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Subject: Arkansas Nuclear One - Units 1 and 2
Docket Nos. 50-313, 50-368 and 72-13
License Nos. DPR-51 and NPF-6
Annual Radioactive Effluent Release Report for 2000

Gentlemen:

Arkansas Nuclear One (ANO), Units 1 and 2 Technical Specifications 6.12.2.6 and 6.9.3, respectively, require the submittal of an annual Radioactive Effluent Release Report. 10CFR72.44(d)(3) also requires an annual submittal of a summary of effluents from the independent spent fuel storage facility. The purpose of this letter is to complete this reporting requirement for the 2000 calendar year at ANO. Liquid and gaseous release data show that the dose from both ANO-1 and ANO-2 is considerably below the Offsite Dose Calculation Manual limits, while the independent spent fuel storage installation had no effluents. This data reveals that the radioactive effluents have an overall minimal dose contribution to the surrounding environment. Should you have any questions, please contact me.

This letter contains no commitments.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Jimmy D. Vandergrift".

Jimmy D. Vandergrift
Director, Nuclear Safety Assurance

JDV/dh
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IE48

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ARKANSAS NUCLEAR ONE

UNIT 1 AND UNIT 2

OPERATING LICENSE NOS. DPR-51 AND NPF-6

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

JANUARY 1 THROUGH DECEMBER 31, 2000

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1. INTRODUCTION

Arkansas Nuclear One (ANO) is a two unit site consisting of a Babcock & Wilcox (Unit 1) and a Combustion Engineering (Unit 2) nuclear steam supply system. Both liquid and gaseous effluents are released in accordance with the Offsite Dose Calculation Manual (ODCM). This report is a summary of the effluent data in accordance with Unit 1 TS 6.12.2.6 and Unit 2 TS 6.9.3. This report provides the following information:

- A. Routine radioactive effluent release reports covering the operation of the units and the independent spent fuel storage installation (ISFSI) 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.
- F. Radiation dose to members of the public due to activities inside the site boundary.
- G. Description of licensee initiated major changes to the radioactive waste systems during the previous calendar year.
- H. Items to be reported in the annual Radioactive Effluent Release Report per other miscellaneous ODCM requirements.

This report covers the period from January 1 through December 31, 2000.

2. REGULATORY LIMITS

The ODCM contains 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 release data show that the dose from both Unit 1 and Unit 2 is considerably below the ODCM limits. This data reveals that the radioactive effluents have an overall minimal dose contribution to the surrounding environment. The following are the limits required by the ODCM:

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 to any organ

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

As required by Regulatory Guide 1.21, Rev. 1, *Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants*, a summary of data for liquid releases is provided in the annual Radioactive Effluent Release Report. This summary covers releases from January 1 through December 31, 2000. The summary of liquid effluents for both Unit 1 and Unit 2 is as follows:

	<u>Unit 1</u>	<u>Unit 2</u>
Number of releases:	337	197
Total time for all releases (minutes):	554075	557520
Maximum time for a release (minutes):	11590	11590
Average time for a release (minutes):	1656	2878
Minimum time for a release (minutes):	17	28

The Unit 1 liquid releases consisted of:

337 Planned Releases
0 Unplanned Releases

The Unit 2 liquid releases consisted of:

197 Planned Releases
0 Unplanned Releases

**ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
 (ALL LIQUID EFFLUENTS)
 January 1 through June 30, 2000**

Type of Effluent	Unit 1			
	Units	Quarter 1	Quarter 2	Est. Total Error %
<u>A. Fission and Activation Products</u>				
1. Total Release (Not Including Tritium, Gases, Alpha)	Curies	1.156E-01	6.775E-02	0
2. Average Diluted Concentration During Period	µCi/ml	4.243E-10	1.933E-10	
3. Percent of Applicable Limit	%	1.414E-01	6.445E-02	
<u>B. Tritium</u>				
1. Total Release	Curies	1.894E+02	8.506E+01	0
2. Average Diluted Concentration During Period	µCi/ml	6.955E-07	2.428E-07	
3. Percent of Applicable Limit	%	2.318E-02	8.092E-03	
<u>C. Dissolved and Entrained Gases</u>				
1. Total Release	Curies	2.722E-02	6.424E-04	0
2. Average Diluted Concentration During Period	µCi/ml	9.995E-11	1.833E-12	
3. Percent of Applicable Limit	%	4.998E-05	9.166E-07	
<u>D. Gross Alpha Radioactivity</u>				
1. Total Release	Curies	1.050E-02	2.521E-03	0
<u>E. Waste Vol Released (Pre-Dilution)</u>				
	Liters	1.620E+07	1.883E+07	0
<u>F. Volume of Dilution Water Used</u>				
	Liters	2.723E+11	3.504E+11	0

**ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
 (ALL LIQUID EFFLUENTS)
 July 1 through December 31, 2000**

Unit 1				
Type of Effluent	Units	Quarter 3	Quarter 4	Est. Total Error %
<u>A. Fission and Activation Products</u>				
1. Total Release (Not Including Tritium, Gases, Alpha)	Curies	6.246E-02	4.459E-02	0
2. Average Diluted Concentration During Period	μCi/ml	1.657E-10	1.402E-10	
3. Percent of Applicable Limit	%	5.522E-02	4.673E-02	
<u>B. Tritium</u>				
1. Total Release	Curies	8.704E+01	1.309E+02	0
2. Average Diluted Concentration During Period	μCi/ml	2.309E-07	4.116E-07	
3. Percent of Applicable Limit	%	7.696E-03	1.372E-02	
<u>C. Dissolved and Entrained Gases</u>				
1. Total Release	Curies	1.443E-03	1.433E-02	0
2. Average Diluted Concentration During Period	μCi/ml	3.826E-12	4.505E-11	
3. Percent of Applicable Limit	%	1.913E-06	2.253E-05	
<u>D. Gross Alpha Radioactivity</u>				
1. Total Release	Curies	4.533E-03	0.000E+00	0
<u>E. Waste Vol Released (Pre-Dilution)</u>				
	Liters	2.413E+07	2.853E+07	0
<u>F. Volume of Dilution Water Used</u>				
	Liters	3.770E+11	3.180E+11	0

UNIT 1

**REPORT CATEGORY : ANNUAL LIQUID CONTINUOUS AND BATCH
 RELEASES**
: TOTALS FOR EACH NUCLIDE RELEASED
TYPE OF ACTIVITY : ALL RADIONUCLIDES
REPORTING PERIOD : QUARTER # 1 AND QUARTER # 2 YEAR 2000

NUCLIDE	UNIT	CONTINUOUS RELEASES		BATCH RELEASES	
		QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
Y-88	CURIES	0.00E+00	0.00E+00	4.40E-06	0.00E+00
FE-59	CURIES	0.00E+00	0.00E+00	8.98E-06	0.00E+00
MN-54	CURIES	0.00E+00	0.00E+00	1.48E-05	0.00E+00
SR-85	CURIES	0.00E+00	0.00E+00	2.03E-05	0.00E+00
ZR-95	CURIES	0.00E+00	0.00E+00	2.45E-05	0.00E+00
SB-126	CURIES	0.00E+00	0.00E+00	5.57E-05	0.00E+00
NB-95	CURIES	0.00E+00	0.00E+00	7.49E-05	0.00E+00
KR-85	CURIES	0.00E+00	0.00E+00	1.32E-02	0.00E+00
I-131	CURIES	0.00E+00	0.00E+00	5.14E-05	5.95E-06
I-135	CURIES	0.00E+00	0.00E+00	0.00E+00	7.15E-06
I-133	CURIES	0.00E+00	0.00E+00	1.71E-05	1.90E-05
CS-134	CURIES	0.00E+00	0.00E+00	1.02E-04	6.13E-05
AG-110M	CURIES	0.00E+00	0.00E+00	1.86E-04	3.03E-04
XE-133	CURIES	0.00E+00	0.00E+00	1.40E-02	6.42E-04
CO-60	CURIES	0.00E+00	0.00E+00	9.08E-04	6.75E-04
CS-137	CURIES	0.00E+00	0.00E+00	1.40E-03	8.71E-04
SB-124	CURIES	0.00E+00	0.00E+00	9.19E-03	8.93E-04
CR-51	CURIES	0.00E+00	0.00E+00	2.13E-03	1.58E-03
G-ALPHA	CURIES	6.32E-03	1.55E-03	4.18E-03	9.70E-04
CO-58	CURIES	0.00E+00	0.00E+00	3.23E-02	5.71E-03
NA-24	CURIES	2.53E-03	7.87E-03	0.00E+00	0.00E+00
SB-125	CURIES	0.00E+00	0.00E+00	6.65E-02	4.97E-02
H-3	CURIES	5.61E-02	1.56E-01	1.89E+02	8.49E+01
Total for Period	CURIES	6.49E-02	1.65E-01	1.90E+02	8.49E+01

UNIT 1

**REPORT CATEGORY : ANNUAL LIQUID CONTINUOUS AND BATCH
 RELEASES**
: TOTALS FOR EACH NUCLIDE RELEASED
TYPE OF ACTIVITY : ALL RADIONUCLIDES
REPORTING PERIOD : QUARTER # 3 AND QUARTER # 4 YEAR 2000

