

ENCLOSURE 1

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
FOR THE PERIOD OF JANUARY 1 TO DECEMBER 31, 1995

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EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
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1. REGULATORY LIMITS

A. Gaseous Effluents

1. Dose rates due to radioactivity released in gaseous effluents from the site to areas at and beyond the unrestricted area boundary shall be limited to the following:
 - a. Noble gases:
 - Less than or equal to 500 mrem/year to the total body.
 - Less than or equal to 3000 mrem/year to the skin.
 - b. Iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days:
 - Less than or equal to 1500 mrem/year to any organ.
2. Air dose due to noble gases released in gaseous effluents to areas at and beyond the unrestricted area boundary shall be limited to the following:
 - a. Less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation during any calendar quarter.
 - b. Less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad for beta radiation during any calendar year.
3. Dose to a member of the public from iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than eight days in gaseous effluents released to areas at and beyond the unrestricted area boundary shall be limited to the following:
 - a. Less than or equal to 7.5 mrem to any organ during any calendar quarter.
 - b. Less than or equal to 15 mrem to any organ during any calendar year.

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B. Liquid Effluents

1. The annual average concentration of radioactivity released in liquid effluents to unrestricted areas shall be limited to the concentrations specified in Title 10 of the Code of Federal Regulations, Part 20 (Standards for Protection Against Radiation), Appendix B, Table 2, Column 2, for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2.0 E-04 microcuries/milliliter ($\mu\text{Ci/ml}$) total activity.
2. The dose or dose commitment to a member of the public from radioactivity in liquid effluents released to unrestricted areas shall be limited to:
 - a. Less than or equal to 1.5 mrem to the total body and less than or equal to 5 mrem to any organ during any calendar quarter.
 - b. Less than or equal to 3 mrem to the total body and less than or equal to 10 mrem to any organ during any calendar year.

2. EFFLUENT CONCENTRATION LIMITS

A. Liquids

- *1. The Effluent Concentration Limits (ECL) for liquids are those listed in 10 CFR 20, Appendix B, Table 2, Column 2. For dissolved and entrained gases the ECL of 2.0E-04 $\mu\text{Ci/ml}$ is applied. This ECL is based on the Xe-135 concentration in air (submersion dose) converted to an equivalent concentration in water as discussed in the International Commission on Radiological Protection (ICRP), Publication 2.

*These values are used as applicable limits for liquid and gaseous effluents.

B. Gaseous

- *1. The maximum permissible dose rates for gaseous releases are defined in plant Offsite Dose Calculation Manual (ODCM).
 - a. Noble gas dose rate at the unrestricted area boundary:
 - Less than or equal to 500 mrem/year to the total body,
 - Less than or equal to 3000 mrem/year to skin.

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b. Iodine-131, iodine-133, tritium, and particulates with half-lives greater than eight days dose rate at the unrestricted area boundary:

- Less than or equal to 1500 mrem/year to any organ.

*These values are used as applicable limits for liquid and gaseous effluents.

3. AVERAGE ENERGY

Sequoyah's ODCM limits the dose equivalent rates due to the release of noble gases to less than or equal to 500 mrem/year to the total body and less than or equal to 3000 mrem/year to the skin. Therefore, the average beta and gamma energies (E) for gaseous effluents as described in Regulatory Guide 1.21, "Measuring, Evaluation, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants," are not applicable.

4. MEASUREMENTS AND APPROXIMATIONS OF TOTAL RADIOACTIVITY

NOTE: Every effort is made to ensure that effluent releases from Sequoyah are conducted such that all Offsite Dose Calculation Manual (ODCM) Lower Limit of Detection (LLD) values are met. Whenever an analysis does not identify a radioisotope, a "0.00E-01 Ci" is recorded for the release. This does not necessarily mean that no activity was released for that particular radionuclide, but that the concentration was below the ODCM and analysis LLD. Refer to Tables A and B for estimates of these typical LLD values.

A. Fission and Activation Gases

Airborne effluent gaseous activity is continuously monitored and recorded. Additional grab samples from the shield building, auxiliary building, service building, and condenser vacuum exhausts are taken and analyzed at least monthly to determine the quantity of noble gas activity released for the month based on the average vent flowrates recorded for the sample period. Also, noble gas samples are collected and evaluated for the shield and auxiliary buildings following startup, shutdown, or rated thermal power change exceeding 15 percent within one hour (sampling only required if dose equivalent I-131 concentration in the primary coolant or the noble gas activity monitor shows that the containment activity has increased more than a factor of 3).

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The quantity of noble gases released through the shield and auxiliary building exhausts due to purging or venting of containment and releases of waste gas decay tanks are also determined.

The total noble gas activity released for the month is then determined by summing all of the activity released from each vent for all sampling periods.

B. Iodines and Particulates

Iodine and particulate activity is continuously sampled. Charcoal and particulate samples are taken from the shield and auxiliary building exhausts and analyzed at least weekly to determine the total activity released from the plant based on the average vent flowrates recorded for sampling period.

