

**ARKANSAS NUCLEAR ONE**

**UNIT 1 AND UNIT 2**  
**OPERATING LICENSE NO. DPR-51 AND NPF-6**

**SEMIANNUAL RADIOACTIVE EFFLUENT**  
**RELEASE REPORT**

**JANUARY 1, 1995 THROUGH JUNE 30, 1995**

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## 1. INTRODUCTION

Arkansas Nuclear One (ANO) is a two unit plant consisting of a Babcock and Wilcox (Unit 1) and a Combustion Engineering (Unit 2) design. Both liquid and gaseous effluents are released in accordance with the technical specifications for each unit. This report is a summary of the effluent data in accordance with Unit 1 Technical Specification 6.12.2.6 and Unit 2 Technical Specification 6.9.3. This report provides the following information:

- A. Routine radioactive effluent release reports covering the operation of the units during the reporting period.
- B. Description of unplanned releases to unrestricted areas.
- C. Description of changes to the Offsite Dose Calculation Manual (ODCM).
- D. Description of changes to the Process Control Program (PCP).
- E. Summary of radiation doses due to radiological effluents during the previous calendar year. This data is included in the first report of each year.
- F. Radiation dose to members of the public due to their activities inside the site boundary. This data is included in the first report of each year.
- G. Description of licensee initiated major changes to the radioactive waste systems during the previous calendar year. This data is included in the first report of each year.
- H. Items to be reported in the Semiannual Report in accordance with other miscellaneous technical specifications.

This report covers the period of January 1, 1995 through June 30, 1995.

## 2. REGULATORY LIMITS

Unit One and Unit Two Technical Specifications contain the limits to which ANO must adhere. Because of the "as low as reasonably achievable" (ALARA) philosophy at ANO, an attempt is made to reduce the amount of radiation released to the environment. Liquid and gaseous data show that the dose from both ANO-1 and ANO-2 is generally a factor of 100 below the technical specification limits. This data reveals that radioactive effluents have had an overall minimal dose contribution to the surrounding environment. The following are the limits required by the technical specifications.

A. Gaseous Effluents

1. Dose rate due to radioactive materials released in gaseous effluent to unrestricted areas 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, tritium, and for all radionuclides in particulate form with half lives greater than 8 days

- Less than or equal to 1500 mrem/yr

2. Dose - Noble Gases

- Quarterly

- Less than or equal to 5 mrads gamma  
Less than or equal to 10 mrads beta

- Yearly

- Less than or equal to 10 mrads gamma  
Less than or equal to 20 mrads beta

3. Dose - Iodine-131, Tritium, and Radionuclides in Particulate Form

- Quarterly

- Less than or equal to 7.5 mrems to any organ

- Yearly

- Less than or equal to 15 mrems to any organ

B. Liquid Effluents

1. Concentration

The concentration of radioactive material released to the discharge canal shall be limited to the concentration specified in 10CFR20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the total concentration released shall be limited to 2E-4 microcuries/ml.

2. Dose

Quarterly

Less than or equal to 1.5 mrem total body  
Less than or equal to 5 mrem critical organ

Yearly

Less than or equal to 3 mrem total body  
Less than or equal to 10 mrem critical organ

3. **SUMMARY OF LIQUID EFFLUENT DATA**

The following data is a summary of the number and times of releases for both Unit 1 and Unit 2. These releases occurred between January 1, 1995 and June 30, 1995.

	<u>Unit 1</u>	<u>Unit 2</u>
Number of releases:	494	187
Total time for all releases (minutes):	87220	58147
Maximum time for a release (minutes):	1261	4422
Average time for a release (minutes):	176	311
Minimum time for a release (minutes):	1	30

As required by Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants," Rev. 1, a summary of data for liquid releases is to be provided in the Semiannual Report. The following pages provide a summary of liquid effluents for both Unit 1 and Unit 2:

**SEMIANNUAL SUMMATION FOR ALL RELEASES BY QUARTER  
 (ALL LIQUID EFFLUENTS)  
 January 1, 1995 through June 30, 1995**

Type of Effluent	Unit 1			
	Units	Quarter 1	Quarter 2	Est. Tot Error %
<u>A. Fission and Activation Products</u>				
1. Total Release (Not Including Tritium, Gases, Alpha)	Curies	6.571E-01	5.146E-01	0
2. Average Diluted Concentration During Period	μCi/ml	2.106E-09	1.394E-09	
3. Percent of Applicable Limit	%	7.021E-01	4.645E-01	
<u>B. Tritium</u>				
1. Total Release	Curies	1.525E+02	7.837E+01	0
2. Average Diluted Concentration During Period	μCi/ml	4.889E-07	2.123E-07	
3. Percent of Applicable Limit	%	1.630E-02	7.075E-03	
<u>C. Dissolved and Entrained Gases</u>				
1. Total Release	Curies	2.692E+00	1.830E-02	0
2. Average Diluted Concentration During Period	μCi/ml	8.630E-09	5.093E-11	
3. Percent of Applicable Limit	%	4.315E-03	2.546E-05	
<u>D. Gross Alpha Radioactivity</u>				
1. Total Release	Curies	0.000E+00	5.744E-05	0
<u>E. Waste Vol Released (Pre-Dilution)</u>				
	Liters	3.200E+07	3.494E+07	0
<u>F. Volume of Dilution Water Used</u>				
	Liters	3.119E+11	3.692E+11	0

**UNIT 1**

**REPORT CATEGORY : SEMIANNUAL LIQUID CONTINUOUS AND BATCH  
 RELEASES**

**: TOTALS FOR EACH NUCLIDE RELEASED**

**TYPE OF ACTIVITY : ALL RADIONUCLIDES**

**REPORTING PERIOD : QUARTER # 1 AND QUARTER # 2 YEAR 1995**

NUCLIDE	UNIT	CONTINUOUS RELEASES		BATCH RELEASES	
		QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
TC-99M	CURIES	0.00E+00	0.00E+00	9.13E-06	0.00E+00
ZN-65	CURIES	0.00E+00	0.00E+00	1.54E-05	0.00E+00
NB-97	CURIES	0.00E+00	0.00E+00	1.91E-05	0.00E+00
LA-140	CURIES	0.00E+00	0.00E+00	2.98E-05	0.00E+00
SN-113	CURIES	0.00E+00	0.00E+00	5.31E-05	0.00E+00
SN-117M	CURIES	0.00E+00	0.00E+00	9.23E-05	0.00E+00
SB-122	CURIES	0.00E+00	0.00E+00	3.25E-04	0.00E+00
ZR-95	CURIES	0.00E+00	0.00E+00	4.81E-04	0.00E+00
AG-110M	CURIES	0.00E+00	0.00E+00	5.38E-04	0.00E+00
SB-126	CURIES	0.00E+00	0.00E+00	9.00E-04	0.00E+00
NB-95	CURIES	0.00E+00	0.00E+00	1.02E-03	0.00E+00
XE-131M	CURIES	0.00E+00	0.00E+00	3.47E-02	0.00E+00
SR-92	CURIES	0.00E+00	0.00E+00	2.53E-05	6.91E-06
I-133	CURIES	0.00E+00	0.00E+00	2.81E-04	9.51E-06
CO-57	CURIES	0.00E+00	0.00E+00	7.10E-04	1.79E-05
I-132	CURIES	0.00E+00	0.00E+00	3.24E-04	3.43E-05
G-ALPHA	CURIES	0.00E+00	0.00E+00	0.00E+00	5.74E-05
SE-75	CURIES	0.00E+00	0.00E+00	5.27E-05	8.82E-05
XE-135	CURIES	0.00E+00	0.00E+00	3.96E-03	8.91E-05
XE-133M	CURIES	0.00E+00	0.00E+00	2.25E-02	1.64E-04
NA-24	CURIES	0.00E+00	0.00E+00	5.09E-04	1.24E-03
MN-54	CURIES	0.00E+00	0.00E+00	4.01E-04	4.64E-03
CS-134	CURIES	0.00E+00	0.00E+00	4.06E-03	4.94E-03
KR-85	CURIES	0.00E+00	0.00E+00	4.52E-02	5.16E-03
I-131	CURIES	0.00E+00	0.00E+00	3.99E-02	5.64E-03
CS-137	CURIES	0.00E+00	0.00E+00	8.85E-03	7.27E-03
CO-60	CURIES	0.00E+00	0.00E+00	2.94E-02	8.76E-03
FE-55	CURIES	0.00E+00	0.00E+00	1.11E-02	1.20E-02
XE-133	CURIES	0.00E+00	0.00E+00	2.59E+00	1.34E-02
CR-51	CURIES	0.00E+00	0.00E+00	1.47E-02	1.36E-02
SB-124	CURIES	0.00E+00	0.00E+00	3.86E-02	2.69E-02

NUCLIDE	UNIT	CONTINUOUS RELEASES		BATCH RELEASES	
		QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
CO-58	CURIES	0.00E+00	0.00E+00	1.86E-01	9.73E-02
SB-125	CURIES	0.00E+00	0.00E+00	3.19E-01	3.32E-01
H-3	CURIES	0.00E+00	0.00E+00	1.53E+02	7.84E+01
Total for Period	CURIES	0.00E+00	0.00E+00	1.56E+02	7.89E+01



**SEMIANNUAL SUMMATION FOR ALL RELEASES BY QUARTER  
 (ALL LIQUID EFFLUENTS)  
 January 1, 1995 through June 30, 1995**

Unit 2				
Type of Effluent	Units	Quarter 1	Quarter 2	Est. Tot Error %
<u>A. Fission and Activation Products</u>				
1. Total Release (Not Including Tritium, Gases, Alpha)	Curies	1.031E-01	5.748E-02	0
2. Average Diluted Concentration During Period	μCi/ml	3.304E-10	1.557E-10	
3. Percent of Applicable Limit	%	1.101E-01	5.189E-02	
<u>B. Tritium</u>				
1. Total Release	Curies	2.455E+02	6.797E+01	0
2. Average Diluted Concentration During Period	μCi/ml	7.871E-07	1.841E-07	
3. Percent of Applicable Limit	%	2.624E-02	6.137E-03	
<u>C. Dissolved and Entrained Gases</u>				
1. Total Release	Curies	8.937E+00	1.398E+00	0
2. Average Diluted Concentration During Period	μCi/ml	2.865E-08	3.787E-09	
3. Percent of Applicable Limit	%	1.432E-02	1.893E-03	
<u>D. Gross Alpha Radioactivity</u>				
1. Total Release	Curies	0.000E+00	0.000E+00	0
<u>E. Waste Vol Released (Pre-Dilution)</u>				
	Liters	1.548E+07	5.796E+06	0
<u>F. Volume of Dilution Water Used</u>				
	Liters	3.119E+11	3.692E+11	0