NUCLIDE	UNIT	CONTINUOUS RELEASES		BATCH RELEASES	
		QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
CR-51	CURIES	0.00E+00	0.00E+00	1.87E-04	0.00E+00
SB-124	CURIES	0.00E+00	0.00E+00	5.14E-04	0.00E+00
G-ALPHA	CURIES	2.66E-03	0.00E+00	1.87E-03	0.00E+00
I-132	CURIES	0.00E+00	0.00E+00	0.00E+00	1.09E-06
I-135	CURIES	0.00E+00	0.00E+00	0.00E+00	7.75E-06
CS-134	CURIES	0.00E+00	0.00E+00	6.28E-06	8.97E-06
AG-110M	CURIES	0.00E+00	0.00E+00	8.35E-05	1.38E-05
I-133	CURIES	0.00E+00	0.00E+00	0.00E+00	1.78E-05
NB-95	CURIES	0.00E+00	0.00E+00	0.00E+00	2.18E-05
I-131	CURIES	0.00E+00	0.00E+00	1.03E-05	3.15E-05
XE-135	CURIES	0.00E+00	0.00E+00	0.00E+00	7.36E-05
CO-57	CURIES	0.00E+00	0.00E+00	1.28E-04	1.02E-04
CS-137	CURIES	0.00E+00	0.00E+00	5.78E-04	1.14E-03
CO-60	CURIES	0.00E+00	0.00E+00	1.70E-03	2.81E-03
SB-125	CURIES	0.00E+00	0.00E+00	2.28E-02	4.30E-03
NA-24	CURIES	2.32E-02	1.23E-02	1.00E-04	0.00E+00
XE-133	CURIES	0.00E+00	0.00E+00	1.44E-03	1.43E-02
CO-58	CURIES	0.00E+00	0.00E+00	1.32E-02	2.38E-02
H-3	CURIES	1.94E-01	2.20E-01	8.68E+01	1.31E+02
Total for Period	CURIES	2.20E-01	2.32E-01	8.69E+01	1.31E+02

**ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
 (ALL LIQUID EFFLUENTS)
 January 1 through June 30, 2000**

Type of Effluent	Unit 2			
	Units	Quarter 1	Quarter 2	Est. Total Error %
<u>A. Fission and Activation Products</u>				
1. Total Release (Not Including Tritium, Gases, Alpha)	Curies	5.439E-02	3.787E-02	0
2. Average Diluted Concentration During Period	μCi/ml	1.997E-10	1.081E-10	
3. Percent of Applicable Limit	%	6.656E-02	3.603E-02	
<u>B. Tritium</u>				
1. Total Release	Curies	1.227E+02	1.668E+02	0
2. Average Diluted Concentration During Period	μCi/ml	4.504E-07	4.760E-07	
3. Percent of Applicable Limit	%	1.501E-02	1.587E-02	
<u>C. Dissolved and Entrained Gases</u>				
1. Total Release	Curies	1.208E-03	2.081E-02	0
2. Average Diluted Concentration During Period	μCi/ml	4.434E-12	5.938E-11	
3. Percent of Applicable Limit	%	2.217E-06	2.969E-05	
<u>D. Gross Alpha Radioactivity</u>				
1. Total Release	Curies	1.140E-01	1.422E-03	0
<u>E. Waste Vol Released (Pre-Dilution)</u>				
	Liters	2.142E+07	1.931E+07	0
<u>F. Volume of Dilution Water Used</u>				
	Liters	2.723E+11	3.504E+11	0

**ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
 (ALL LIQUID EFFLUENTS)
 July 1 through December 31, 2000**

Unit 2				
Type of Effluent	Units	Quarter 3	Quarter 4	Est. Total Error %
<u>A. Fission and Activation Products</u>				
1. Total Release (Not Including Tritium, Gases, Alpha)	Curies	9.335E-02	7.364E-02	0
2. Average Diluted Concentration During Period	μCi/ml	2.476E-10	2.315E-10	
3. Percent of Applicable Limit	%	8.253E-02	7.718E-02	
<u>B. Tritium</u>				
1. Total Release	Curies	1.814E+02	2.783E+01	0
2. Average Diluted Concentration During Period	μCi/ml	4.811E-07	8.749E-08	
3. Percent of Applicable Limit	%	1.604E-02	2.916E-03	
<u>C. Dissolved and Entrained Gases</u>				
1. Total Release	Curies	1.875E-01	8.673E-04	0
2. Average Diluted Concentration During Period	μCi/ml	4.973E-10	2.727E-12	
3. Percent of Applicable Limit	%	2.487E-04	1.363E-06	
<u>D. Gross Alpha Radioactivity</u>				
1. Total Release	Curies	1.780E-03	0.000E+00	0
<u>E. Waste Vol Released (Pre-Dilution)</u>				
	Liters	2.690E+07	1.611E+07	0
<u>F. Volume of Dilution Water Used</u>				
	Liters	3.770E+11	3.180E+11	0

UNIT 2

**REPORT CATEGORY : ANNUAL LIQUID CONTINUOUS AND BATCH
 RELEASES**
: TOTALS FOR EACH NUCLIDE RELEASED
TYPE OF ACTIVITY : ALL RADIONUCLIDES
REPORTING PERIOD : QUARTER # 1 AND QUARTER # 2 YEAR 2000

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

NUCLIDE	UNIT	CONTINUOUS RELEASES QUARTER 1	CONTINUOUS RELEASES QUARTER 2	BATCH RELEASES QUARTER 1	BATCH RELEASES QUARTER 2
FE-59	CURIES	0.00E+00	0.00E+00	8.75E-05	0.00E+00
ZR-95	CURIES	0.00E+00	0.00E+00	1.05E-04	0.00E+00
CR-51	CURIES	0.00E+00	0.00E+00	4.27E-04	0.00E+00
CS-134	CURIES	0.00E+00	0.00E+00	0.00E+00	3.81E-05
MN-54	CURIES	0.00E+00	0.00E+00	2.82E-04	7.49E-05
SB-124	CURIES	0.00E+00	0.00E+00	9.11E-04	1.40E-04
CS-137	CURIES	0.00E+00	0.00E+00	2.07E-04	3.85E-04
CO-60	CURIES	0.00E+00	0.00E+00	6.76E-04	3.99E-04
NA-24	CURIES	0.00E+00	6.98E-04	0.00E+00	0.00E+00
G-ALPHA	CURIES	9.63E-02	1.25E-03	1.77E-02	1.70E-04
AG-110M	CURIES	0.00E+00	0.00E+00	2.31E-03	2.41E-03
CO-58	CURIES	0.00E+00	0.00E+00	1.74E-02	2.83E-03
SB-125	CURIES	0.00E+00	0.00E+00	3.10E-02	1.07E-02
FE-55	CURIES	1.05E-03	1.75E-02	0.00E+00	2.70E-03
XE-133	CURIES	0.00E+00	0.00E+00	1.21E-03	2.08E-02
H-3	CURIES	8.35E-01	8.08E-01	1.22E+02	1.66E+02
Total for Period	CURIES	9.33E-01	8.27E-01	1.22E+02	1.66E+02

UNIT 2

**REPORT CATEGORY : ANNUAL LIQUID CONTINUOUS AND BATCH
 RELEASES**
: TOTALS FOR EACH NUCLIDE RELEASED
TYPE OF ACTIVITY : ALL RADIONUCLIDES
REPORTING PERIOD : QUARTER # 3 AND QUARTER # 4 YEAR 2000

NUCLIDE	UNIT	CONTINUOUS RELEASES		BATCH RELEASES	
		QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
NB-97	CURIES	0.00E+00	0.00E+00	5.21E-05	0.00E+00
ZR-95	CURIES	0.00E+00	0.00E+00	6.79E-05	0.00E+00
CS-134	CURIES	0.00E+00	0.00E+00	7.06E-05	0.00E+00
SN-117M	CURIES	0.00E+00	0.00E+00	7.96E-05	0.00E+00
NB-95	CURIES	0.00E+00	0.00E+00	1.73E-04	0.00E+00
TE-132	CURIES	0.00E+00	0.00E+00	2.56E-04	0.00E+00
FE-59	CURIES	0.00E+00	0.00E+00	2.89E-04	0.00E+00
LA-140	CURIES	0.00E+00	0.00E+00	3.24E-04	0.00E+00
I-132	CURIES	0.00E+00	0.00E+00	6.39E-04	0.00E+00
CS-137	CURIES	0.00E+00	0.00E+00	1.04E-03	0.00E+00
SB-122	CURIES	0.00E+00	0.00E+00	1.68E-03	0.00E+00
G-ALPHA	CURIES	1.46E-03	0.00E+00	3.20E-04	0.00E+00
XE-133M	CURIES	0.00E+00	0.00E+00	2.04E-03	0.00E+00
MN-54	CURIES	0.00E+00	0.00E+00	1.82E-04	1.02E-05
I-134	CURIES	0.00E+00	0.00E+00	0.00E+00	3.19E-05
I-133	CURIES	0.00E+00	0.00E+00	0.00E+00	5.86E-05
SB-126	CURIES	0.00E+00	0.00E+00	3.76E-04	6.34E-05
XE-135	CURIES	0.00E+00	0.00E+00	1.69E-03	1.95E-04
CR-51	CURIES	0.00E+00	0.00E+00	4.62E-04	3.46E-04
CO-60	CURIES	0.00E+00	0.00E+00	1.32E-03	6.00E-04
XE-133	CURIES	0.00E+00	0.00E+00	1.84E-01	6.72E-04
AG-110M	CURIES	0.00E+00	0.00E+00	2.16E-03	5.66E-03
CO-58	CURIES	0.00E+00	0.00E+00	1.38E-02	7.20E-03
SB-124	CURIES	0.00E+00	0.00E+00	1.65E-02	8.48E-03
FE-55	CURIES	9.00E-04	9.04E-03	0.00E+00	2.86E-03
SB-125	CURIES	0.00E+00	0.00E+00	5.30E-02	3.93E-02
H-3	CURIES	5.50E-01	1.23E-01	1.80E+02	2.77E+01
Total for Period	CURIES	5.53E-01	1.32E-01	1.81E+02	2.78E+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 annual Radioactive Effluent Release Report. This summary covers releases from January 1 to December 31, 2000. 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:	138	138
Total time for all releases (minutes):	1019260	707360
Maximum time for a release (minutes):	10523	10514
Average time for a release (minutes):	7504	5302
Minimum time for a release (minutes):	5	4