Also, particulate and charcoal samples are taken from the auxiliary and shield building exhausts once per 24 hours for 2 days following startup, shutdown, or a rated thermal power change exceeding 15 percent within one hour. The quantity of iodine and particulate released from each vent during each sampling period is then determined using the average vent flowrates recorded for the sampling period and activity concentration.

The total particulate and iodine activity released for the month is then determined by summing all of the activity released from the shield and auxiliary building exhausts for all sampling periods.

C. Liquid Effluents

Batch (Radwaste and during periods of primary to secondary leakage, condensate regenerants to cooling tower blowdown)

Total gamma isotopic activity concentrations are determined on each batch of liquid effluent prior to release. The total activity of a released batch is determined by summing each nuclide's concentration and multiplying 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.

Continuous Releases and Periodic Continuous Releases (Condensate regenerants, turbine building sump and steam generator blowdown)

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Total gamma isotopic activity concentration is determined daily on a composite sample from the condensate system and turbine building sump and weekly for steam generator blowdown. The total activity of the continuous release is determined by summing each nuclide's concentration and multiplying by the total volume discharged. The total activity released during the month is then determined by summing the activity content of each daily and weekly composite for the month.

5. BATCH

Value		Units
1st Half	2nd Half	

A. Liquid (Radwaste only)

1. Number of releases	170	204	Each
2. Total time period of releases	21,640	28,410	Minutes
3. Maximum time period of release	220	581	Minutes
4. Average time period of releases	127	139	Minutes
5. Minimum time period for release	58	60	Minutes
6. Average dilution stream flow during release periods - cubic feet/second (CFS)	32,862	34,732	CFS

B. Gaseous (Batches only, containment purges,
and waste decay tanks)

1. Number of releases	9	15	Each
2. Total time period of releases	10,040	17,920	Minutes
3. Maximum time period for release	4,064	3,837	Minutes
4. Average time period for releases	1,115	1,194	Minutes
5. Minimum time period for release	4	60	Minutes

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6. ABNORMAL RELEASES

	Value		Units
	1st Half	2nd Half	
A. Liquid			
Number of Releases	0	1	
Total Activity Released	0.00E-01	1.20E-06	Ci
B. Gaseous			
Number of Releases	0	0	
Total Activity Released	0.00E-01	0.00E-01	Ci

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LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

A. <u>Fission and Activation Products</u>	<u>Unit</u>	<u>1st Qtr</u>	<u>2nd Qtr</u>	<u>3rd Qtr</u>	<u>4th Qtr</u>	<u>%Error</u>
1. Total Released						
2. Average Diluted Conc. During Period of All Identified Isotopes	Curies $\mu\text{Ci/ml}$	3.87E-01 1.01E-06	4.08E-01 1.18E-06	1.14E+00 2.01E-06	1.60E+00 4.00E-06	$\pm 1.8E+01$
3. Percent of Applicable Limit ($\Sigma\text{ECL} \leq 10$)	%	1.75E+00	1.69E+00	3.56E+00	2.93E+00	

NOTE: Percent of applicable limit is based on identified isotope concentration after dilution, related to their appropriate ECL concentration and sum of all the isotope fractions compared to 10.0.

B. <u>Tritium</u>						
1. Total Released	Curies	4.52E+02	5.39E+02	2.96E+02	1.78E+02	$\pm 1.8E+01$
2. Average Diluted Conc. During Period	$\mu\text{Ci/ml}$	1.18E-03	1.56E-03	5.21E-04	4.45E-04	
3. Percent of Applicable Limit (1.0E-02 $\mu\text{Ci/ml}$)	%	1.18E+01	1.56E+01	5.21E+00	4.45E+00	

C. <u>Dissolved and Entrained Gases</u>						
1. Total Released	Curies	9.60E-03	1.13E-02	8.26E-02	3.54E-03	$\pm 3.9E+01$
2. Average Diluted Conc. During Period	$\mu\text{Ci/ml}$	2.51E-08	3.26E-08	1.45E-07	8.86E-09	
3. Percent of Applicable Limit (2.0E-04 $\mu\text{Ci/ml}$)	%	1.26E-02	1.63E-02	7.27E-02	4.43E-03	

D. <u>Gross Alpha Radioactivity</u>						
1. Total Released	Curies	0.00E-01	0.00E-01	0.00E-01	0.00E-01	$\pm 2.0E+01$
E. <u>Volume of Waste Released</u>	Liters	4.94E+06	4.52E+06	6.32E+06	4.77E+06	$\pm 4.0E+00$
F. <u>Volume of Dilution Water for Period</u>	Liters	3.77E+08	3.42E+08	5.62E+08	3.95E+08	$\pm 1.1E+01$

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LIQUID EFFLUENTS - TOTAL PLANT DISCHARGE