**UNIT 2**

**REPORT CATEGORY : SEMIANNUAL LIQUID CONTINUOUS AND BATCH  
 RELEASES**

**: TOTALS FOR EACH NUCLIDE RELEASED**

**TYPE OF ACTIVITY : ALL RADIONUCLIDES**

**REPORTING PERIOD : QUARTER # 1 AND QUARTER # 2 YEAR 1995**

NUCLIDE	UNIT	CONTINUOUS RELEASES		BATCH RELEASES	
		QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
I-134	CURIES	0.00E+00	0.00E+00	8.68E-06	0.00E+00
SB-126	CURIES	0.00E+00	0.00E+00	3.00E-05	0.00E+00
AR-41	CURIES	0.00E+00	0.00E+00	4.72E-05	0.00E+00
LA-140	CURIES	0.00E+00	0.00E+00	6.13E-05	0.00E+00
CS-136	CURIES	0.00E+00	0.00E+00	1.01E-04	0.00E+00
BE-7	CURIES	0.00E+00	0.00E+00	1.09E-04	0.00E+00
FE-59	CURIES	0.00E+00	0.00E+00	1.49E-04	0.00E+00
LA-142	CURIES	0.00E+00	0.00E+00	1.75E-04	0.00E+00
NB-95	CURIES	0.00E+00	0.00E+00	2.55E-04	0.00E+00
ZR-95	CURIES	0.00E+00	0.00E+00	2.97E-04	0.00E+00
MN-54	CURIES	0.00E+00	0.00E+00	3.55E-04	0.00E+00
MO-99	CURIES	0.00E+00	0.00E+00	4.18E-04	0.00E+00
SR-89	CURIES	0.00E+00	0.00E+00	4.21E-04	0.00E+00
I-135	CURIES	0.00E+00	0.00E+00	4.46E-04	0.00E+00
SN-117M	CURIES	0.00E+00	0.00E+00	4.47E-04	0.00E+00
TC-99M	CURIES	0.00E+00	0.00E+00	6.52E-04	0.00E+00
TE-132	CURIES	0.00E+00	0.00E+00	9.39E-04	0.00E+00
I-132	CURIES	0.00E+00	0.00E+00	2.20E-03	0.00E+00
KR-85	CURIES	0.00E+00	0.00E+00	2.43E-02	0.00E+00
I-133	CURIES	0.00E+00	0.00E+00	3.52E-03	4.86E-08
I-131	CURIES	0.00E+00	0.00E+00	1.32E-02	4.19E-05
AG-110M	CURIES	0.00E+00	0.00E+00	8.20E-04	1.40E-04
CS-134	CURIES	0.00E+00	0.00E+00	1.70E-03	1.50E-04
CO-60	CURIES	0.00E+00	0.00E+00	2.25E-03	3.40E-04
CS-137	CURIES	0.00E+00	0.00E+00	3.74E-03	5.41E-04
XE-135	CURIES	0.00E+00	0.00E+00	4.75E-04	1.73E-03
FE-55	CURIES	0.00E+00	0.00E+00	0.00E+00	1.99E-03
CR-51	CURIES	0.00E+00	0.00E+00	3.85E-02	2.43E-03
CO-58	CURIES	0.00E+00	0.00E+00	1.25E-02	5.11E-03
SB-124	CURIES	0.00E+00	0.00E+00	4.02E-03	5.26E-03
XE-133M	CURIES	0.00E+00	0.00E+00	6.58E-02	1.16E-02

NUCLIDE	UNIT	CONTINUOUS RELEASES		BATCH RELEASES	
		QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
XE-131M	CURIES	0.00E+00	0.00E+00	3.34E-02	1.59E-02
SB-125	CURIES	0.00E+00	0.00E+00	1.57E-02	4.15E-02
XE-133	CURIES	0.00E+00	0.00E+00	8.81E+00	1.37E+00
H-3	CURIES	0.00E+00	0.00E+00	2.46E+02	6.80E+01
Total for Period	CURIES	0.00E+00	0.00E+00	2.55E+02	6.94E+01

#### 4. SUMMARY OF GASEOUS EFFLUENT DATA

As required by Regulatory Guide 1.21, Rev. 1, a summary of data for gaseous releases is provided in the Semiannual Report. This summary covers releases from January 1 through June 30, 1995. The summary of gaseous effluents for both Unit 1 and Unit 2 is as follows:

	<u>Unit 1</u>	<u>Unit 2</u>
Number of releases:	83	91
Total time for all releases (minutes):	517457	534897
Maximum time for a release (minutes):	10534	11089
Average time for a release (minutes):	6234	5943
Minimum time for a release (minutes):	2	1

The Unit 1 gaseous releases consisted of:

10 emergency feedwater (EFW) pump releases - These releases were a result of surveillances to the steam driven EFW pump.

8 waste gas decay tank releases.

3 reactor building purge releases.

57 vent releases.

3 make-up/quench tank releases.

2 secondary steam releases.

The Unit 2 gaseous releases consisted of:

14 emergency feedwater (EFW) pump releases - These releases were a result of surveillances to the steam driven EFW pump.

1 waste gas decay tank release.

1 reactor building purge release.

73 vent releases.

1 volume control tank release.

1 secondary steam release.

**SEMIANNUAL SUMMATION FOR ALL RELEASES BY QUARTER  
 (ALL AIRBORNE EFFLUENTS)  
 January 1, 1995 through June 30, 1995**

Type of Effluent	Unit 1			
	Units	Quarter 1	Quarter 2	Est. Tot Error %
<u>A. Fission and Activation Products</u>				
1. Total Release	Curies	3.858E+01	4.768E+00	0
2. Average Release Rate For Period	μCi/Sec	4.961E+00	6.064E-01	
3. Percent of Applicable Limit	%	6.946E-02	8.490E-03	
<u>B. Radioiodines</u>				
1. Total Iodine-131	Curies	1.207E-04	1.458E-05	0
2. Average Release Rate For Period	μCi/Sec	1.553E-05	1.854E-06	
3. Percent of Applicable Limit	%	4.347E-05	5.191E-06	
<u>C. Particulates</u>				
1. Particulates (Half-Lives > 8 Days)	Curies	7.052E-06	6.345E-07	0
2. Average Release Rate For Period	μCi/Sec	9.068E-07	8.070E-08	
3. Percent of Applicable Limit	%	2.539E-06	2.259E-07	
4. Gross Alpha Radioactivity	Curies	0.00E+00	1.782E-06	
<u>D. Tritium</u>				
1. Total Release	Curies	2.188E+00	2.036E+00	0
2. Average Release Rate For Period	μCi/Sec	2.814E-01	2.589E-01	
3. Percent of Applicable Limit	%	3.940E-04	3.625E-04	

**UNIT 1**

**REPORT CATEGORY : SEMIANNUAL AIRBORNE GROUND LEVEL  
 : CONTINUOUS AND BATCH RELEASES  
 : TOTALS FOR EACH NUCLIDE RELEASED**  
**TYPE OF ACTIVITY : FISSION GASES, IODINES, AND PARTICULATES**  
**REPORTING PERIOD : QUARTER # 1 AND QUARTER # 2 YEAR 1995**

NUCLIDE	UNIT	CONTINUOUS RELEASES		BATCH RELEASES	
		QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2

Fission Gases

XE-133M	CURIES	0.00E+00	0.00E+00	1.01E-01	0.00E+00
XE-135	CURIES	0.00E+00	0.00E+00	4.68E-02	1.04E-06
XE-131M	CURIES	0.00E+00	0.00E+00	3.40E-01	1.01E-02
KR-85	CURIES	0.00E+00	0.00E+00	7.20E+00	8.92E-01
XE-133	CURIES	0.00E+00	0.00E+00	3.09E+01	3.87E+00
Total for Period	CURIES	0.00E+00	0.00E+00	3.86E+01	4.77E+00

Iodines

I-133	CURIES	0.00E+00	0.00E+00	9.05E-07	8.16E-07
I-131	CURIES	0.00E+00	0.00E+00	1.21E-04	1.46E-05
Total for Period	CURIES	0.00E+00	0.00E+00	1.22E-04	1.54E-05

Particulates

CO-58	CURIES	0.00E+00	0.00E+00	6.35E-06	0.00E+00
CS-137	CURIES	0.00E+00	0.00E+00	0.00E+00	6.34E-07
Total for Period	CURIES	0.00E+00	0.00E+00	6.35E-06	6.34E-07

Other

SR-89	CURIES	0.00E+00	0.00E+00	7.03E-07	0.00E+00
G-ALPHA	CURIES	0.00E+00	0.00E+00	0.00E+00	1.78E-06
H-3	CURIES	0.00E+00	0.00E+00	2.19E+00	2.04E+00
Total for Period	CURIES	0.00E+00	0.00E+00	2.19E+00	2.04E+00

**SEMIANNUAL SUMMATION FOR ALL RELEASES BY QUARTER  
 (ALL AIRBORNE EFFLUENTS)  
 January 1, 1995 through June 30, 1995**

Type of Effluent	Unit 2	Quarter 1	Quarter 2	Est. Tot Error %
	Units			
<u>A. Fission and Activation Products</u>				
1. Total Release	Curies	1.887E+03	4.054E+02	0
2. Average Release Rate For Period	μCi/Sec	2.427E+02	5.157E+01	
3. Percent of Applicable Limit	%	3.398E+00	7.220E-01	
<u>B. Radioiodines</u>				
1. Total Iodine-131	Curies	7.443E-04	7.301E-07	0
2. Average Release Rate For Period	μCi/Sec	9.571E-05	9.286E-08	
3. Percent of Applicable Limit	%	2.680E-04	2.600E-07	
<u>C. Particulates</u>				
1. Particulates (Half-Lives > 8 Days)	Curies	1.255E-05	0.000E+00	0
2. Average Release Rate For Period	μCi/Sec	1.614E-06	0.000E+00	
3. Percent of Applicable Limit	%	4.519E-06	0.000E+00	
4. Gross Alpha Radioactivity	Curies	1.515E-06	1.496E-06	
<u>D. Tritium</u>				
1. Total Release	Curies	9.171E+00	2.050E+00	0
2. Average Release Rate For Period	μCi/Sec	1.179E+00	2.608E-01	
3. Percent of Applicable Limit	%	1.651E-03	3.651E-04	