The Unit 1 gaseous releases consisted of:

- 135 Planned vent & tank releases
- 3 Unplanned releases

The Unit 2 gaseous releases consisted of:

- 138 Planned vent & tank releases
- 0 Unplanned releases

**ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
 (ALL AIRBORNE EFFLUENTS)
 January 1 through June 30, 2000**

Type of Effluent	Unit 1			
	Units	Quarter 1	Quarter 2	Est. Total Error %
<u>A. Fission and Activation Products</u>				
1. Total Release	Curies	1.477E+02	4.553E-01	0
2. Average Release Rate for Period	μCi/Sec	1.879E+01	5.790E-02	
3. Percent of Applicable Limit	%	2.630E-01	8.106E-04	
<u>B. Radioiodines</u>				
1. Total Iodine-131	Curies	1.328E-07	0.000E+00	0
2. Average Release Rate for Period	μCi/Sec	1.689E-08	0.000E+00	
3. Percent of Applicable Limit	%	4.730E-08	0.000E+00	
<u>C. Particulates</u>				
1. Particulates (Half-Lives > 8 Days)	Curies	0.000E+00	0.000E+00	0
2. Average Release Rate for Period	μCi/Sec	0.000E+00	0.000E+00	
3. Percent of Applicable Limit	%	0.000E+00	0.000E+00	
4. Gross Alpha Radioactivity	Curies	1.004E-06	0.000E+00	
<u>D. Tritium</u>				
1. Total Release	Curies	7.023E+00	8.123E+00	0
2. Average Release Rate for Period	μCi/Sec	8.932E-01	1.033E+00	
3. Percent of Applicable Limit	%	1.251E-03	1.446E-03	

**ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
 (ALL AIRBORNE EFFLUENTS)
 July 1 through December 31, 2000**

Unit 1				
Type of Effluent	Units	Quarter 3	Quarter 4	Est. Total Error %
<u>A. Fission and Activation Products</u>				
1. Total Release	Curies	1.784E+01	0.000E+00	0
2. Average Release Rate for Period	μCi/Sec	2.245E+00	0.000E+00	
3. Percent of Applicable Limit	%	3.143E-02	0.000E+00	
<u>B. Radioiodines</u>				
1. Total Iodine-131	Curies	0.000E+00	0.000E+00	0
2. Average Release Rate for Period	μCi/Sec	0.000E+00	0.000E+00	
3. Percent of Applicable Limit	%	0.000E+00	0.000E+00	
<u>C. Particulates</u>				
1. Particulates (Half-Lives > 8 Days)	Curies	0.000E+00	0.000E+00	0
2. Average Release Rate for Period	μCi/Sec	0.000E+00	0.000E+00	
3. Percent of Applicable Limit	%	0.000E+00	0.000E+00	
4. Gross Alpha Radioactivity	Curies	0.000E+00	0.000E+00	
<u>D. Tritium</u>				
1. Total Release	Curies	2.916E+01	6.800E+00	0
2. Average Release Rate for Period	μCi/Sec	3.668E+00	8.554E-01	
3. Percent of Applicable Limit	%	5.136E-03	1.198E-03	

UNIT 1

**REPORT CATEGORY : ANNUAL 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 2000

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

Fission Gases

NUCLIDE	UNIT	CONTINUOUS RELEASES QUARTER 1	CONTINUOUS RELEASES QUARTER 2	BATCH RELEASES QUARTER 1	BATCH RELEASES QUARTER 2
XE-135	CURIES	0.00E+00	0.00E+00	5.68E-04	0.00E+00
XE-133M	CURIES	0.00E+00	0.00E+00	1.76E-03	0.00E+00
XE-131M	CURIES	0.00E+00	0.00E+00	4.13E-03	0.00E+00
XE-133	CURIES	0.00E+00	0.00E+00	6.56E+01	0.00E+00
KR-85	CURIES	0.00E+00	0.00E+00	8.21E+01	4.55E-01
Total for Period	CURIES	0.00E+00	0.00E+00	1.48E+02	4.55E-01

Iodines

NUCLIDE	UNIT	CONTINUOUS RELEASES QUARTER 1	CONTINUOUS RELEASES QUARTER 2	BATCH RELEASES QUARTER 1	BATCH RELEASES QUARTER 2
I-131	CURIES	0.00E+00	0.00E+00	1.33E-07	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	1.33E-07	0.00E+00

Particulates

NUCLIDE	UNIT	CONTINUOUS RELEASES QUARTER 1	CONTINUOUS RELEASES QUARTER 2	BATCH RELEASES QUARTER 1	BATCH RELEASES QUARTER 2
None	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Other

NUCLIDE	UNIT	CONTINUOUS RELEASES QUARTER 1	CONTINUOUS RELEASES QUARTER 2	BATCH RELEASES QUARTER 1	BATCH RELEASES QUARTER 2
G-ALPHA	CURIES	0.00E+00	0.00E+00	1.00E-06	0.00E+00
H-3	CURIES	0.00E+00	0.00E+00	7.02E+00	8.12E+00
Total for Period	CURIES	0.00E+00	0.00E+00	7.02E+00	8.12E+00

UNIT 1

**REPORT CATEGORY : ANNUAL AIRBORNE GROUND LEVEL
 CONTINUOUS AND BATCH RELEASES
 : TOTALS FOR EACH NUCLIDE RELEASED**
TYPE OF ACTIVITY : FISSION GASES, IODINES, AND PARTICULATES
REPORTING PERIOD : QUARTER # 3 AND QUARTER # 4 YEAR 2000

		CONTINUOUS RELEASES		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4

Fission Gases

XE-133	CURIES	0.00E+00	0.00E+00	1.78E+01	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	1.78E+01	0.00E+00

Iodines

NONE	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Particulates

NONE	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Other

H-3	CURIES	0.00E+00	0.00E+00	2.92E+01	6.80E+00
Total for Period	CURIES	0.00E+00	0.00E+00	2.92E+01	6.80E+00

**ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
 (ALL AIRBORNE EFFLUENTS)
 January 1 through June 30, 2000**

Type of Effluent	Unit 2			
	Units	Quarter 1	Quarter 2	Est. Total Error %
<u>A. Fission and Activation Products</u>				
1. Total Release	Curies	0.000E+00	0.000E+00	0
2. Average Release Rate for Period	μCi/Sec	0.000E+00	0.000E+00	
3. Percent of Applicable Limit	%	0.000E+00	0.000E+00	
<u>B. Radioiodines</u>				
1. Total Iodine-131	Curies	0.000E+00	0.000E+00	0
2. Average Release Rate for Period	μCi/Sec	0.000E+00	0.000E+00	
3. Percent of Applicable Limit	%	0.000E+00	0.000E+00	
<u>C. Particulates</u>				
1. Particulates (Half-Lives > 8 Days)	Curies	0.000E+00	0.000E+00	0
2. Average Release Rate for Period	μCi/Sec	0.000E+00	0.000E+00	
3. Percent of Applicable Limit	%	0.000E+00	0.000E+00	
4. Gross Alpha Radioactivity	Curies	1.448E-07	1.945E-07	
<u>D. Tritium</u>				
1. Total Release	Curies	7.900E+00	3.796E+00	0
2. Average Release Rate for Period	μCi/Sec	1.005E+00	4.828E-01	
3. Percent of Applicable Limit	%	1.407E-03	6.759E-04	

**ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
 (ALL AIRBORNE EFFLUENTS)
 July 1 through December 31, 2000**

Unit 2

Type of Effluent	Units	Quarter 3	Quarter 4	Est. Total Error %
<u>A. Fission and Activation Products</u>				
1. Total Release	Curies	4.468E+00	2.259E-03	0
2. Average Release Rate for Period	μCi/Sec	5.621E-01	2.843E-04	
3. Percent of Applicable Limit	%	7.869E-03	3.980E-06	
<u>B. Radioiodines</u>				
1. Total Iodine-131	Curies	0.000E+00	0.000E+00	0
2. Average Release Rate for Period	μCi/Sec	0.000E+00	0.000E+00	
3. Percent of Applicable Limit	%	0.000E+00	0.000E+00	
<u>C. Particulates</u>				
1. Particulates (Half-Lives > 8 Days)	Curies	0.000E+00	7.437E-06	0
2. Average Release Rate for Period	μCi/Sec	0.000E+00	9.356E-07	
3. Percent of Applicable Limit	%	0.000E+00	2.620E-06	
4. Gross Alpha Radioactivity	Curies	0.000E+00	0.000E+00	
<u>D. Tritium</u>				
1. Total Release	Curies	5.811E+00	2.376E+00	0
2. Average Release Rate for Period	μCi/Sec	7.311E-01	2.989E-01	
3. Percent of Applicable Limit	%	1.023E-03	4.184E-04	

