIVIDUAL CHILD (MREM)	1.9E-02 ^o	7.7E-04	7.3E-03	4.3E-03	2.3E-02	4.3E-03
B. MAXIMUM INDIVIDUAL ADULT (MREM)	7.1E-03	1.2E-03	1.1E-02	8.8E-03	1.2E-02	8.8E-03
C. TENNESSEE RIVER POPULATION (MAN-REM)	1.3E-01	1.2E-02	9.7E-02	8.8E-02	1.8E-01	8.8E-02
II. FISH INGESTION FROM						
WHEELER LAKE BELOW BFN						
A. MAXIMUM INDIVIDUAL CHILD (MREM)	5.0E-01	8.2E-03	1.1E-01	1.1E-01	6.2E-01	1.1E-01
B. MAXIMUM INDIVIDUAL ADULT (MREM)	3.6E-01	3.4E-02	5.0E-01	5.0E-01	6.9E-01	5.0E-01
C. TENNESSEE RIVER POPULATION (MAN-REM)	4.5E+01	2.8E+00	4.2E+01	4.1E+01	7.1E+01	4.1E+01
III. RECREATION AT						
WHEELER LAKE BELOW BFN						
A. SHORELINE INDIVIDUAL (MREM)	3.9E-02	3.4E-02	3.0E-02	3.5E-02	3.0E-02	4.2E-02
POPULATION (MAN-REM)	1.4E-01	1.2E-01	1.1E-01	1.3E-01	1.1E-01	1.5E-01
B. IN-WATER INDIVIDUAL (MREM)	1.0E-03	8.4E-04	7.5E-04	8.8E-04	7.5E-04	1.1E-03
POPULATION (MAN-REM)	5.0E-04	3.9E-04	3.4E-04	4.2E-04	3.6E-04	5.2E-04
C. ABOVE-WATER INDIVIDUAL (MREM)	1.0E-03	8.2E-04	7.3E-04	8.7E-04	7.4E-04	1.1E-03
POPULATION (MAN-REM)	1.3E-03	1.0E-03	8.8E-04	1.1E-03	9.3E-04	1.3E-03
IV. TOTAL						
A. MAXIMUM INDIVIDUAL CHILD (MREM)	5.6E-01	4.4E-02	1.5E-01	1.5E-01	6.7E-01	1.6E-01
B. MAXIMUM INDIVIDUAL ADULT (MREM)	4.3E-01	7.0E-02	5.4E-01	5.5E-01	7.3E-01	5.5E-01
C. TENNESSEE RIVER POPULATION (MAN-REM)	4.5E+01	2.9E+00	4.2E+01	4.2E+01	7.2E+01	4.2E+01