G. Nuclide Summary (Note: Refer to Table A for ODCM nuclides reported as 0.00E-01)

Required by ODCM/Others

Fission and Activation Products

Nuclide	Unit	Continuous Mode		Batch Mode	
		Quarter	Quarter	Quarter	Quarter
		1st	2nd	1st	2nd
1. Strontium-89	Ci	0.00E-01	0.00E-01	0.00E-01	0.00E-01
2. Strontium-90	Ci	0.00E-01	0.00E-01	0.00E-01	0.00E-01
3. Iron-55	Ci	0.00E-01	7.51E-04	9.13E-02	9.56E-02
4. Manganese-54	Ci	0.00E-01	0.00E-01	2.81E-03	2.02E-03
5. Cobalt-58	Ci	1.60E-06	1.58E-06	1.16E-01	1.89E-01
6. Iron-59	Ci	0.00E-01	0.00E-01	3.45E-04	2.51E-03
7. Cobalt-60	Ci	6.12E-06	0.00E-01	6.26E-02	4.68E-02
8. Zinc-65	Ci	0.00E-01	0.00E-01	8.83E-04	1.13E-05
9. Molybdenum-99	Ci	0.00E-01	0.00E-01	1.10E-03	0.00E-01
10. Iodine-131	Ci	0.00E-01	0.00E-01	1.51E-02	1.07E-03
11. Cesium-134	Ci	7.57E-07	0.00E-01	6.58E-03	1.08E-02
12. Cesium-137	Ci	2.45E-05	1.49E-05	1.27E-02	1.71E-02
13. Cerium-141	Ci	0.00E-01	0.00E-01	8.79E-06	0.00E-01
14. Cerium-144	Ci	0.00E-01	0.00E-01	2.21E-04	0.00E-01
15. Antimony-125	Ci	7.45E-07	0.00E-01	4.31E-02	2.18E-02
16. Cobalt-57	Ci	0.00E-01	0.00E-01	1.02E-03	7.59E-04
17. Chromium-51	Ci	0.00E-01	0.00E-01	1.10E-02	8.51E-03
18. Niobium-95	Ci	0.00E-01	0.00E-01	4.40E-03	1.42E-03

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Nuclide	Unit	Continuous Mode		Batch Mode	
		Quarter	Quarter	Quarter	Quarter
		1st	2nd	1st	2nd
19. Iodine-133	Ci	0.00E-01	0.00E-01	1.16E-03	1.35E-04
20. Zirconium-95	Ci	0.00E-01	0.00E-01	1.98E-03	3.99E-04
21. Technetium-99m	Ci	0.00E-01	0.00E-01	9.78E-04	0.00E-01
22. Strontium-92	Ci	0.00E-01	0.00E-01	0.00E-01	1.19E-05
23. Tellurium-132	Ci	0.00E-01	0.00E-01	4.76E-06	0.00E-01
24. Antimony-124	Ci	0.00E-01	0.00E-01	2.09E-03	4.78E-04
25. Lanthanum-140	Ci	0.00E-01	0.00E-01	6.41E-03	3.76E-04
26. Sodium-24	Ci	0.00E-01	0.00E-01	3.94E-05	0.00E-01
27. Niobium-97	Ci	0.00E-01	0.00E-01	0.00E-01	2.79E-05
28. Silver-110m	Ci	0.00E-01	0.00E-01	3.72E-03	1.61E-03
29. Yttrium-91	Ci	0.00E-01	0.00E-01	0.00E-01	6.64E-03
30. Barium-139	Ci	0.00E-01	0.00E-01	0.00E-01	3.30E-05
31. Barium-140	Ci	0.00E-01	0.00E-01	6.41E-04	0.00E-01
32. Iodine-135	Ci	0.00E-01	0.00E-01	0.00E-01	3.34E-05
33. Ruthenium-103	Ci	0.00E-01	0.00E-01	6.53E-05	0.00E-01
34. Tin-113	Ci	0.00E-01	0.00E-01	2.63E-04	3.48E-05
35. Yttrium-93	Ci	0.00E-01	0.00E-01	6.44E-05	0.00E-01
36. Zinc-69m	Ci	0.00E-01	0.00E-01	5.43E-06	0.00E-01
Total for Period	Ci	3.37E-05	7.68E-04	3.87E-01	4.07E-01

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G. Nuclide Summary (Note: Refer to Table A for ODCM nuclides reported as 0.00E-01)

Required by ODCM/Others

Dissolved and Entrained Noble Gases

Nuclide	Unit	Continuous Mode		Batch Mode	
		Quarter	Quarter	Quarter	Quarter
		1st	2nd	1st	2nd
1. Krypton-87	Ci	5.83E-07	0.00E-01	0.00E-01	1.86E-05
2. Krypton-88	Ci	0.00E-01	0.00E-01	0.00E-01	0.00E-01
3. Xenon-133	Ci	0.00E-01	0.00E-01	8.71E-03	9.47E-03
4. Xenon-133m	Ci	0.00E-01	0.00E-01	0.00E-01	0.00E-01
5. Xenon-135	Ci	0.00E-01	0.00E-01	6.59E-04	1.80E-03
6. Xenon-138	Ci	0.00E-01	0.00E-01	0.00E-01	0.00E-01
7. Krypton-85m	Ci	0.00E-01	0.00E-01	0.00E-01	0.00E-01
8. Xenon-131m	Ci	0.00E-01	0.00E-01	2.18E-04	0.00E-01
9. Xenon-135m	Ci	0.00E-01	0.00E-01	0.00E-01	1.87E-05
10. Krypton-85	Ci	0.00E-01	0.00E-01	0.00E-01	0.00E-01
11. Argon-41	Ci	0.00E-01	0.00E-01	9.83E-06	5.08E-06
Total for Period	Ci	5.83E-07	0.00E-01	9.60E-03	1.13E-02