UNIT 2

**REPORT CATEGORY : ANNUAL 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 2000**

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

Fission Gases

NONE	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Iodines

NONE	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Particulates

NONE	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Other

G-ALPHA	CURIES	0.00E+00	0.00E+00	1.45E-07	1.95E-07
H-3	CURIES	0.00E+00	0.00E+00	7.90E+00	3.80E+00
Total for Period	CURIES	0.00E+00	0.00E+00	7.90E+00	3.80E+00

UNIT 2

**REPORT CATEGORY : ANNUAL AIRBORNE GROUND LEVEL
 CONTINUOUS AND BATCH RELEASES
 : TOTALS FOR EACH NUCLIDE RELEASED
 TYPE OF ACTIVITY : FISSION GASES, IODINES, AND PARTICULATES
 REPORTING PERIOD : QUARTER # 3 AND QUARTER # 4 YEAR 2000**

NUCLIDE	UNIT	CONTINUOUS RELEASES		BATCH RELEASES	
		QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4

Fission Gases

NUCLIDE	UNIT	CONTINUOUS RELEASES QUARTER 3	CONTINUOUS RELEASES QUARTER 4	BATCH RELEASES QUARTER 3	BATCH RELEASES QUARTER 4
XE-135	CURIES	0.00E+00	0.00E+00	4.61E-02	0.00E+00
XE-133	CURIES	0.00E+00	0.00E+00	4.39E+00	0.00E+00
KR-85	CURIES	0.00E+00	0.00E+00	3.41E-02	2.26E-03
Total for Period	CURIES	0.00E+00	0.00E+00	4.47E+00	2.26E-03

Iodines

NUCLIDE	UNIT	CONTINUOUS RELEASES QUARTER 3	CONTINUOUS RELEASES QUARTER 4	BATCH RELEASES QUARTER 3	BATCH RELEASES QUARTER 4
NONE	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Particulates

NUCLIDE	UNIT	CONTINUOUS RELEASES QUARTER 3	CONTINUOUS RELEASES QUARTER 4	BATCH RELEASES QUARTER 3	BATCH RELEASES QUARTER 4
CO-58	CURIES	0.00E+00	0.00E+00	0.00E+00	7.44E-06
Total for Period	CURIES	0.00E+00	0.00E+00	0.00E+00	7.44E-06

Other

NUCLIDE	UNIT	CONTINUOUS RELEASES QUARTER 3	CONTINUOUS RELEASES QUARTER 4	BATCH RELEASES QUARTER 3	BATCH RELEASES QUARTER 4
H-3	CURIES	0.00E+00	0.00E+00	5.81E+00	2.38E+00
Total for Period	CURIES	0.00E+00	0.00E+00	5.81E+00	2.38E+00

5. SUMMARY OF RADIATION DOSES

The following is a summary of the annual radiation doses due to radiological effluents during 2000 calculated in accordance with the Offsite Dose Calculation Manual.

UNIT 1

Liquid Radwaste Effluents

Dose Limits (mRem): Total Body = 1.5/Qtr 3/Yr, Other Organs = 5/Qtr 10/Yr

<u>Organ</u>	<u>Qtr 1</u>	<u>%</u>	<u>Qtr 2</u>	<u>%</u>	<u>Qtr 3</u>	<u>%</u>	<u>Qtr 4</u>	<u>%</u>	<u>Year</u>	<u>%</u>
TBody	0.0012	0.08	0.0005	0.04	0.0004	0.03	0.0008	0.05	0.0030	0.10
Bone	0.0009	0.02	0.0004	0.01	0.0003	0.01	0.0006	0.01	0.0022	0.02
Liver	0.0016	0.03	0.0007	0.01	0.0005	0.01	0.0010	0.02	0.0039	0.04
Thyroid	0.0004	0.01	0.0001	0.00	0.0003	0.00	0.0002	0.00	0.0009	0.01
Kidney	0.0007	0.01	0.0003	0.01	0.0003	0.01	0.0005	0.01	0.0019	0.02
Lung	0.0005	0.01	0.0002	0.00	0.0002	0.00	0.0003	0.01	0.0012	0.01
GI-LLI	0.0017	0.03	0.0002	0.00	0.0004	0.01	0.0008	0.02	0.0031	0.03

Gaseous Radwaste Effluents

Iodine, H-3, and Particulate (ITP) - Dose Limits (mRem) = 7.5/Qtr 15/Yr

<u>Organ</u>	<u>Qtr 1</u>	<u>%</u>	<u>Qtr 2</u>	<u>%</u>	<u>Qtr 3</u>	<u>%</u>	<u>Qtr 4</u>	<u>%</u>	<u>Year</u>	<u>%</u>
TBody	0.0043	0.06	0.0050	0.07	0.0180	0.24	0.0042	0.06	0.0315	0.21
Bone	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00
Liver	0.0043	0.06	0.0050	0.07	0.0180	0.24	0.0042	0.06	0.0315	0.21
Thyroid	0.0044	0.06	0.0050	0.07	0.0180	0.24	0.0042	0.06	0.0315	0.21
Kidney	0.0043	0.06	0.0050	0.07	0.0180	0.24	0.0042	0.06	0.0315	0.21
Lung	0.0043	0.06	0.0050	0.07	0.0180	0.24	0.0042	0.06	0.0315	0.21
GI-LLI	0.0043	0.06	0.0050	0.07	0.0180	0.24	0.0042	0.06	0.0315	0.21

Noble Gas Air Dose Limits (mRad) = Gamma 5/Qtr 10/Yr, Beta 10/Qtr 20/Yr

<u>Type</u>	<u>Qtr 1</u>	<u>%</u>	<u>Qtr 2</u>	<u>%</u>	<u>Qtr 3</u>	<u>%</u>	<u>Qtr 4</u>	<u>%</u>	<u>Year</u>	<u>%</u>
Gamma	0.0022	0.04	0.0000	0.00	0.0006	0.01	0.0000	0.00	0.0027	0.03
Beta	0.0203	0.20	0.0001	0.00	0.0017	0.02	0.0000	0.00	0.0221	0.11

UNIT 2

Liquid Radwaste Effluents

Dose Limits (mRem): Total Body = 1.5/Qtr 3/Yr, Other Organs = 5 /Qtr 10/Yr

<u>Organ</u>	<u>Qtr 1</u>	<u>%</u>	<u>Qtr 2</u>	<u>%</u>	<u>Qtr 3</u>	<u>%</u>	<u>Qtr 4</u>	<u>%</u>	<u>Year</u>	<u>%</u>
TBody	0.0003	0.02	0.0004	0.03	0.0007	0.05	0.0001	0.00	0.0016	0.05
Bone	0.0001	0.00	0.0003	0.01	0.0005	0.01	0.0001	0.00	0.0010	0.01
Liver	0.0004	0.01	0.0006	0.01	0.0010	0.02	0.0001	0.00	0.0020	0.02
Thyroid	0.0002	0.00	0.0002	0.00	0.0005	0.00	0.0000	0.00	0.0007	0.01
Kidney	0.0003	0.01	0.0003	0.01	0.0005	0.01	0.0000	0.00	0.0011	0.01
Lung	0.0002	0.00	0.0003	0.01	0.0003	0.01	0.0001	0.00	0.0009	0.01
GI-LLI	0.0005	0.01	0.0003	0.01	0.0021	0.04	0.0002	0.00	0.0031	0.03

Gaseous Radwaste Effluents

Iodine, H-3, and Particulate - Dose Limits (mRem) = 7.5/Qtr 15/Yr

<u>Organ</u>	<u>Qtr 1</u>	<u>%</u>	<u>Qtr 2</u>	<u>%</u>	<u>Qtr 3</u>	<u>%</u>	<u>Qtr 4</u>	<u>%</u>	<u>Year</u>	<u>%</u>
Tbody	0.0049	0.06	0.0023	0.03	0.0036	0.05	0.0015	0.02	0.0122	0.08
Bone	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00
Liver	0.0049	0.06	0.0023	0.03	0.0036	0.05	0.0015	0.02	0.0122	0.08
Thyroid	0.0049	0.06	0.0023	0.03	0.0036	0.05	0.0015	0.02	0.0122	0.08
Kidney	0.0049	0.06	0.0023	0.03	0.0036	0.05	0.0015	0.02	0.0122	0.08
Lung	0.0049	0.06	0.0023	0.03	0.0036	0.05	0.0015	0.02	0.0122	0.08
GI-LLI	0.0049	0.06	0.0023	0.03	0.0036	0.05	0.0015	0.02	0.0122	0.08

Noble Gas Air Dose Limits (mRad) = Gamma 5/Qtr 10/Yr, Beta 10/Qtr 20/Yr

<u>Type</u>	<u>Qtr 1</u>	<u>%</u>	<u>Qtr 2</u>	<u>%</u>	<u>Qtr 3</u>	<u>%</u>	<u>Qtr 4</u>	<u>%</u>	<u>Year</u>	<u>%</u>
Gamma	0.0000	0.00	0.0000	0.00	0.0001	0.00	0.0000	0.00	0.0001	0.00
Beta	0.0000	0.00	0.0000	0.00	0.0004	0.00	0.0000	0.00	0.0004	0.00

6. SUMMARY OF DOSE TO MEMBERS OF THE PUBLIC

The following is a summary of the annual radiation dose to members of the public (in mrem) due to activities inside the site boundary.