**UNIT 2**

**REPORT CATEGORY : SEMIANNUAL AIRBORNE GROUND LEVEL**  
**: CONTINUOUS AND BATCH RELEASES**  
**: TOTALS FOR EACH NUCLIDE RELEASED**  
**TYPE OF ACTIVITY : FISSION GASES, IODINES, AND PARTICULATES**  
**REPORTING PERIOD : QUARTER # 1 AND QUARTER # 2 YEAR 1995**

NUCLIDE	UNIT	CONTINUOUS RELEASES		BATCH RELEASES	
		QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2

Fission Gases

KR-87	CURIES	0.00E+00	0.00E+00	6.70E-08	0.00E+00
XE-133M	CURIES	0.00E+00	0.00E+00	8.80E+00	0.00E+00
XE-131M	CURIES	0.00E+00	0.00E+00	9.89E+00	0.00E+00
KR-85	CURIES	0.00E+00	0.00E+00	1.19E+01	0.00E+00
KR-85M	CURIES	0.00E+00	0.00E+00	1.83E-01	8.51E-07
XE-135	CURIES	0.00E+00	0.00E+00	4.16E+01	4.18E+01
XE-133	CURIES	0.00E+00	0.00E+00	1.81E+03	3.64E+02
Total for Period	CURIES	0.00E+00	0.00E+00	1.89E+03	4.05E+02

Iodines

I-131	CURIES	0.00E+00	0.00E+00	7.44E-04	7.30E-07
Total for Period	CURIES	0.00E+00	0.00E+00	7.44E-04	7.30E-07

Particulates

CO-58	CURIES	0.00E+00	0.00E+00	3.22E-07	0.00E+00
CS-134	CURIES	0.00E+00	0.00E+00	4.35E-06	0.00E+00
CS-137	CURIES	0.00E+00	0.00E+00	7.33E-06	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	1.20E-05	0.00E+00

Other

SR-89	CURIES	0.00E+00	0.00E+00	5.61E-07	0.00E+00
G-ALPHA	CURIES	0.00E+00	0.00E+00	1.55E-06	1.50E-06
H-3	CURIES	0.00E+00	0.00E+00	9.17E+00	2.05E+00
Total for Period	CURIES	0.00E+00	0.00E+00	9.17E+00	2.05E+00



5. **SUMMARY OF RADIATION DOSES**

Annual data is provided in the first report submitted each year.

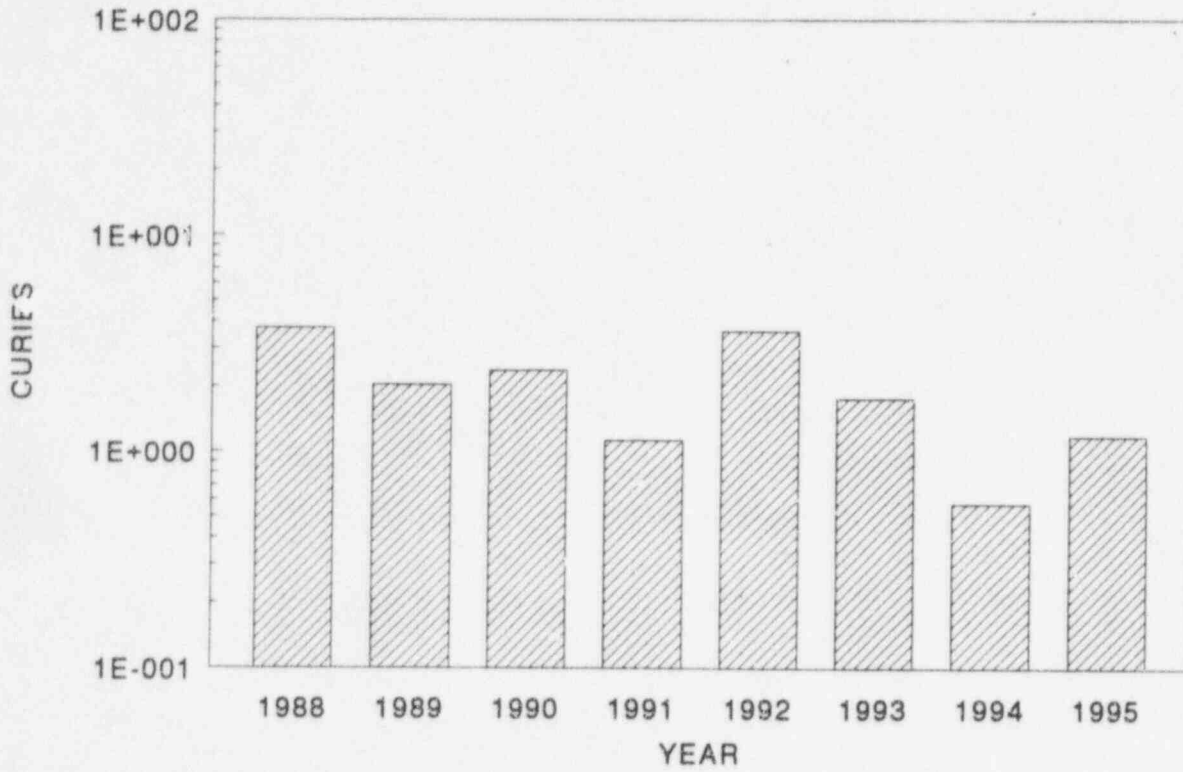
6. **SUMMARY OF DOSE TO MEMBERS OF THE PUBLIC**

Annual data is provided in the first report submitted each year.

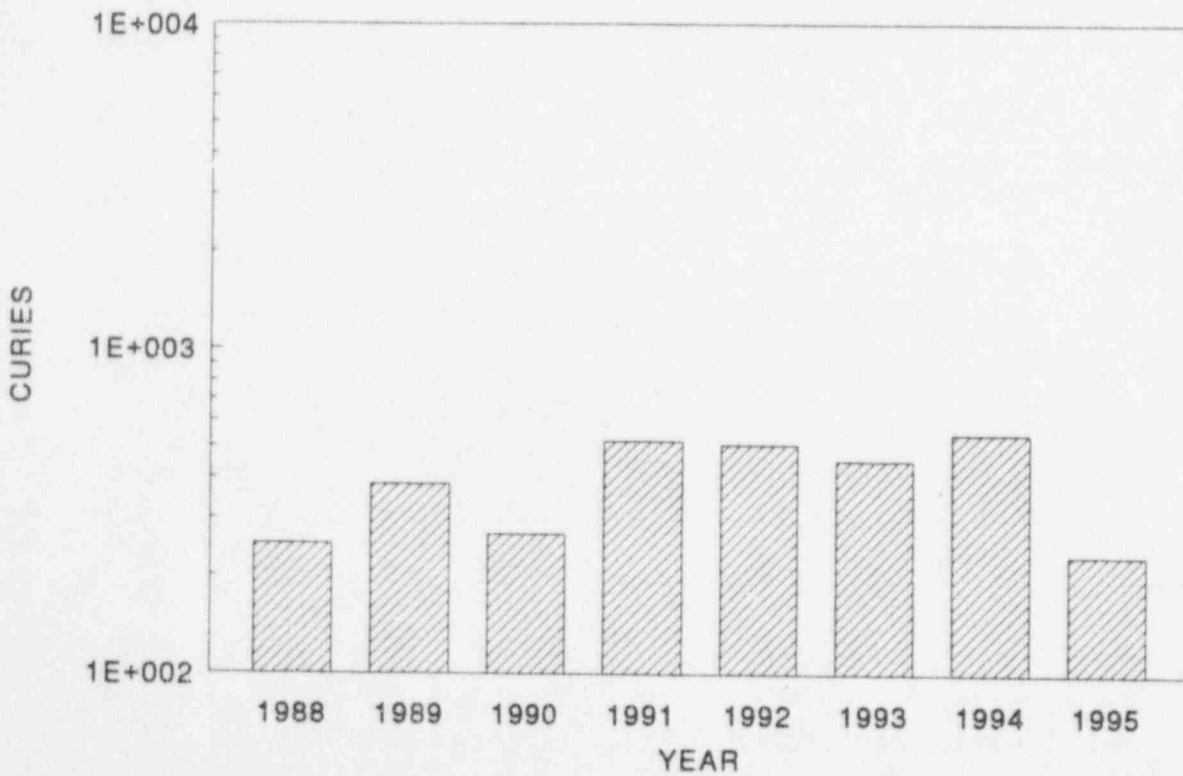
7. **HISTORICAL EFFLUENT DATA**

The following graphs show the historical release data for both units on a yearly basis. These graphs compare data from 1988 through 1995 (data for 1995 is based on the first six months of the year).

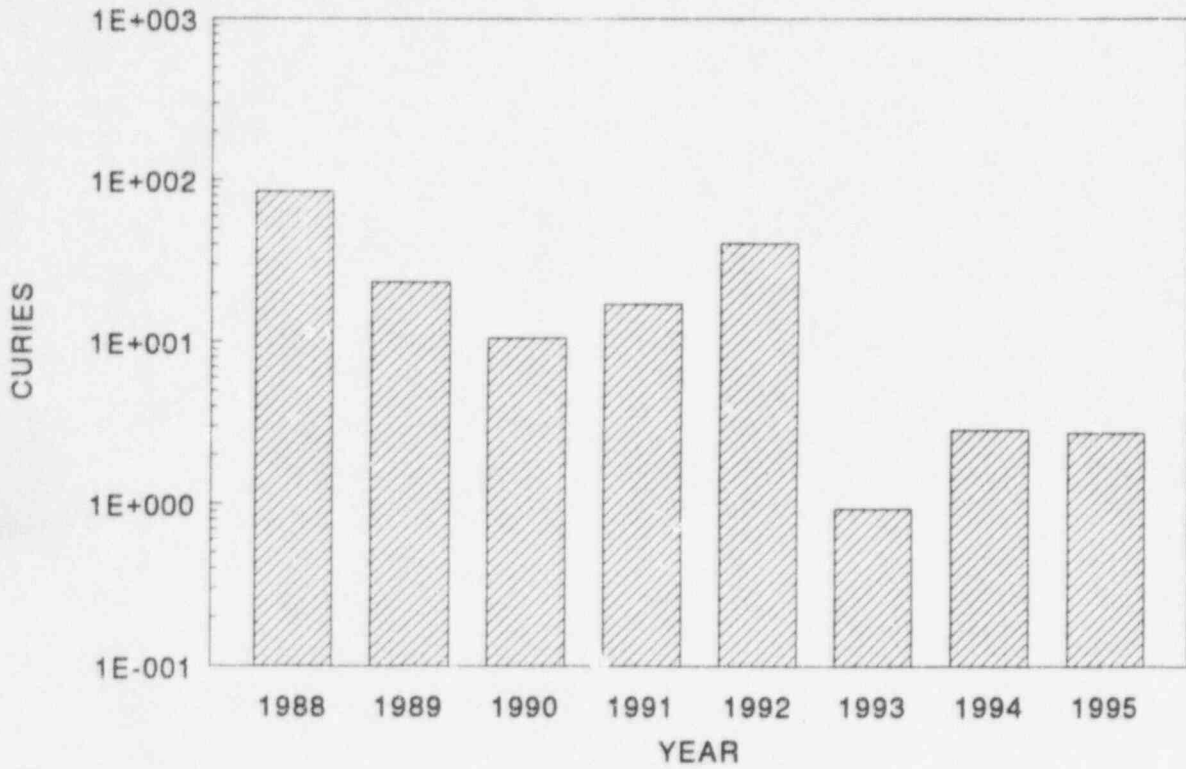
### UNIT 1 LIQUID EFFLUENTS Fission and Activation Products