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G. Nuclide Summary (Note: Refer to Table A for ODCM nuclides reported as 0.00E-01)

Required by ODCM/Others

Fission and Activation Products

Nuclide	Unit	Continuous Mode		Batch Mode	
		Quarter	Quarter	Quarter	Quarter
		3rd	4th	3rd	4th
1. Strontium-89	Cl	0.00E-01	0.00E-01	0.00E-01	4.51E-04
2. Strontium-90	Cl	0.00E-01	0.00E-01	0.00E-01	0.00E-01
3. Iron-55	Cl	1.36E-03	0.00E-01	9.98E-02	9.40E-02
4. Manganese-54	Cl	0.00E-01	0.00E-01	1.97E-02	1.34E-02
5. Cobalt-58	Cl	0.00E-01	5.70E-04	6.32E-01	1.18E+00
6. Iron-59	Cl	0.00E-01	0.00E-01	3.98E-03	2.00E-02
7. Cobalt-60	Cl	0.00E-01	1.67E-05	7.92E-02	8.74E-02
8. Zinc-65	Cl	0.00E-01	0.00E-01	3.76E-04	9.87E-05
9. Molybdenum-99	Cl	0.00E-01	0.00E-01	3.51E-04	0.00E-01
10. Iodine-131	Cl	0.00E-01	0.00E-01	2.51E-03	3.91E-04
11. Cesium-134	Cl	6.09E-06	1.02E-05	5.14E-02	7.27E-03
12. Cesium-137	Cl	1.44E-05	2.29E-05	7.74E-02	1.22E-02
13. Cerium-141	Cl	0.00E-01	0.00E-01	0.00E-01	0.00E-01
14. Cerium-144	Cl	0.00E-01	0.00E-01	2.99E-04	1.79E-04
15. Antimony-125	Cl	0.00E-01	0.00E-01	3.74E-02	4.62E-02
16. Cobalt-57	Cl	0.00E-01	0.00E-01	2.37E-03	3.91E-03
17. Chromium-51	Cl	0.00E-01	0.00E-01	7.20E-02	8.27E-02
18. Niobium-95	Cl	0.00E-01	0.00E-01	2.47E-02	2.49E-02
19. Iodine-133	Cl	0.00E-01	0.00E-01	1.01E-03	0.00E-01
20. Zirconium-95	Cl	0.00E-01	0.00E-01	1.50E-02	1.51E-02
21. Technetium-99m	Cl	0.00E-01	0.00E-01	3.24E-04	0.00E-01
22. Ruthenium-103	Cl	0.00E-01	0.00E-01	9.65E-04	1.41E-03

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Nuclide	Unit	Continuous Mode		Batch Mode	
		Quarter	Quarter	Quarter	Quarter
		3rd	4th	3rd	4th
23. Antimony-124	Ci	0.00E-01	0.00E-01	3.66E-03	4.48E-03
24. Lanthanum-140	Ci	0.00E-01	0.00E-01	3.28E-03	2.19E-03
25. Sodium-24	Ci	0.00E-01	0.00E-01	9.91E-05	7.91E-05
26. Cesium-138	Ci	0.00E-01	0.00E-01	3.03E-05	0.00E-01
27. Strontium-92	Ci	0.00E-01	0.00E-01	2.79E-04	0.00E-01
28. Niobium-97	Ci	0.00E-01	0.00E-01	7.28E-04	0.00E-01
29. Yttrium-91m	Ci	0.00E-01	0.00E-01	0.00E-01	2.58E-05
30. Silver-110m	Ci	0.00E-01	0.00E-01	5.97E-03	1.21E-03
31. Cesium-136	Ci	0.00E-01	0.00E-01	0.00E-01	7.56E-06
32. Iodine-132	Ci	0.00E-01	0.00E-01	1.09E-04	0.00E-01
33. Iodine-135	Ci	0.00E-01	0.00E-01	3.30E-05	0.00E-01
34. Manganese-56	Ci	0.00E-01	0.00E-01	5.38E-06	0.00E-01
35. Tin-113	Ci	0.00E-01	0.00E-01	2.03E-03	2.45E-03
36. Cerium-143	Ci	0.00E-01	0.00E-01	1.96E-05	0.00E-01
37. Tellurium-129m	Ci	0.00E-01	0.00E-01	1.13E-03	3.15E-04
38. Copper-64	Ci	0.00E-01	0.00E-01	5.74E-04	8.48E-04
39. Iodine-134	Ci	0.00E-01	0.00E-01	2.06E-04	0.00E-01
40. Ruthenium-105	Ci	0.00E-01	0.00E-01	1.30E-04	0.00E-01
41. Tellurium-132	Ci	0.00E-01	0.00E-01	1.86E-04	0.00E-01
Total for Period	Ci	1.38E-03	6.20E-04	1.14E+00	1.60E+00