UNIT 1

	<u>BONE</u>	<u>LIVER</u>	<u>TBODY</u>	<u>THYROID</u>	<u>KIDNEY</u>	<u>GI-LLI</u>	<u>LUNG</u>	<u>SKIN</u>
<u>Gaseous Effluent</u>								
Iodine/Tritium	3.82E-08	1.37E-02	1.37E-02	1.38E-02	1.37E-02	1.37E-02	1.37E-02	
Particulate								
Noble Gas			7.02E-04					4.62E-03
<u>Liquid Effluent</u>								
Fish	2.21E-03	3.88E-03	2.96E-03	9.27E-04	1.87E-03	1.21E-03	3.12E-03	
Sediment			1.33E-04					1.57E-04
Unit 1 Total	2.21E-03	1.76E-02	1.74E-02	1.47E-02	1.56E-02	1.50E-02	1.69E-02	4.78E-03

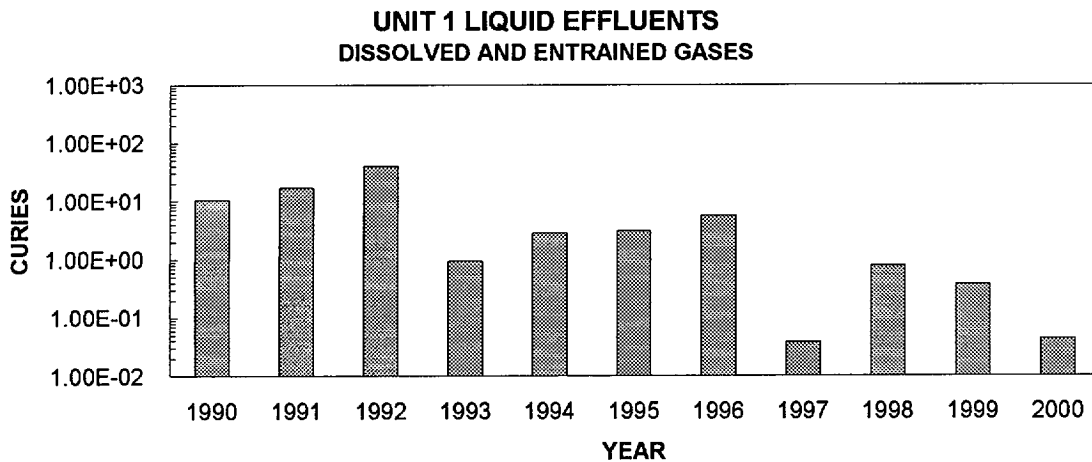
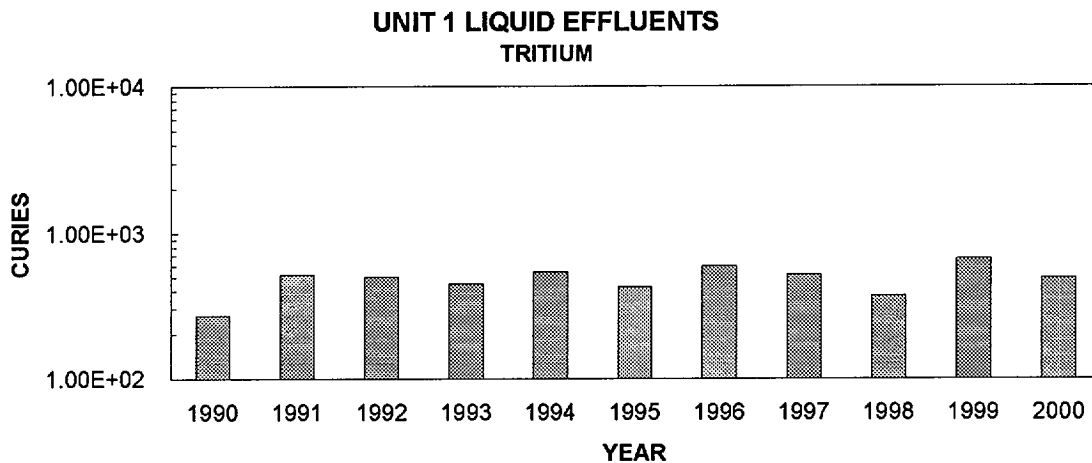
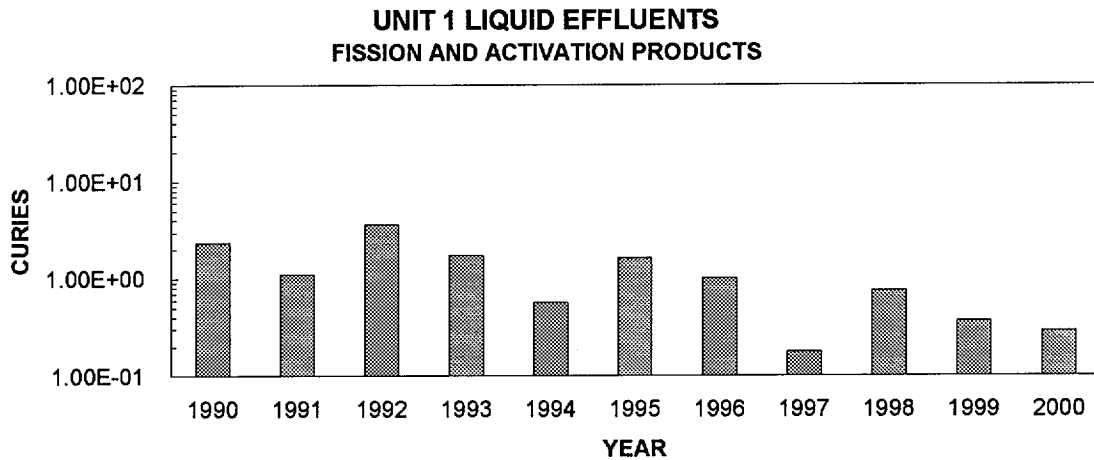
UNIT 2

<u>Gaseous Effluent</u>								
Iodine/Tritium	7.86E-07	5.35E-03	5.35E-03	5.35E-03	5.35E-03	5.35E-03	5.35E-03	
Particulate								
Noble Gas			3.73E-05					8.91E-05
<u>Liquid Effluent</u>								
Fish	9.51E-04	2.00E-03	1.57E-03	7.28E-04	1.13E-03	9.01E-04	3.09E-03	
Sediment			9.26E-05					1.08E-04
Unit 2 Total	9.51E-04	7.35E-03	6.96E-03	6.08E-03	6.48E-03	6.25E-03	8.44E-03	1.98E-04

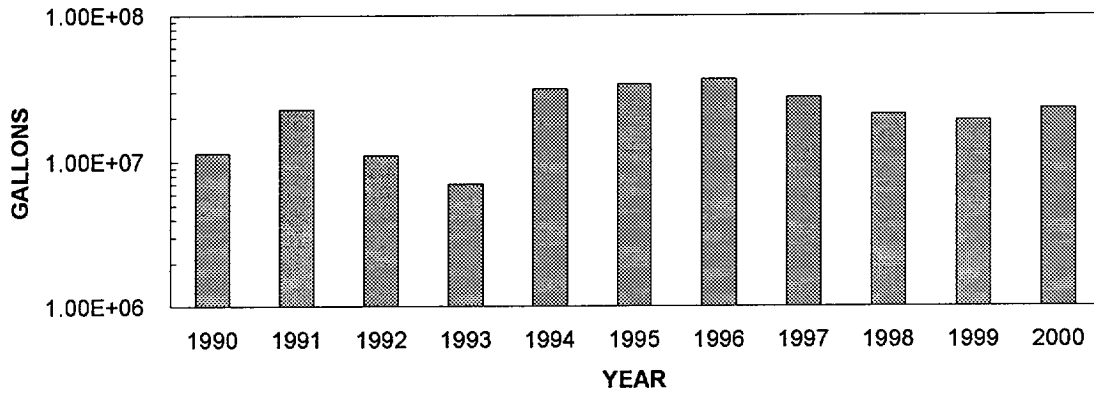
Site Total	3.17E-03	2.50E-02	2.44E-02	2.08E-02	2.21E-02	2.12E-02	2.53E-02	4.98E-03
Limit (40CFR190)	25	25	25	75	25	25	25	25
% Limit	1.27E-02	9.99E-02	9.75E-02	2.77E-02	8.84E-02	8.48E-02	1.01E-01	1.99E-02

7. HISTORICAL EFFLUENT DATA

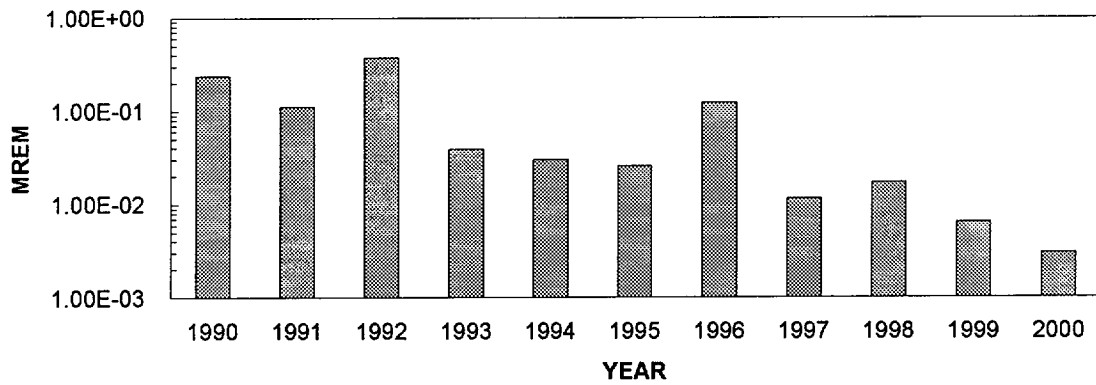
The following graphs show the historical release data for both units on a yearly basis. These graphs compare data from 1990 through 2000.