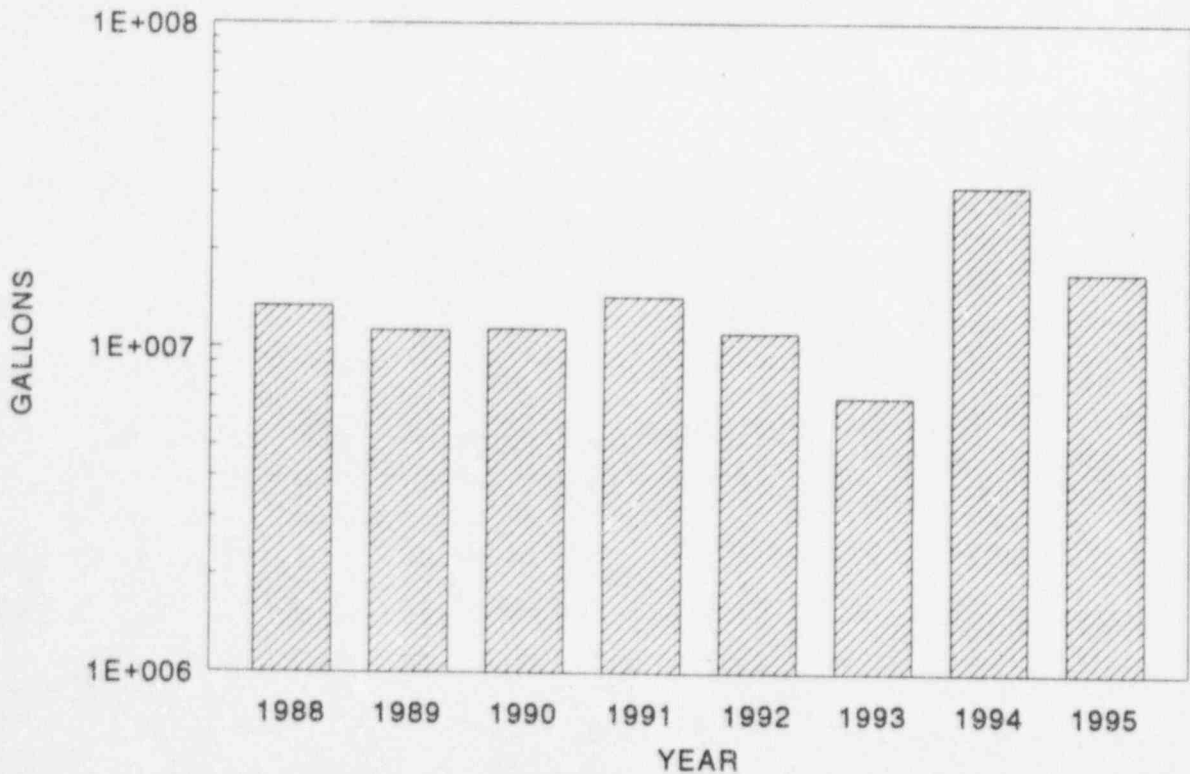
### UNIT 1 LIQUID EFFLUENTS Tritium



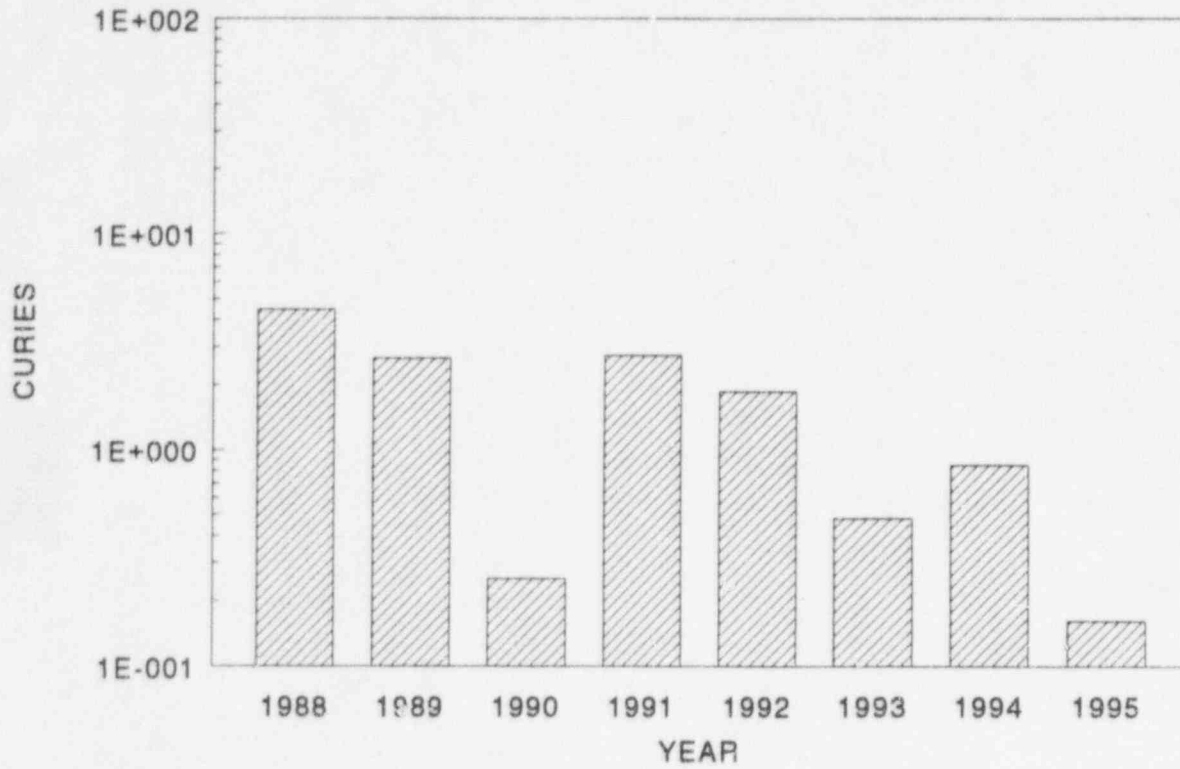
### UNIT 1 LIQUID EFFLUENTS Dissolved and Entrained Gases



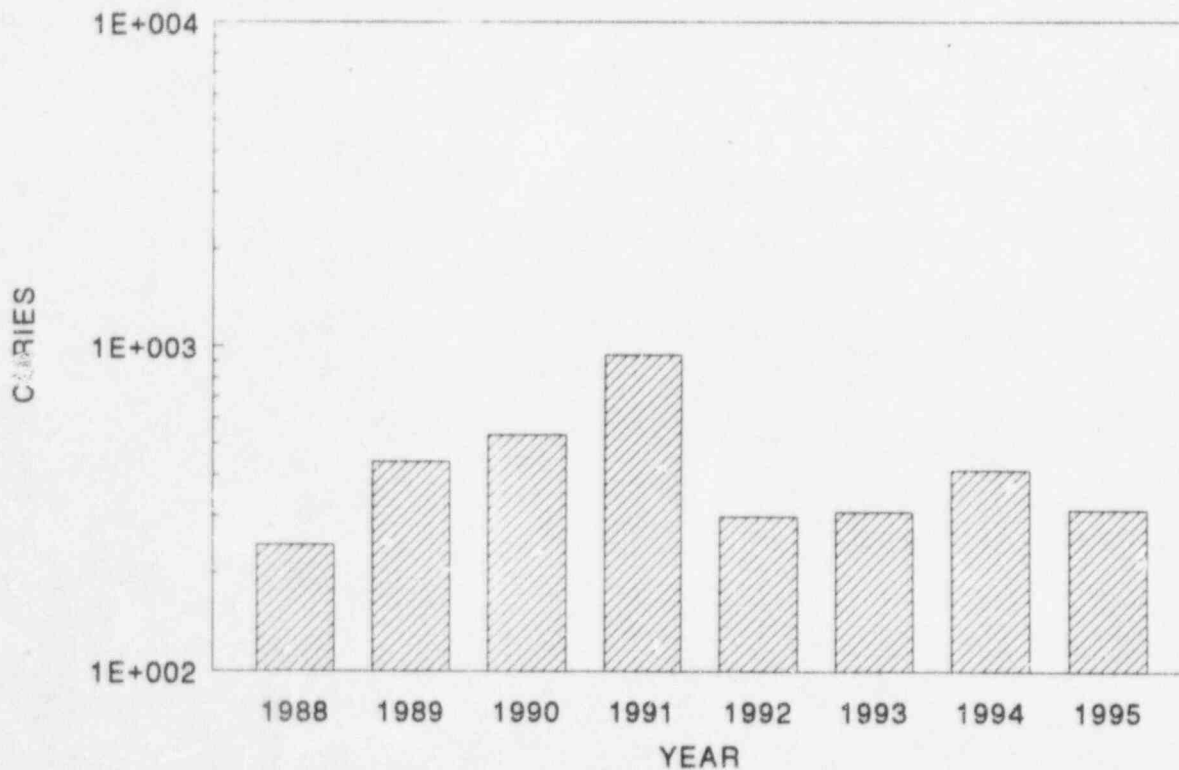
### UNIT 1 LIQUID EFFLUENTS Total Volume Released