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G. Nuclide Summary (Note: Refer to Table A for ODCM nuclides reported as 0.00E-01)

Required by ODCM/Others

Dissolved and Entrained Noble Gases

Nuclide	Unit	Continuous Mode		Batch Mode	
		Quarter	Quarter	Quarter	Quarter
		3rd	4th	3rd	4th
1. Krypton-87	Cl	0.00E-01	0.00E-01	9.96E-06	0.00E-01
2. Krypton-88	Cl	0.00E-01	0.00E-01	0.00E-01	2.45E-05
3. Xenon-133	Cl	0.00E-01	0.00E-01	7.89E-02	3.35E-03
4. Xenon-133m	Cl	0.00E-01	0.00E-01	2.04E-04	0.00E-01
5. Xenon-135	Cl	0.00E-01	0.00E-01	3.21E-03	6.34E-05
6. Xenon-138	Cl	0.00E-01	0.00E-01	0.00E-01	0.00E-01
7. Krypton-85m	Cl	0.00E-01	0.00E-01	0.00E-01	0.00E-01
8. Xenon-131m	Cl	0.00E-01	0.00E-01	2.57E-04	0.00E-01
9. Xenon-135m	Cl	0.00E-01	0.00E-01	0.00E-01	0.00E-01
10. Krypton-85	Cl	0.00E-01	0.00E-01	0.00E-01	0.00E-01
11. Argon-41	Cl	0.00E-01	0.00E-01	2.64E-05	1.03E-04
Total for Period	Cl	0.00E-01	0.00E-01	8.26E-02	3.54E-03

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TABLE A

LIQUID "TYPICAL LLD" EVALUATION⁽¹⁾

Nuclide	ODCM LLD	$\Delta t^{(2)}$		
		1 hr	8 hr	32 hr
Manganese-54	5.0E-07	3.36E-08	3.36E-08	3.37E-08
Cobalt-58	5.0E-07	2.53E-08	2.54E-08	2.56E-08
Iron-59	5.0E-07	5.26E-08	5.29E-08	5.37E-08
Cobalt-60	5.0E-07	4.63E-08	4.63E-08	4.64E-08
Zinc-65	5.0E-07	2.95E-08	2.95E-08	2.96E-08
Molybdenum-99	5.0E-07	1.55E-07	1.67E-07	2.15E-07
Cesium-134	5.0E-07	1.91E-08	1.91E-08	1.92E-08
Cesium-137	5.0E-07	3.87E-08	3.87E-08	3.87E-08
Cerium-141	5.0E-07	2.80E-08	2.81E-08	2.87E-08
Cerium-144	5.0E-06	1.11E-07	1.12E-07	1.12E-07
Iodine-131	1.0E-06	2.28E-08	2.34E-08	2.55E-08
Krypton-87	1.0E-05	1.16E-07	5.25E-07	(3)
Krypton-88	1.0E-05	9.95E-08	5.49E-07	(3)
Xenon-133	1.0E-05	4.19E-08	4.36E-08	4.98E-08
Xenon-133m	1.0E-05	1.42E-07	1.55E-07	2.13E-07
Xenon-135	1.0E-05	2.06E-08	3.50E-08	2.17E-07
Xenon-138	1.0E-05	8.37E-06	(3)	(3)

Nuclide	ODCM LLD	Typical LLD
Tritium	1.0E-05	1.2E-06
Gross Alpha	1.0E-07	2.0E-08
Strontium-89	5.0E-08	3.8E-08
Strontium-90	5.0E-08	4E-08
Iron-55	1.0E-06	1.3E-08

NOTES: (1) LLD values are in $\mu\text{Ci/ml}$.

(2) Δt is the time between sample collection and counting time.

(3) T 1/2 too short.

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
1995
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
(GROUND LEVEL RELEASES)