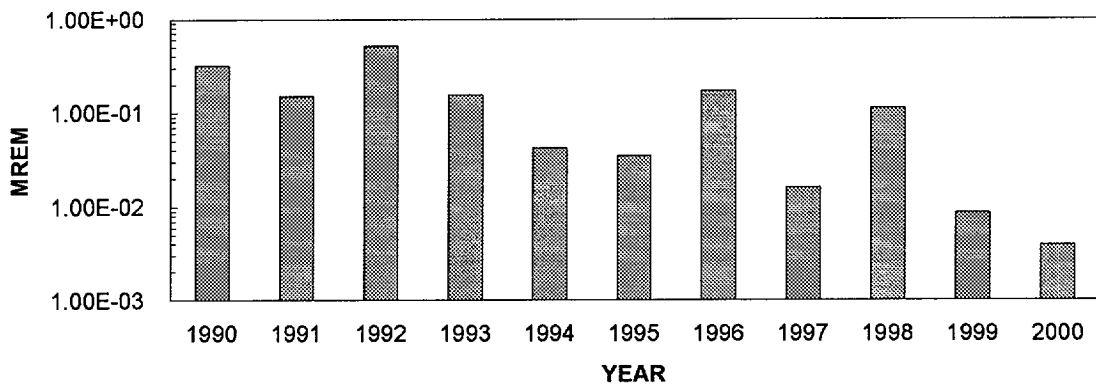
**UNIT 1 LIQUID EFFLUENTS
TOTAL VOLUME RELEASED**



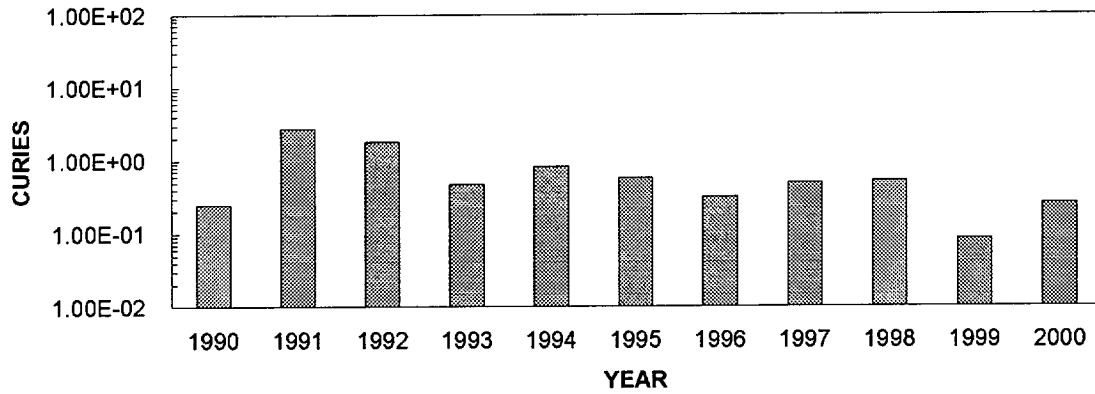
**UNIT 1 LIQUID EFFLUENTS
TOTAL BODY DOSE**



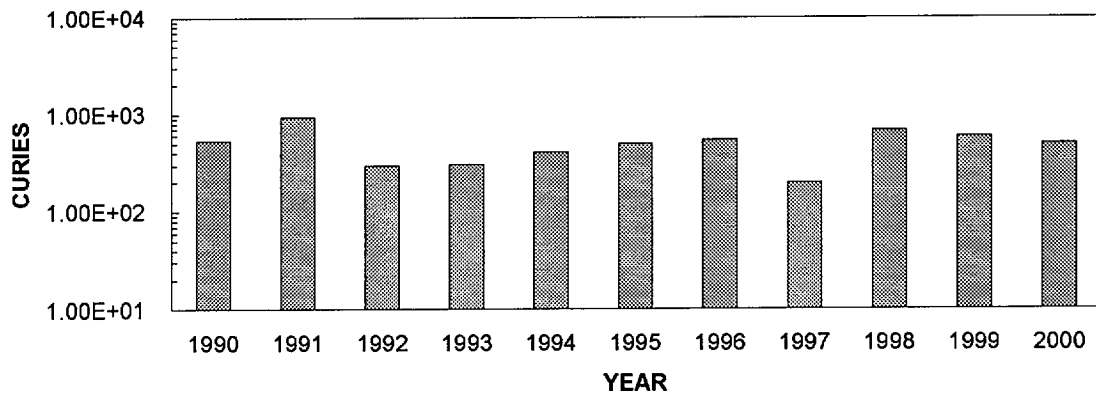
**UNIT 1 LIQUID EFFLUENTS
CRITICAL ORGAN DOSE**



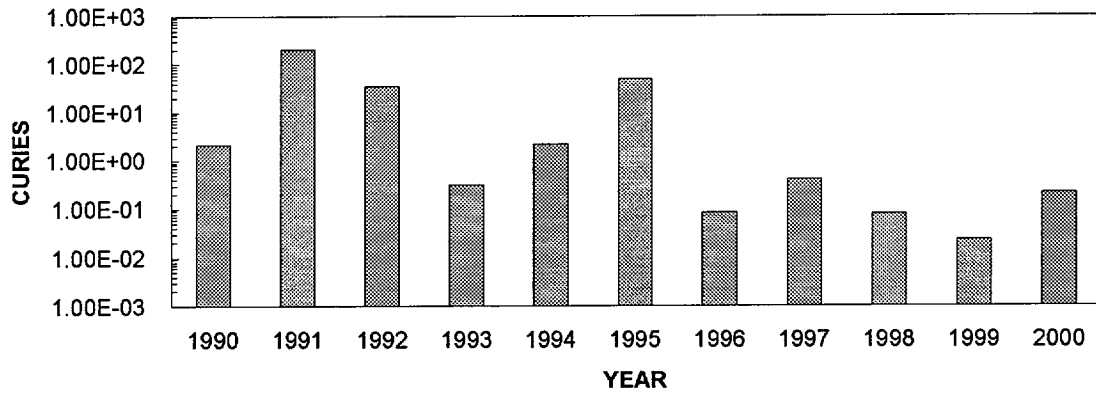
**UNIT 2 LIQUID EFFLUENTS
FISSION AND ACTIVATION PRODUCTS**



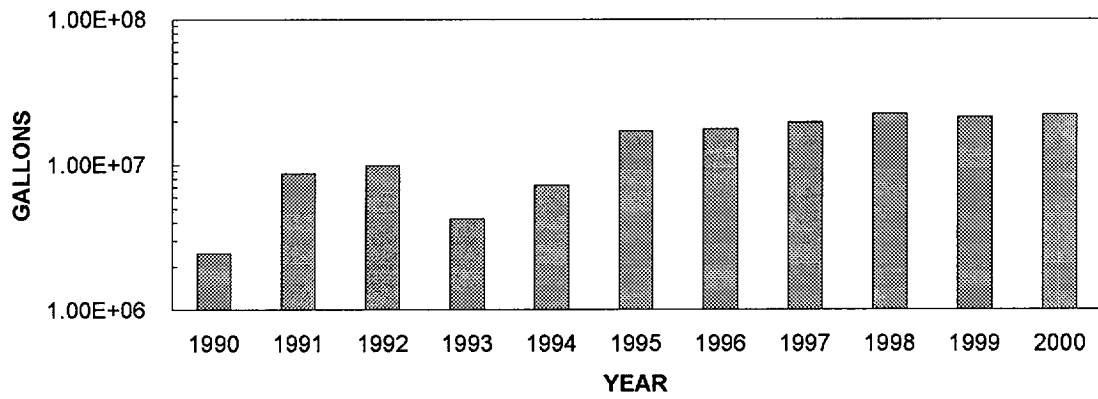
**UNIT 2 LIQUID EFFLUENTS
TRITIUM**



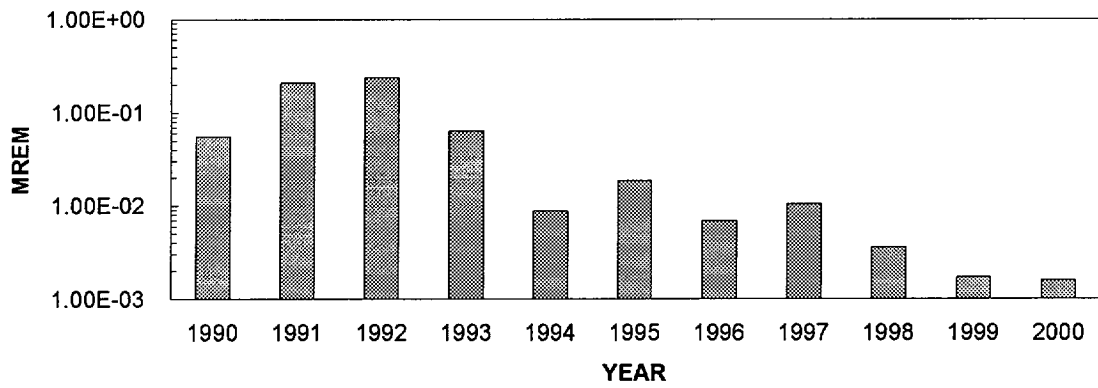
**UNIT 2 LIQUID EFFLUENTS
DISSOLVED AND ENTRAINED GASES**