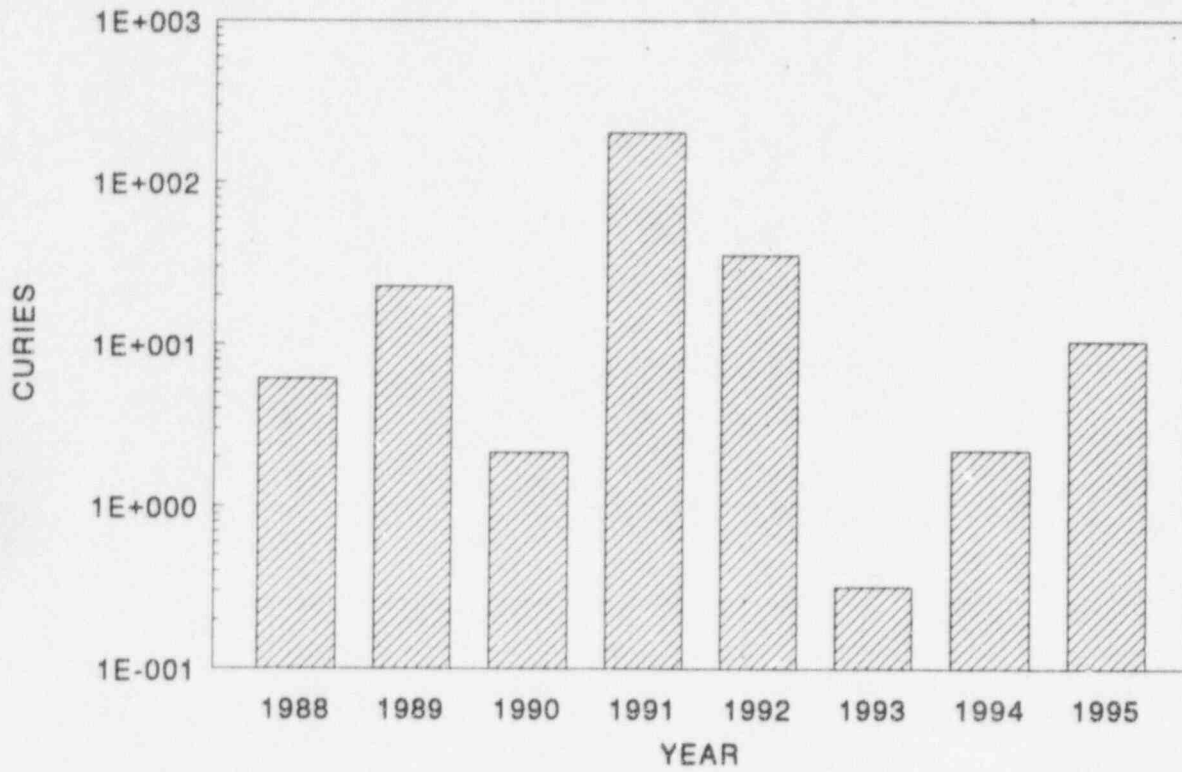
## UNIT 2 LIQUID EFFLUENTS Fission and Activation Products



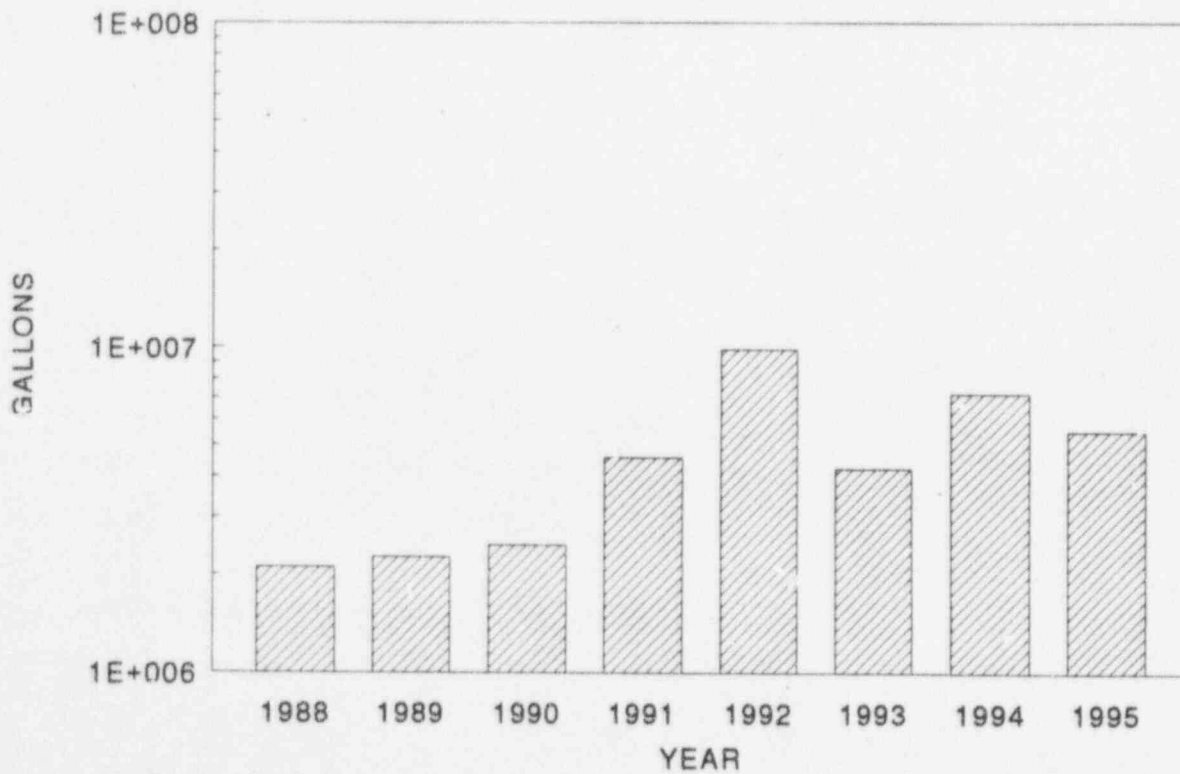
## UNIT 2 LIQUID EFFLUENTS Tritium



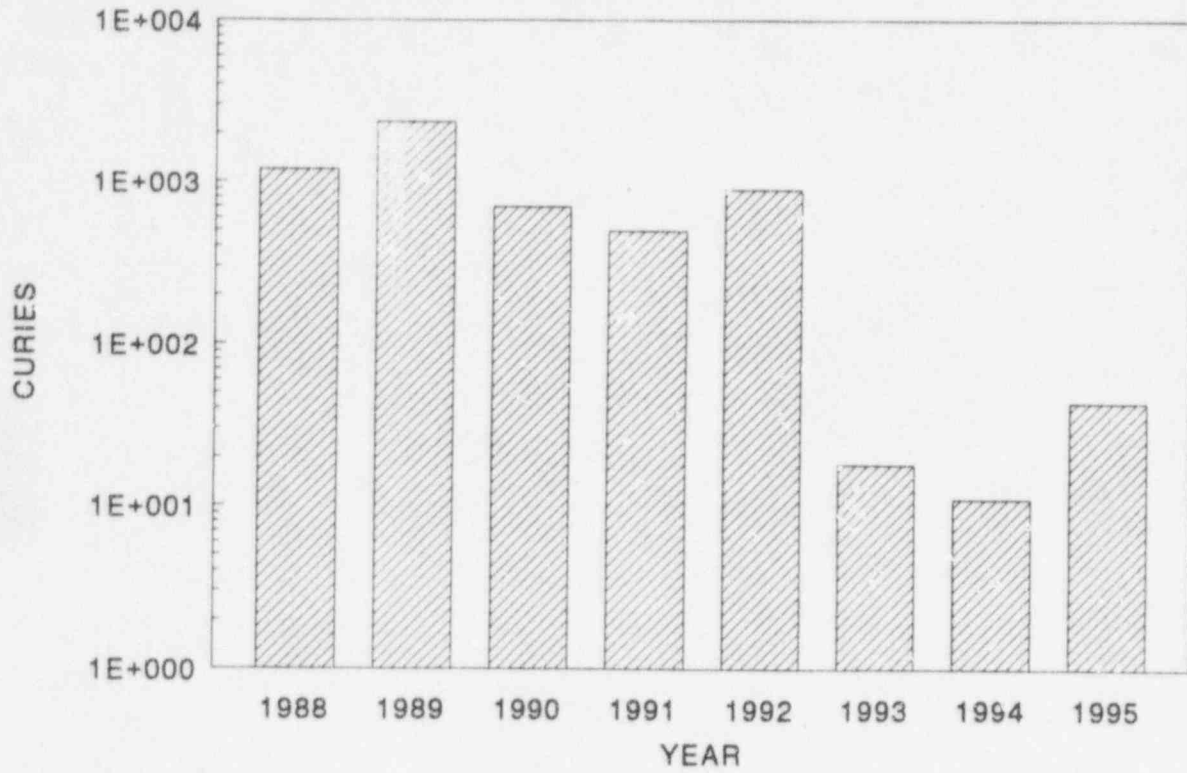
### UNIT 2 LIQUID EFFLUENTS Dissolved and Entrained Gases