<u>Summation of All Releases</u>	<u>Unit</u>	<u>1st Qtr</u>	<u>2nd Qtr</u>	<u>3rd Qtr</u>	<u>4th Qtr</u>	<u>%Error</u>
A. Noble Gases						
1. Total Released	Ci	1.51E+01	1.60E+01	2.92E+01	3.66E+00	±1.1E+01
2. Average Release Rate of Period	μCi/sec	1.94E+00	2.04E+00	3.67E+00	4.61E-01	
3. Percent of Applicable Limit	%	1.15E-03	1.08E-03	2.00E-03	4.85E-04	
B. Iodines						
1. Total Iodine-131	Ci	1.36E-06	0.00E-01	6.54E-06	1.59E-06	±1.3E+01
2. Average Release Rate for Period	μCi/sec	1.75E-07	0.00E-01	8.23E-07	2.00E-07	
3. Percent of Applicable Limit (1.60E-01 μCi/sec)	%	1.09E-04	0.00E-01	5.14E-04	1.25E-04	
C. Particulates						
1. Particulates with half-lives > 8 days	Ci	4.27E-06	0.00E-01	1.04E-05	3.42E-05	±1.6E+01
2. Average Release Rate for Period	μCi/sec	5.49E-07	0.00E-01	1.31E-06	4.30E-06	
3. Percent of Applicable Limit	%	1.65E-05	0.00E-01	1.34E-06	3.12E-05	
4. Gross Alpha Radioactivity	Ci	0.00E-01	0.00E-01	0.00E-01	0.00E-01	±2.1E+01
D. Tritium						
1. Total Release	Ci	1.56E+01	2.60E+00	4.50E+00	1.81E+01	±1.5E+01
2. Average Release Rate for Period	μCi/sec	2.01E+00	3.31E-01	5.66E-01	2.28E+00	
3. Percent of Applicable Limit (8.47E+04 μCi/sec)		2.37E-03	3.90E-04	6.68E-04	2.69E-03	

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
1995
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
(GROUND LEVEL RELEASES)

1. Noble Gases

Required by
ODCM/Others

Nuclide	Unit	Continuous Mode		Batch Mode	
		Quarter	Quarter	Quarter	Quarter
		1st	2nd	1st	2nd
1. Krypton-87	Ci	0.00E-01	0.00E-01	0.00E-01	0.00E-01
2. Krypton-88	Ci	0.00E-01	1.23E-02	9.25E-03	1.39E-02
3. Xenon-133	Ci	2.63E-02	2.36E-02	1.32E+01	1.46E+01
4. Xenon-133m	Ci	0.00E-01	0.00E-01	2.23E-01	2.65E-01
5. Xenon-135	Ci	5.64E-01	2.95E-02	7.96E-01	7.64E-01
6. Xenon-138	Ci	0.00E-01	0.00E-01	0.00E-01	0.00E-01
7. Krypton-85	Ci	0.00E-01	0.00E-01	0.00E-01	0.00E-01
8. Argon-41	Ci	6.60E-03	0.00E-01	2.29E-01	2.34E-01
9. Krypton-85m	Ci	2.77E-03	3.13E-03	3.11E-02	3.82E-02
10. Xenon-131m	Ci	0.00E-01	0.00E-01	0.00E-01	0.00E-01
11. Xenon-135m	Ci	1.27E-02	4.34E-03	1.16E-02	0.00E-01
Total for Period	Ci	6.13E-01	7.29E-02	1.45E+01	1.59E+01

2. Iodines

1. Iodine-131	Ci	1.36E-06	0.00E-01
2. Iodine-133	Ci	1.56E-06	0.00E-01
3. Iodine-135	Ci	0.00E-01	0.00E-01
Total for Period	Ci	2.92E-06	0.00E-01

NOTE: Refer to Table B for ODCM nuclides reported as 0.00E-01.

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
1995
 GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
 (GROUND LEVEL RELEASES)

3. Particulates

Nuclide	Unit	Continuous Mode	
		Quarter	Quarter
		1st	2nd
1. Strontium-89	Ci	0.00E-01	0.00E-01
2. Strontium-90	Ci	0.00E-01	0.00E-01
3. Iron-59	Ci	0.00E-01	0.00E-01
4. Cobalt-60	Ci	4.27E-06	0.00E-01
5. Zinc-65	Ci	0.00E-01	0.00E-01
6. Manganese-54	Ci	0.00E-01	0.00E-01
7. Cobalt-58	Ci	0.00E-01	0.00E-01
8. Molybdenum-99	Ci	0.00E-01	0.00E-01
9. Cesium-134	Ci	0.00E-01	0.00E-01
10. Cesium-137	Ci	0.00E-01	0.00E-01
11. Cerium-141	Ci	0.00E-01	0.00E-01
12. Cerium-144	Ci	0.00E-01	0.00E-01
Total for Period	Ci	4.27E-06	0.00E-01

NOTE: Refer to Table B for ODCM nuclides reported as 0.00E-01.

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
1995
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
(GROUND LEVEL RELEASES)

1. Noble Gases

Required by ODCM/Others		Continuous Mode		Batch Mode	
Nuclide	Unit	Quarter	Quarter	Quarter	Quarter
		3rd	4th	3rd	4th
1. Krypton-87	CI	8.32E-05	1.10E-04	0.00E-01	0.00E-00
2. Krypton-88	CI	5.62E-03	2.73E-03	5.19E-03	0.00E-01
3. Xenon-133	CI	6.48E-01	2.85E-02	2.57E+01	2.27E+00
4. Xenon-133m	CI	0.00E-01	0.00E-01	1.08E+00	8.91E-01
5. Xenon-135	CI	2.90E-02	2.78E-02	9.73E-01	1.32E-01
6. Xenon-138	CI	0.00E-01	0.00E-01	0.00E-01	0.00E-01
7. Krypton-85	CI	0.00E-01	0.00E-01	0.00E-01	0.00E-01
8. Argon-41	CI	0.00E-01	1.79E-02	6.16E-01	2.56E-01
9. Krypton-85m	CI	2.15E-03	2.80E-03	1.56E-02	1.78E-03
10. Xenon-131m	CI	0.00E-01	0.00E-01	6.66E-02	0.00E-01
11. Xenon-135m	CI	1.55E-02	3.20E-02	0.00E-01	0.00E-01
Total for Period	CI	7.00E-01	1.12E-01	2.85E+01	3.55E+00