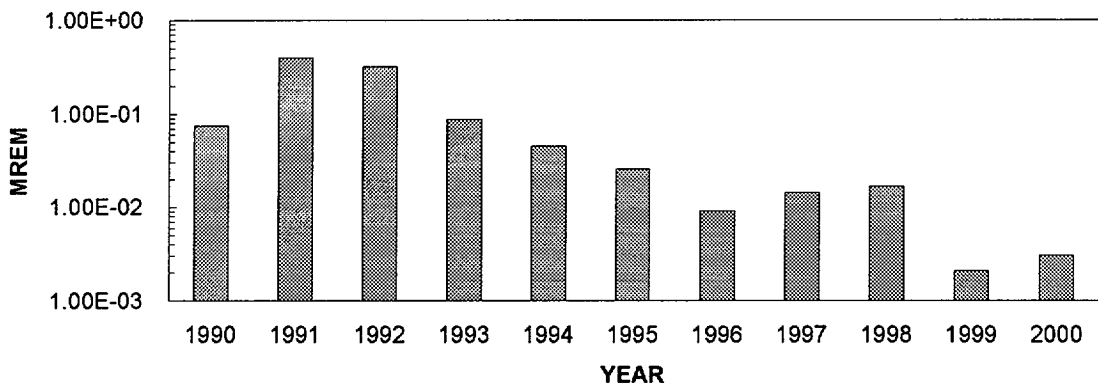
**UNIT 2 LIQUID EFFLUENTS
TOTAL VOLUME RELEASED**



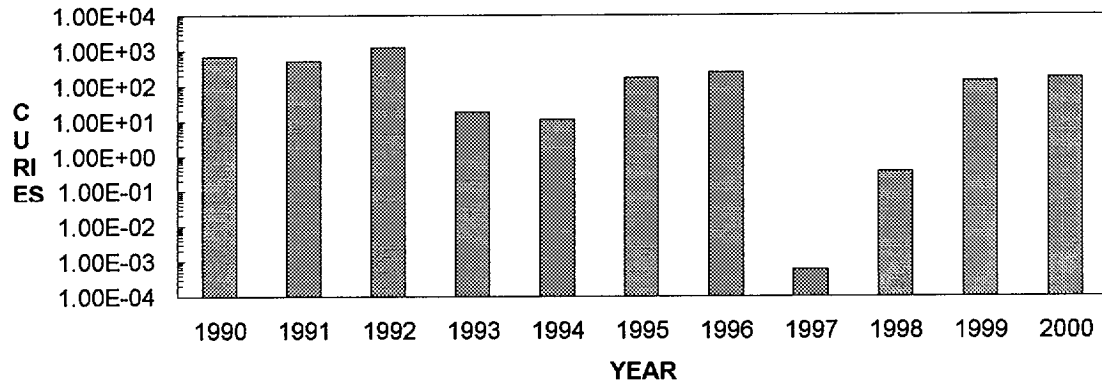
**UNIT 2 LIQUID EFFLUENTS
TOTAL BODY DOSE**



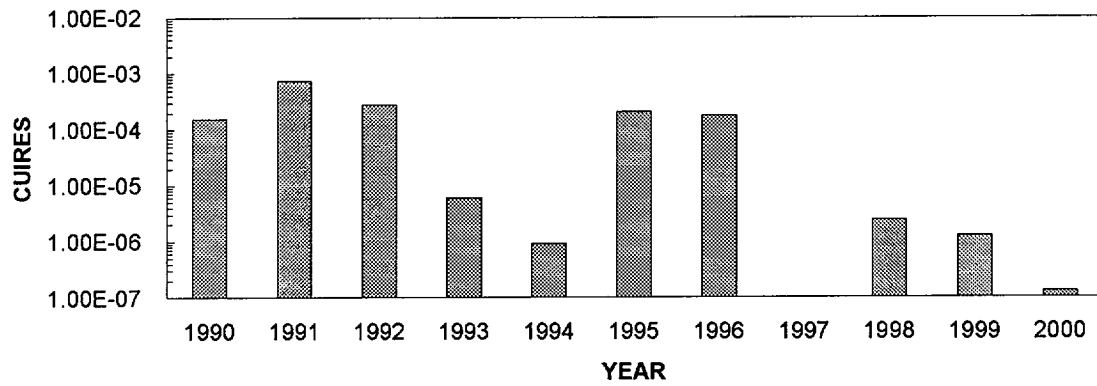
**UNIT 2 LIQUID EFFLUENTS
CRITICAL ORGAN DOSE**



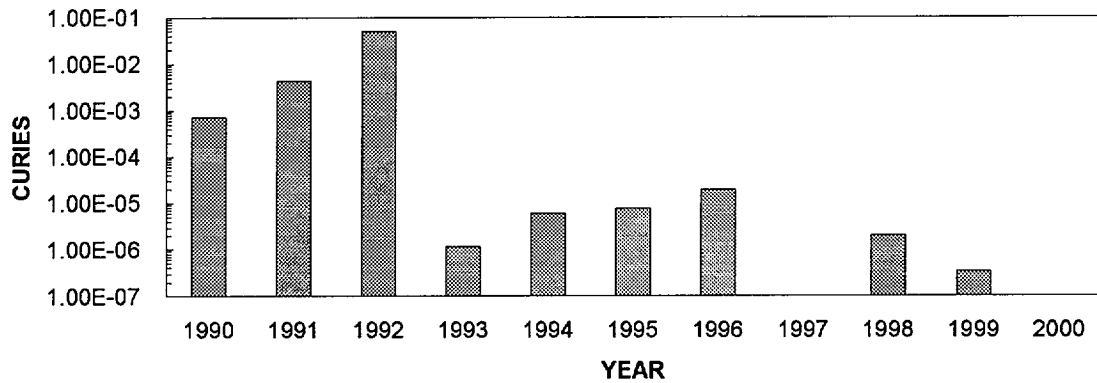
UNIT 1 GASEOUS FISSION AND ACTIVATION PRODUCTS