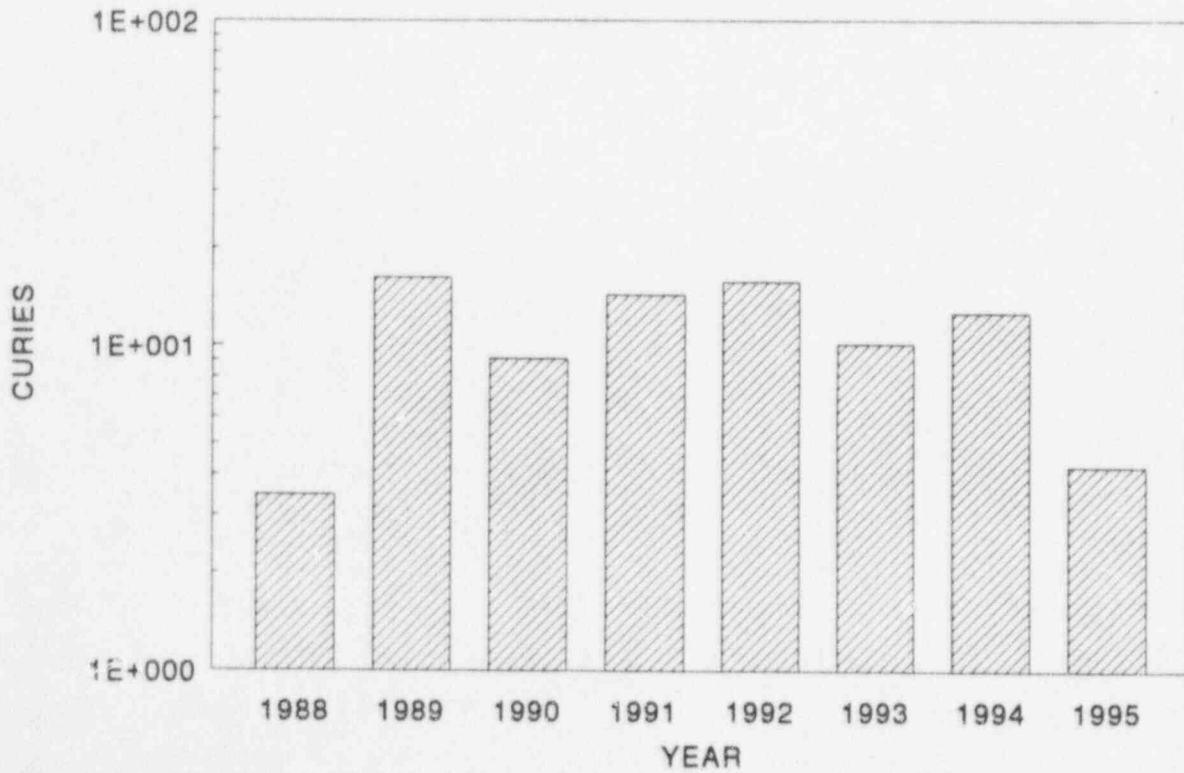
### UNIT 2 LIQUID EFFLUENTS Total Volume Released



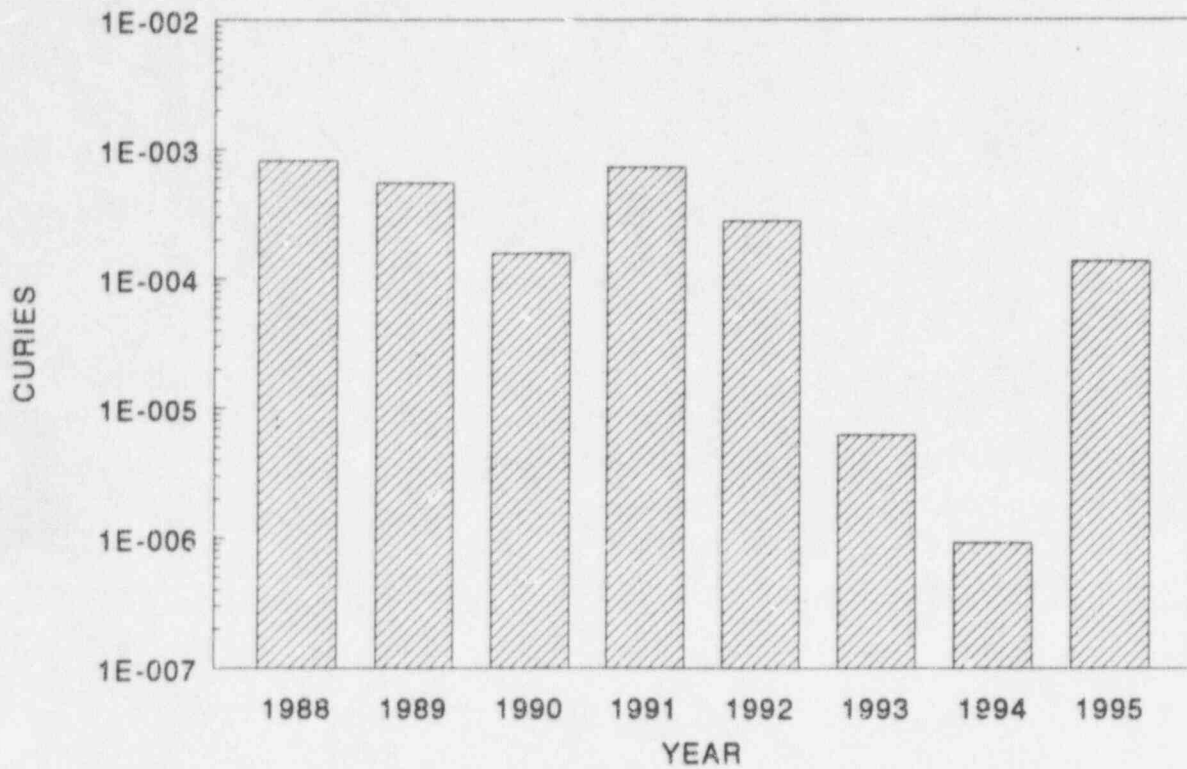
### UNIT 1 GASEOUS EFFLUENTS Fission and Activation Products



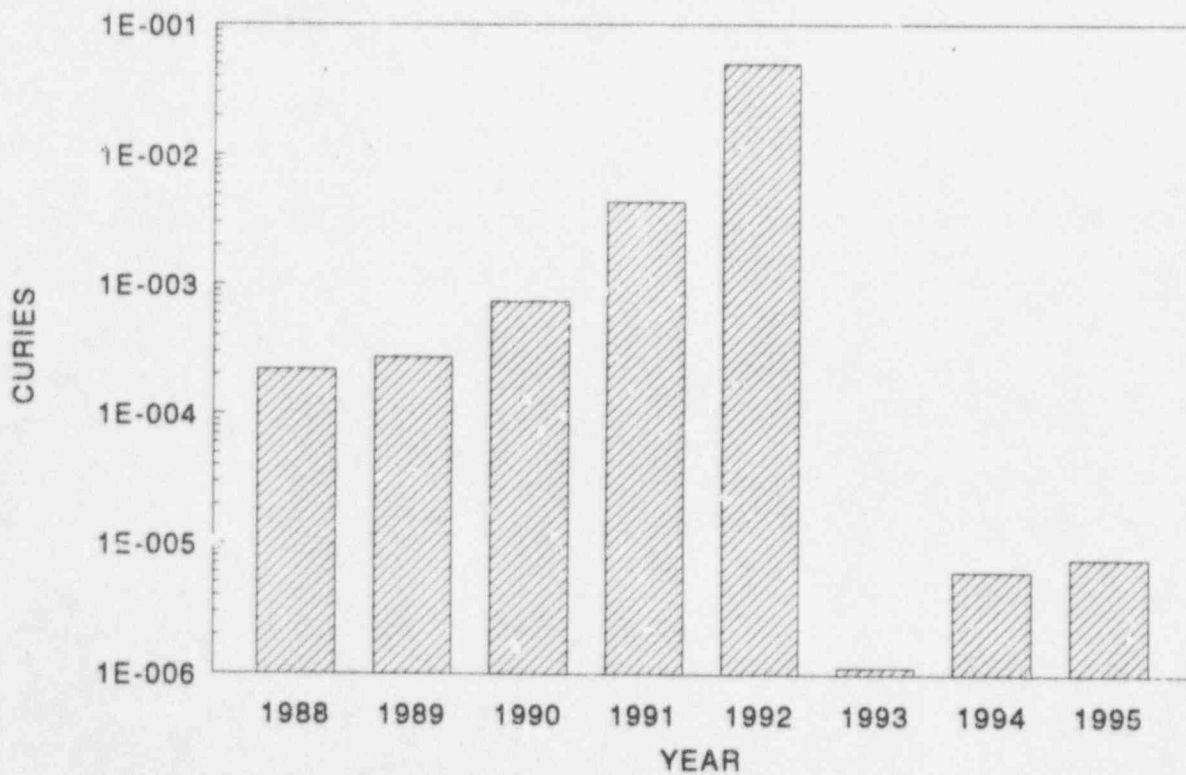
### UNIT 1 GASEOUS EFFLUENTS Tritium



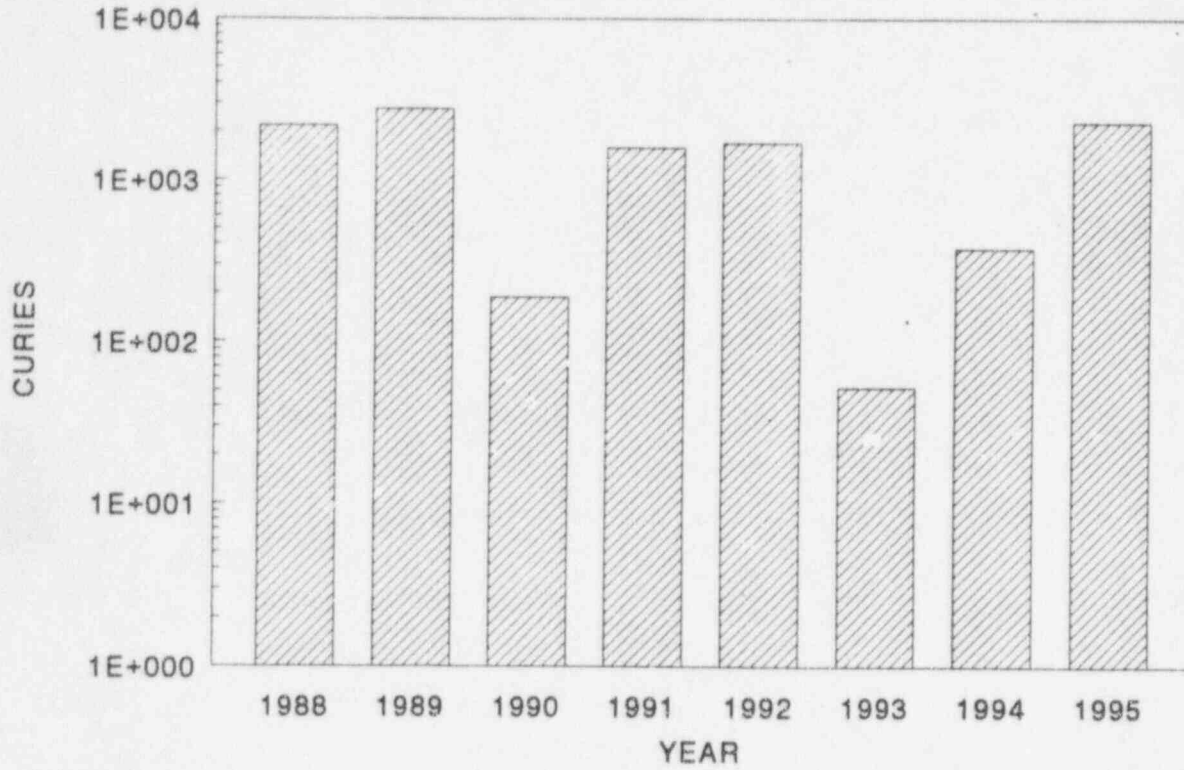
## UNIT 1 GASEOUS EFFLUENTS Radioiodines