2. Iodines

1. Iodine-131	CI	6.54E-06	1.59E-06
2. Iodine-133	CI	0.00E-01	0.00E-01
3. Iodine-135	CI	0.00E-01	0.00E-01
Total for Period	CI	6.54E-06	1.59E-06

NOTE: Refer to Table B for ODCM nuclides reported as 0.00E-01.

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
1995
 GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
 (GROUND LEVEL RELEASES)

3. Particulates

Required by ODCM/Others		<u>Continuous Mode</u>	
<u>Nuclide</u>	<u>Unit</u>	<u>Quarter</u>	<u>Quarter</u>
		<u>3rd</u>	<u>4th</u>
1. Strontium-89	Ci	0.00E-01	0.00E-01
2. Strontium-90	Ci	0.00E-01	0.00E-01
3. Iron-59	Ci	0.00E-01	0.00E-01
4. Cobalt-60	Ci	0.00E-01	7.31E-06
5. Zinc-65	Ci	0.00E-01	0.00E-01
6. Manganese-54	Ci	0.00E-01	0.00E-01
7. Cobalt-58	Ci	1.04E-05	2.22E-05
8. Molybdenum-99	Ci	0.00E-01	0.00E-01
9. Cesium-134	Ci	0.00E-01	0.00E-01
10. Cesium-137	Ci	0.00E-01	0.00E-01
11. Cerium-141	Ci	0.00E-01	0.00E-01
12. Cerium-144	Ci	0.00E-01	0.00E-01
13. Niobium-95	Ci	0.00E-01	1.62E-06
14. Zirconium-95	Ci	0.00E-01	3.06E-06
Total for Period	Ci	1.04E-05	3.42E-05

NOTE: Refer to Table B for ODCM nuclides reported as 0.00E-01.

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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TABLE B

GASEOUS "TYPICAL" LLD EVALUATION⁽¹⁾Noble Gas

<u>Nuclide</u>	<u>ODCM LLD</u>	<u>$\Delta t^{(2)}$</u>	
		<u>1 hr</u>	<u>1.5 hr</u>
Krypton-87	1.0E-04	2.08E-06	2.73E-06
Krypton-88	1.0E-04	1.61E-06	1.81E-06
Xenon-133	1.0E-04	6.61E-07	6.63E-07
Xenon-133m	1.0E-04	2.34E-06	2.35E-06
Xenon-135	1.0E-04	3.43E-07	3.56E-07
Xenon-138	1.0E-04	1.40E-04	6.10E-04

Particulate Sample⁽³⁾

		<u>1 hr</u>	<u>24 hr</u>	<u>7.0 da</u>
Manganese-54	1.0E-10	7.47E-12	3.12E-13	4.48E-14
Cobalt-58	1.0E-10	5.62E-12	2.35E-13	3.46E-14
Iron-59	1.0E-10	1.20E-11	5.02E-13	7.49E-14
Cobalt-60	1.0E-10	1.07E-11	4.46E-13	6.38E-14
Zinc-65	1.0E-10	6.71E-12	2.80E-13	4.03E-14
Molybdenum-99	1.0E-10	3.43E-11	1.61E-12	4.70E-13
Cesium-134	1.0E-10	4.25E-12	1.77E-13	2.54E-14
Cesium-137	1.0E-10	8.48E-12	3.54E-13	5.05E-14
Cerium-141	1.0E-10	5.10E-12	2.15E-13	3.26E-14
Cerium-144	1.0E-10	2.01E-11	8.33E-13	1.20E-13
Iodine-131	1.0E-10	4.76E-12	2.07E-13	3.77E-14

Charcoal Sample

Iodine-131	1.0E-11	7.25E-12	3.15E-13	5.74E-14
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(1) LLD values are in $\mu\text{Ci/ml}$.(2) Δt is the time between sample collection and counting time.

(3) LLD based on sample time + 30 min. sample to analysis.

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

1995

TABLE B

GASEOUS "TYPICAL" LLD EVALUATION⁽¹⁾

<u>Nuclide</u>	<u>ODCM LLD</u>	<u>Typical LLD</u>
Tritium	1.0E-06	1.0E-11
Gross Alpha	1.0E-11	1.5E-14
Strontium-89	1.0E-11	1.0E-14
Strontium-90	1.0E-11	1.0E-15

NOTES: (1) LLD values are in $\mu\text{Ci/cc}$.

(2) Δt for noble gases is the time from sampling to analysis.
 Δt for charcoal and particulate samples is the midpoint of sampling to analysis.