^o 1.9E-02 = 1.9 x 10⁻²

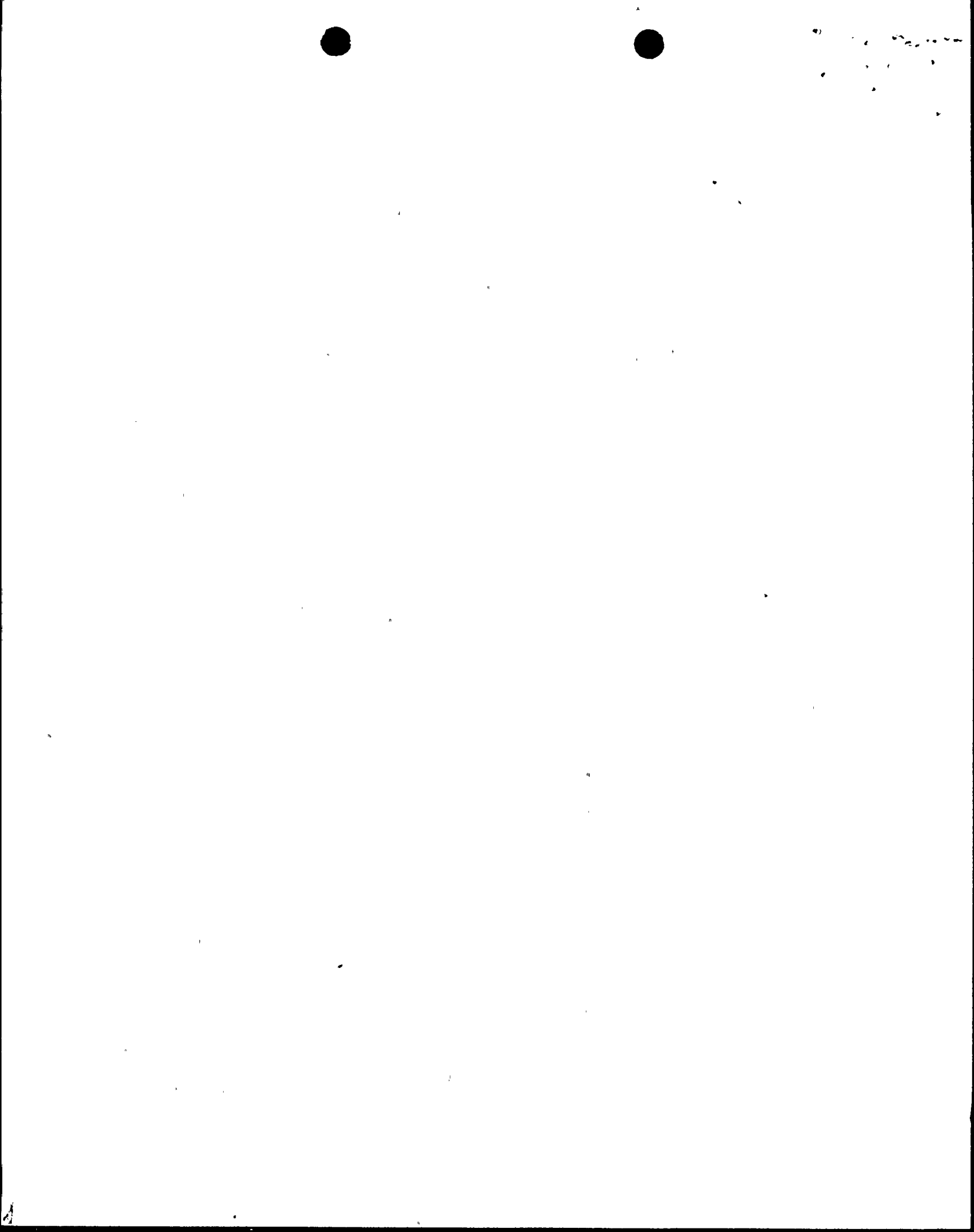


Table 15

Browns Ferry Nuclear Plant - Five-Year Summary
of Quarterly Doses*

Year	Quarter	Air- γ (mrad)	Air- β (mrad)	Air Submersion		Real Pathway	Liquid Effluents	
				Skin (mrem)	Total Body (mrem)	Maximum Organ (mrem)	Total Body (mrem)	Maximum Organ (mrem)
1979	1	1.44	5.01	2.24	.89	.10 Thy.	.02	.13 GI Tract
	2	.79	7.00	2.49	.51	.09 Thy.	.02	.07 GI Tract
	3	1.94	12.90	4.36	1.19	.26 Thy.	.04	.04 Thy.
	4	2.25	16.00	5.65	1.27	.14 Thy.	.06	.06 Thy.
1980	1 ^a	.35	.44	.31	.21	.11 Thy.	.05	.03 Thy.
	2 ^b	.39	.48	.33	.22	1.19 Bone	.03	.01 Thy.
	3 ^b	.40	.52	.31	.21	.07 Thy.	.09	.11 Liver
	4	.93	1.09	.64	.45	.08 Thy.	.15	.19 Liver
1981	1	1.97	2.11	1.40	.96	.09 Bone	.07	.10 Liver
	2	.28	.35	.23	.15	.98 Bone	.21	.25 Liver
	3	.15	.19	.11	.07	.14 Bone	.23	.28 Liver
	4	.09	.12	.09	.06	.08 Thy.	.05	.06 Liver
1982	1	.11	.16	.09	.07	.13 Bone	.11	.13 Liver
	2	.33	.52	.23	.17	.11 Bone	.06	.07 Liver
	3	.27	.35	.37	.27	.24 Bone	.10	.12 Liver
	4	.19	.23	.20	.13	.16 Bone	.07	.08 Liver
1983	1	.47	.45	.24	.16	.25 Bone	.07	.09 Liver
	2	.48	.42	.32	.19	.31 Thy.	.09	.11 Liver
	3	.18	.34	.16	.10	.30 Bone	.25	.33 Liver
	4	.39	.85	.24	.14	.04 Thy.	.54	.73 Liver

^a Plant procedures were revised in early 1980 for determining more realistically Kr-85 releases via the plant gaseous effluent release points.

^b Prior to the third quarter of 1980 the liver was not considered in liquid dose analyses.

*Note: All calculated doses are below limits specified in Appendix I to 10 CFR 50.