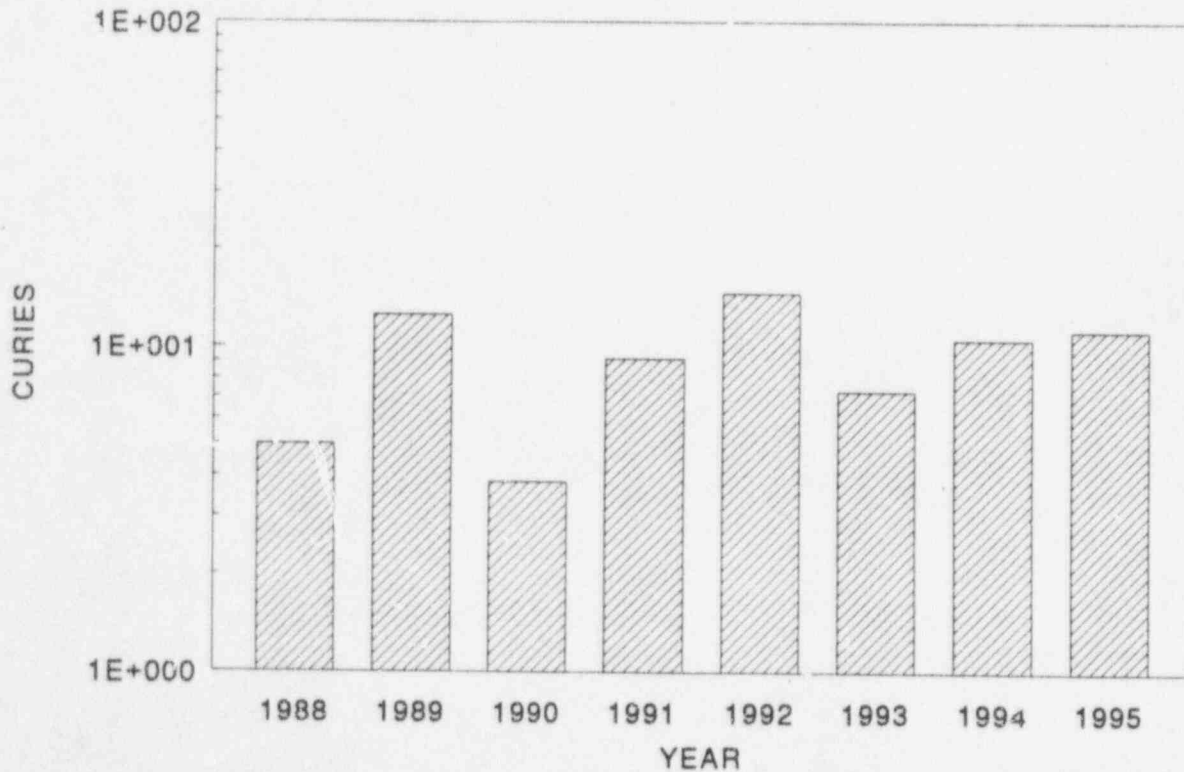
## UNIT 1 GASEOUS EFFLUENTS Particulates



## UNIT 2 GASEOUS EFFLUENTS Fission and Activation Products

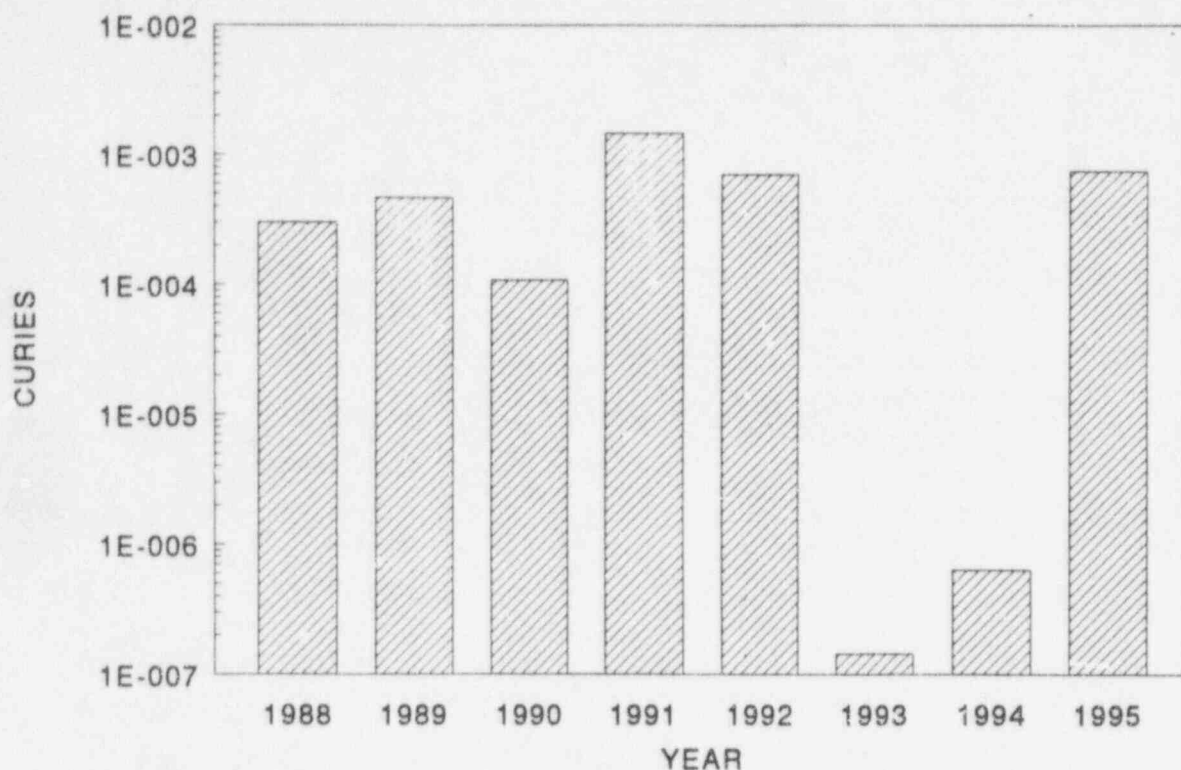


## UNIT 2 GASEOUS EFFLUENTS Tritium

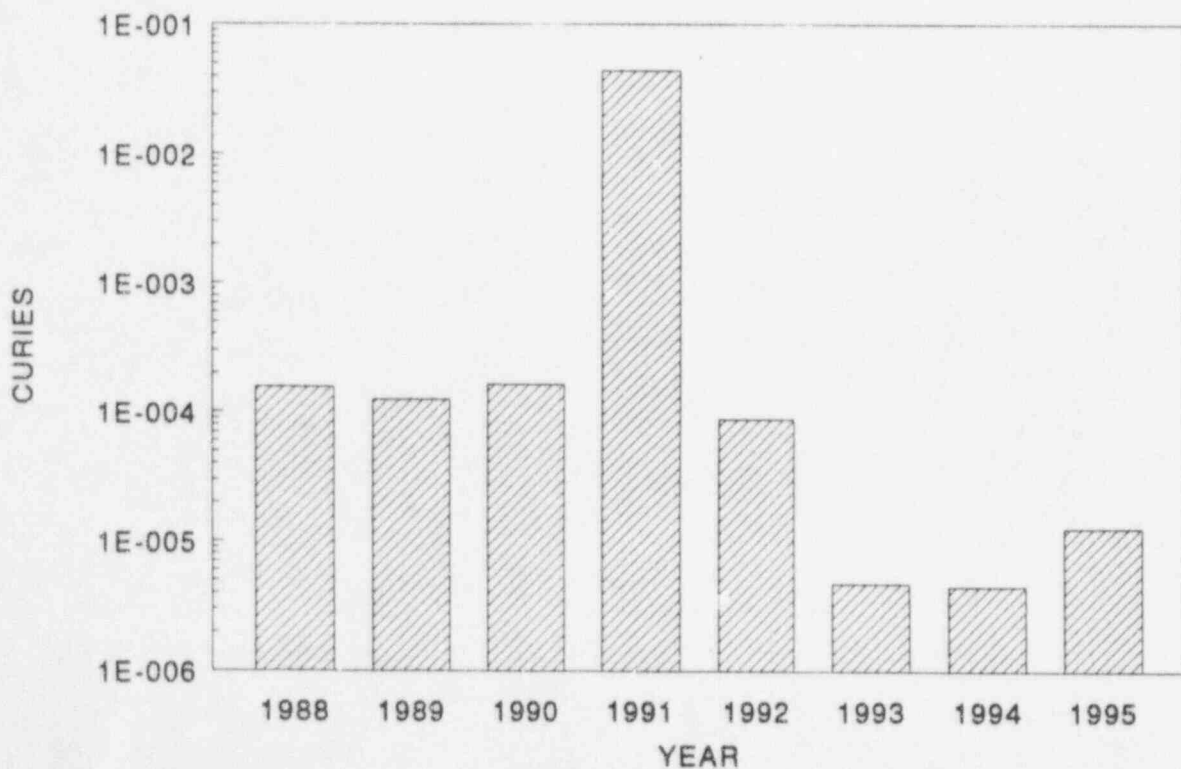




## UNIT 2 GASEOUS EFFLUENTS Radioiodines



## UNIT 2 GASEOUS EFFLUENTS Particulates



8. **SOLID WASTE SUMMARY**

The following is a summary of the solid wastes shipped offsite during the first six months of 1995.