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
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SOLID WASTE (RADIOACTIVE SHIPMENTS)

A. Solid Waste Shipped Offsite for Burial or Disposal (not Irradiated Fuel)

1. <u>Type of Waste</u>	<u>Unit</u>	<u>12 Month Period</u>	<u>Est. Tot. Error %</u>
a. Spent resins, filter sludges, evaporator bottoms, etc.	m ³ Ci	1.77E+01 7.01E+02	±1.00E-01 ±1.50E+01
b. Dry Active Waste, Compressible Waste Contaminated Equipment, etc.	m ³ Ci	2.99E+01 6.04E+00	±1.00E-01 ±1.50E+01
c. Irradiated Components, Control Rods, etc.	m ³ Ci	None None	N/A N/A
d. Other	m ³ Ci	None None	N/A N/A

2. Estimate of Major Nuclide Composition (by type of waste)

a. Spent resins, filter sludges, evaporator bottoms, etc.
(nuclides determined by measurement)

	<u>Curies</u>	<u>Percent</u>
1. Manganese-54	8.56E+00	1.22E+00
2. Iron-55	1.01E+02	1.45E+01
3. Cobalt-60	2.32E+02	3.32E+01
4. Nickel-63	3.10E+02	4.42E+01
5. Cesium-134	1.17E+01	1.66E+00
6. Cesium-137	2.72E+01	3.88E+00

b. Dry active waste, compressible waste, contaminated equipment, etc.
(nuclides determined by estimate)

1. Iron-55	3.35E+00	5.55E+01
2. Cobalt-58	1.40E+00	2.32E+01
3. Cobalt-60	4.21E-01	6.97E+00
4. Nickel-63	3.45E-01	5.72E+00
5. Cesium-134	2.03E-01	3.37E+00
6. Cesium-137	2.98E-01	4.94E+00

c. Irradiated Components	N/A	N/A
d. Other	N/A	N/A

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
1995
SOLID WASTE (RADIOACTIVE SHIPMENTS)

3. Solid Waste Disposition

a. Spent resins, filter sludges, evaporator bottoms, etc.

<u>Number of Shipments</u>	<u>Type</u>	<u>Quantity</u>	<u>Mode of Transportation</u>	<u>Destination</u>
2	B-LSA		Motor Freight	Barnwell, SC
2	A-LSA		Motor Freight	Barnwell, SC

b. Dry active waste, compressible waste, contaminated equipment, etc.

<u>Number of Shipments</u>	<u>Type</u>	<u>Quantity</u>	<u>Mode of Transportation</u>	<u>Destination</u>
106	A-LSA		Motor Freight	Barnwell, SC

c. Irradiated components, control rods, etc.

<u>Number of Shipments</u>	<u>Type</u>	<u>Quantity</u>	<u>Mode of Transportation</u>	<u>Destination</u>
None	N/A		N/A	N/A

d. Other: Mechanical Filters, Floor Drain Media

<u>Number of Shipments</u>	<u>Type</u>	<u>Quantity</u>	<u>Mode of Transportation</u>	<u>Destination</u>
None	N/A		N/A	N/A

4. Irradiated Fuel Shipments (Disposition)

<u>Number of Shipments</u>	<u>Type</u>	<u>Quantity</u>	<u>Mode of Transportation</u>	<u>Destination</u>
None	N/A		N/A	N/A

5. Solidification of Waste

Was solidification performed? NO

If yes, solidification media: N/A

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
1995

ATTACHMENT 1.0

INOPERABLE INSTRUMENTATION

In accordance with SQN Technical Specification 6.8.4.f.1, the radioactive gaseous effluent monitoring instrumentation channels shown in Table 1.1-2 of the ODCM shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of the ODCM are not exceeded.

During the period between 5/15/95 @ 2000 and 5/17/95 @ 0100, the auxiliary building stack flow monitor O-F-30-174 has been determined to be inoperable. This period of inoperability was unknown to Operations personnel, so the associated ODCM action to estimate flow rate at least once per 4 hours was not performed. During the timeframe of inoperability, 2nd quarter 1995, there was no noble gas, iodine, or particulate radioactivity identified from the auxiliary building. Routinely, only a small trace of tritium is identified from auxiliary building releases which has negligible impact on any offsite dose.

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
1995

ATTACHMENT 2.0

ABNORMAL RELEASES

In accordance with Regulatory Guide 1.21, any abnormal releases should be clearly identified in the annual effluent report and the methods utilized in evaluating any radioactive effluents and/or offsite dose.

Refueling Water Storage Tank (RWST)

On 9/13/95 @ 2200, the Unit 2 RWST moat was sampled and analyzed to contain Co-58 of $3.99\text{E-}07 \mu\text{Ci/ml}$ and Co-60 of $8.66\text{E-}08 \mu\text{Ci/ml}$. However due to the heavy rainfall, a maximum of 640 gallons from the moat overflowed to the environment prior to being pumped to the radwaste system. The 640 gallons resulted in approximately $1.2 \mu\text{Ci}$ of radioactivity being released and only monitored by grab sampling and analysis. The radioactivity was reported and evaluated as part of the September dose evaluation.