REGULATORY GUIDE 1.21 REPORT  
 WASTE DISPOSAL SEMIANNUAL SUMMARY REPORT  
 SOLID WASTE AND IRRADIATED FUEL SHIPMENTS  
 JANUARY 1 THROUGH JUNE 30, 1995

A. Solid Waste Shipped Offsite for Burial or Disposal (Not irradiated fuel)

1. Type of Waste	Unit	6 Month Period	Est. Total Error (%)
a. Spent resins, filter sludges, evaporator bottoms, etc.	m <sup>3</sup> Ci	0.00E+00 0.00E+00	0.00E+00
b. Dry compressible waste, contaminated equip., etc.	m <sup>3</sup> Ci	0.00E+00 0.00E+00	0.00E+00
c. Irradiated components, control rods, etc.	m <sup>3</sup> Ci	0.00E+00 0.00E+00	0.00E+00
d. Other (describe)	m <sup>3</sup> Ci	0.00E+00 0.00E+00	0.00E+00

2. Estimate of Major Nuclide Composition (by Type of Waste)

- a. N/A
- b. N/A
- c. N/A
- d. N/A

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
6	Unshielded Van/Truck	Oak Ridge, TN

B. Irradiated Fuel Shipments (Disposition)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
N/A	N/A	N/A

9. **UNPLANNED RELEASES**

During the six month period from January 1, 1995 through June 30, 1995 there was one unplanned release.

1LR95-0193 - Neutralizing Tank Release

Release start time	:March 14, 1995 at 0957
Release stop time	:March 14, 1995 at 1042
Release volume	:3600 gallons
Release duration	:45 minutes
Total Body Dose	:2.96E-06 mRem - Percent of yearly limit < 0.01
Critical Organ Dose	:3.57E-06 mRem - Percent of yearly limit < 0.01

A. Description of Occurrence

On March 14, 1995, a Unit 1 operator began a planned neutralizing tank release, but failed to log the release in accordance with procedures. Approximately 2.5 hours later, after a shift turnover, a second operator commenced backwashing of a condensate polisher. In accordance with procedures, this water is to be sent to the Unit 1 neutralizing tank for sampling and analysis prior to release. However, since a neutralizing tank release was already in progress (unknown to the second operator due to the logging failure), the water from the backwashing operation was added directly to the release without sampling or modification of the release permit. After commencing the backflush, the second operator was notified that the neutralizing tank release had been secured; at this time the unplanned release was realized.

B. Cause for Exceeding Limits

No limits were exceeded due to this release.

C. Corrective Actions Taken to Mitigate Occurrence

When the neutralizing tank isolation valve was secured, the release was terminated.

D. Actions Taken to Prevent Recurrence

1. Procedure 1106.024, "Condensate Demineralizer System Operation and Regeneration," was revised to require verification that a neutralizing tank release is not in progress prior to transferring resin from an exhausted polisher to the regeneration receiving tank.
2. Operations personnel were briefed on the circumstances leading to the unplanned release.

E. Consequences of the Unplanned Release

The Unit 1 neutralizing tank is a normal release tank for radioactive and non-radioactive effluents generated by the secondary systems. Samples from this unplanned release revealed that the contents discharged to the flume were consistent with previous tanks of effluents released by this pathway. Because the release pathway and effluent activities were consistent with previous planned releases, no abnormal consequences would be expected to occur due to this release. See data above for dose contribution from this release.

10. **RADIATION INSTRUMENTATION**

As required by Unit 1 and Unit 2 Technical Specifications, any radioactive effluent instrumentation inoperable for more than 30 days shall be reported in the next Semiannual Radioactive Effluent Release Report. During the first and second quarters of 1995, no instrumentation was inoperable longer than 30 days.

11. **CHANGES TO THE PROCESS CONTROL PROGRAM**

As required by Unit 1 and Unit 2 Technical Specifications, a description of changes made to the Process Control Program (PCP) during the reporting period shall be included in the next Semiannual Radioactive Effluent Release Report. No changes were made to the PCP during the first and second quarters of 1995.

12. **CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL**

During the first and second quarters of 1995, the following changes were made to the Offsite Dose Calculation Manual (ODCM):

- A. Sample Station Number 29, used as an alternate location to obtain a milk sample, was deleted because the dairy ceased to function. This change is reflected on pages 37 and 41 of the ODCM.

- B. Sample Station Number 41, used to obtain a milk sample, was deleted because the dairy ceased to function. This change is reflected on pages 37 and 43 of the ODCM.
- C. New Sample Station Number 49 was added to replace Sample Station Number 41. This change is reflected on pages 37 and 44 of the ODCM.

These changes do not reduce the accuracy or reliability of dose calculations or setpoint determinations. Revised pages for the ODCM are included in Attachment 2. The circumstances necessitating these changes are discussed in Section 14.

### 13. LLD LEVELS

In accordance with Unit 1 and Unit 2 Technical Specifications, lower limits of detection (LLDs) higher than required shall be documented in the Semiannual Radioactive Effluent Release Report. During the reporting period, there were no LLDs higher than required.

### 14. RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

The three environmental sample location changes discussed in Section 12 were the only changes to the Radiological Environmental Monitoring Program (REMP) during the reporting period.

The following summary describes the circumstances which caused technical specification required samples not to be taken and the modifications to the REMP identified in Section 12 to be necessary.

On March 20, 1995, Entergy Operations determined that the Radiological Environmental Monitoring Program was not being conducted in accordance with the requirements of the ANO Units 1 and 2 Technical Specifications. During the months of December 1994 through February 1995, only three milk samples were collected, while the ANO Technical Specifications require four samples. This condition was initiated due to the cessation of operation of one milk sample station (dairy) in December 1994. Due to an improper interpretation of the technical specification requirements, it was decided that the sample station did not need to be replaced since no other milk samples could be obtained within five miles of ANO. The improper interpretation was identified during review of the draft Annual Radiological Environmental Report. The condition was corrected in March 1995, when a new milk sample station was identified and collection of samples began. Further details may be found in Licensee Event Report 50-313/95-003-00, dated April 14, 1995 (OCAN049511).

During the reporting period, there were no sampling locations identified which would yield a calculated dose commitment greater than the values currently being calculated.

15. **SUMMARY OF HOURLY METEOROLOGICAL DATA**

Annual data is provided in the first report submitted each year.

16. **DESCRIPTION OF MAJOR CHANGES TO RADWASTE SYSTEMS**

Annual data is provided in the first report submitted each year.

**ATTACHMENT 2**

**OFFSITE DOSE CALCULATION MANUAL**

**REPLACEMENT PAGES**

OFFSITE DOSE CALCULATION MANUAL  
FOR ARKANSAS NUCLEAR ONE  
REVISION 05



FIGURE 4-1



TABLE 4-1  
Environmental Sampling Stations - Radiological

Sample Station Number: 14

Approximate Direction and Distance from Plant: 70° - 5.3

Sample Types: 1) Drinking water

Sample Station Location:

From junction of Highway 7 and Water Works Road, go approximately 0.8 miles west on Water Works Road. The sample station is on the left at the intake to the Russellville city water system from the Illinois Bayou.

Sample Station Number: 16

Approximate Direction and Distance from Plant: 290° - 5.9 miles

Sample Types: 1) Shoreline sediment

Sample Station Location:

From junction of Highway 64 and Highway 359 (Flat Rock Piney Bay Recreational Area turnoff), go approximately 0.7 miles west on Highway 64. The sample station is at the Piney Creek area on Lake Dardanelle..

Sample Station Number: 19

Approximate Direction and Distance from Plant: 95° - 5.1 miles

Sample Types: 1) Milk

Sample Station Location:

Turn from Highway 7 onto Harrell Drive in Russellville, AR and go approximately 0.1 miles. Turn right and go approximately 0.25 miles. The sample station is on the left at the Arkansas Tech Dairy.

TABLE 4-1  
Environmental Sampling Stations - Radiological

Sample Station Number: 38  
Approximate Direction and Distance from Plant: 314° - 2.4 miles  
Sample Types: Food products (alternate)  
Sample Station Location:

From west junction of Highway 64 and Highway 333 in London, AR, go approximately 0.4 miles west on Highway 64. Turn right at Hornet Estate and go approximately 0.1 miles. Turn left and go approximately 0.1 miles. The sample station is on the left at Ronnie Jones' residence.

Sample Station Number: 40  
Approximate Direction and Distance from Plant: 119° - 2.2 miles  
Sample Types: 1) Foods products  
Sample Station Location:

From junction on Highway 64 and Highway 326 (Marina Road), go approximately 2.0 miles on Marina Road. The sample station is on the left at Horace Hollis' residence just prior to curve.

Sample Station Number: 42  
Approximate Direction and Distance from Plant: 73° - 12.4 miles  
Sample Types: 1) Milk  
Sample Station Location:

From junction of Highway 124 and Highway 326 in Gum Log, AR, go approximately 1.1 miles northeast on Highway 124. Turn left onto Gravel Hill Road and go approximately 0.6 miles. Turn right onto Hudson Loop and go approximately 0.3 miles. The sample station is on the left at the Hudson Dairy.

Sample Station Number: 45  
Approximate Direction and Distance from Plant: 90° - 0.9 miles  
Sample Types: 1) Broad leaf vegetation  
Sample Station Location:

|  
The sample station is located near mouth of intake canal.

TABLE 4-1  
Environmental Sampling Stations - Radiological

Sample Station Number: 46  
Approximate Direction and Distance from Plant: 295° - 4.1 miles  
Sample Types: 1) Food products  
Sample Station Location:

From west junction of Highway 64 and Highway 333 in London, AR, go west on Highway 64 approximately 2.4 miles. Turn right onto Scottie Lane and go approximately 0.1 miles. The sample location is on the right at Dewey Gregory's residence.

Sample Station Number: 48  
Approximate Direction and Distance from Plant: 316° - 2.2 miles  
Sample Types: 1) Food Products  
Sample Station Location:

R.J. Cochran residence, No. 26 Hwy 64 London West, directly North (across from) London Volunteer Fire Dept.

Sample Station Number: 49  
Approximate Direction and Distance from Plant: 338° - 9.0 miles  
Sample Types: 1) Milk  
Sample Station Location:

IF traveling from London,  
THEN take Hwy. 333 N. to Augsburg community. Turn left (west) at the Augsburg Church. Travel west on County Road 81 for 3.2 miles. Rylee Dairy on right (north) side of County Road 81.

Sample Station Number: 108  
Approximate Direction and Distance from Plant: 301° - 0.9 miles  
Sample Types: 1) Direct radiation  
2) Food Products  
Sample Station Location:

IF traveling from Highway 333,  
THEN turn south onto Flatwood Road and go approximately 0.4 miles. The sample station is on the right.

IF traveling north on Flatwood Road,  
THEN go approximately 0.4 miles from sample station 109. The sample station is on the left.