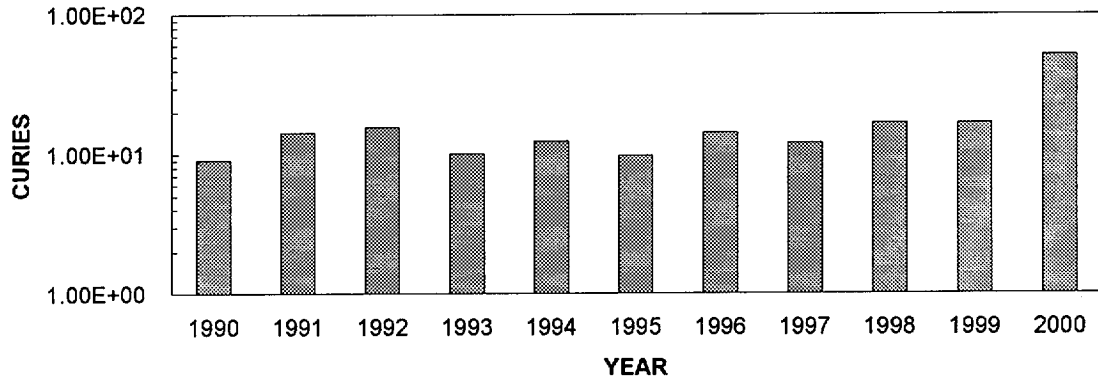
UNIT 1 GASEOUS EFFLUENTS RADIOIODINES



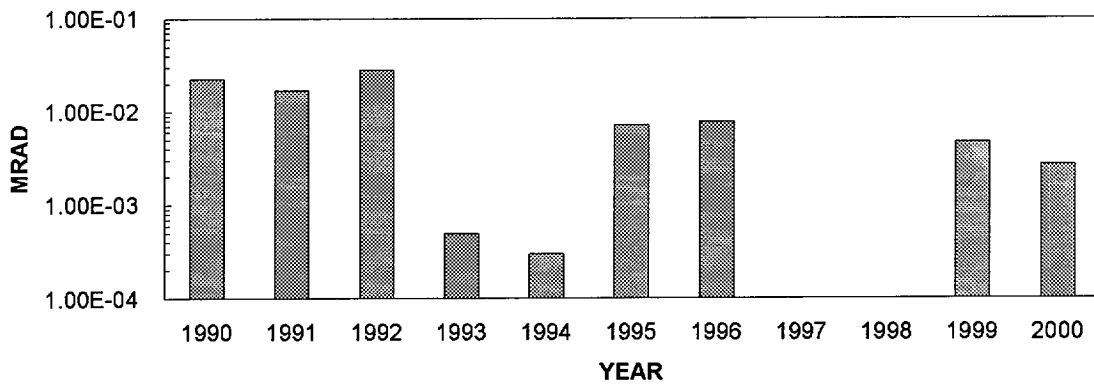
UNIT 1 GASEOUS EFFLUENTS PARTICULATES



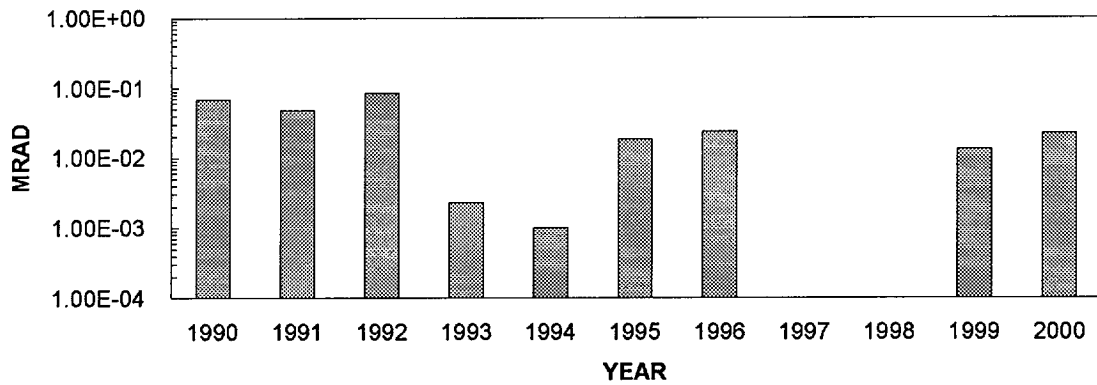
**UNIT 1 GASEOUS EFFLUENTS
TRITIUM**



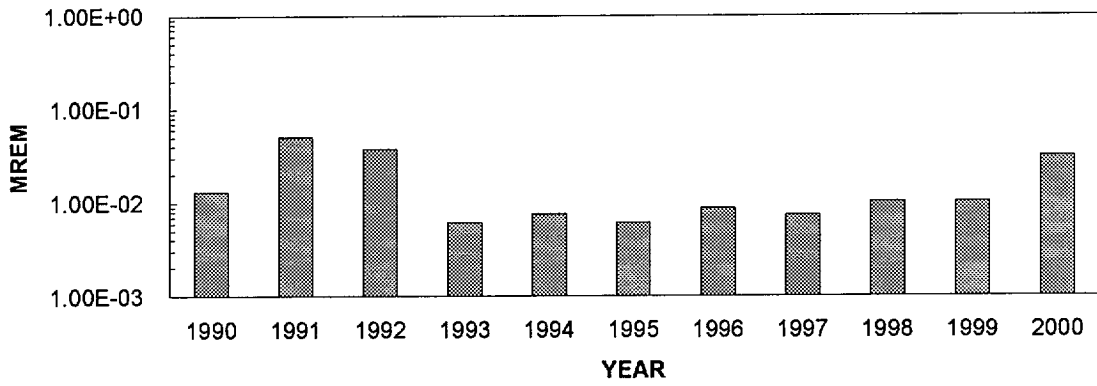
**UNIT 1 GASEOUS EFFLUENTS
GAMMA DOSE**



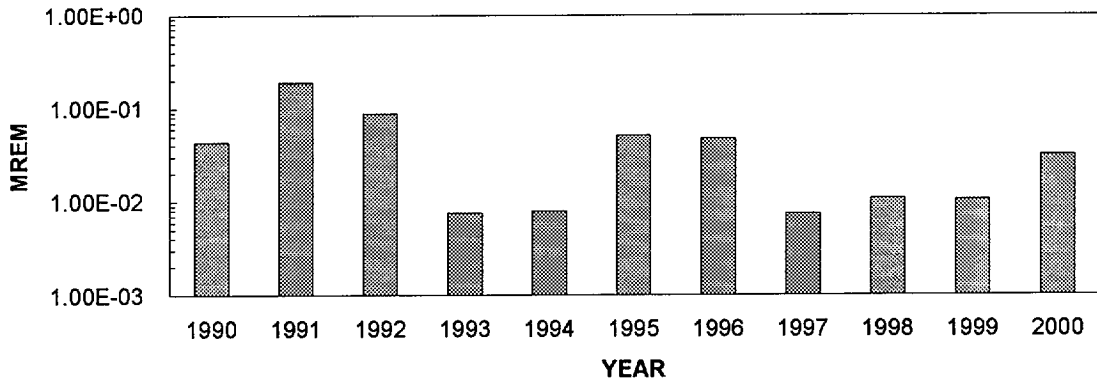
**UNIT 1 GASEOUS EFFLUENTS
BETA DOSE**



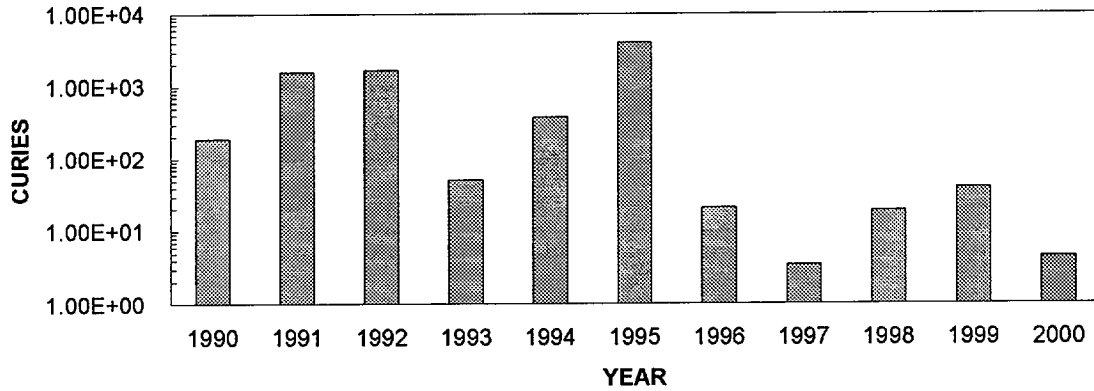
**UNIT 1 GASEOUS EFFLUENTS
TOTAL BODY DOSE**



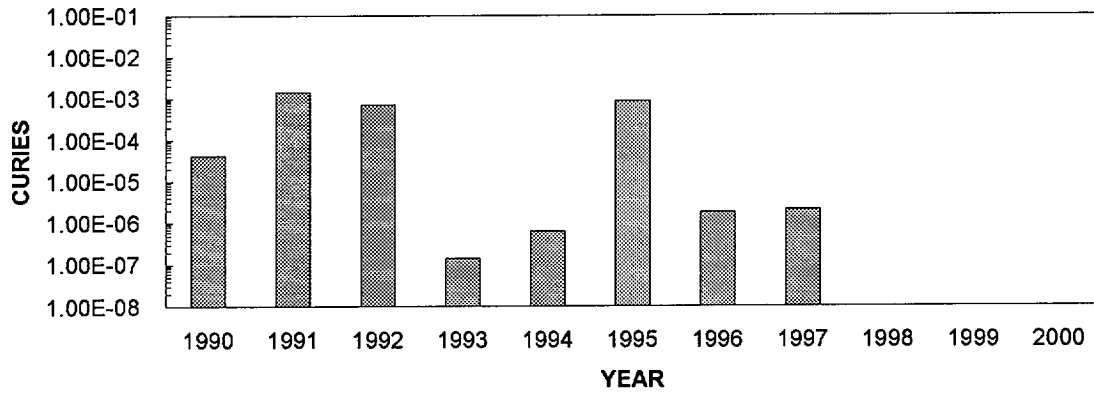
**UNIT 1 GASEOUS EFFLUENTS
CRITICAL ORGAN DOSE**



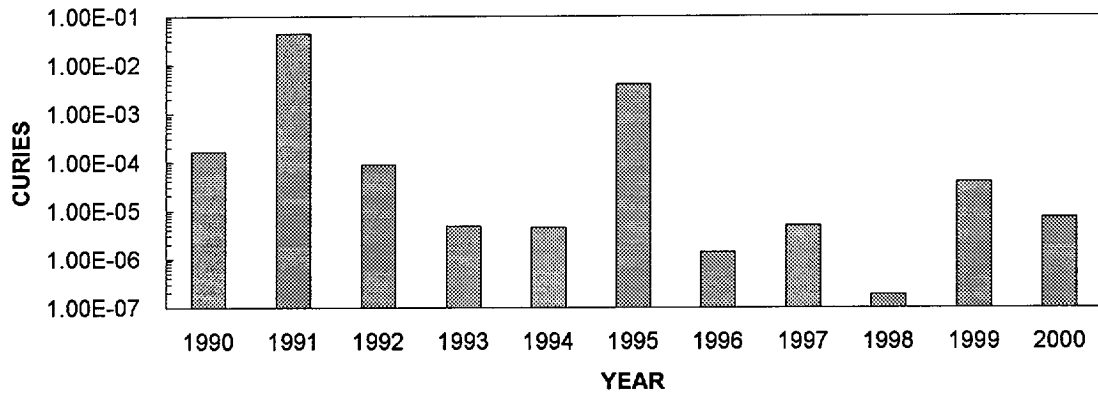
**UNIT 2 GASEOUS EFFLUENTS
FISSION AND ACTIVATION PRODUCTS**



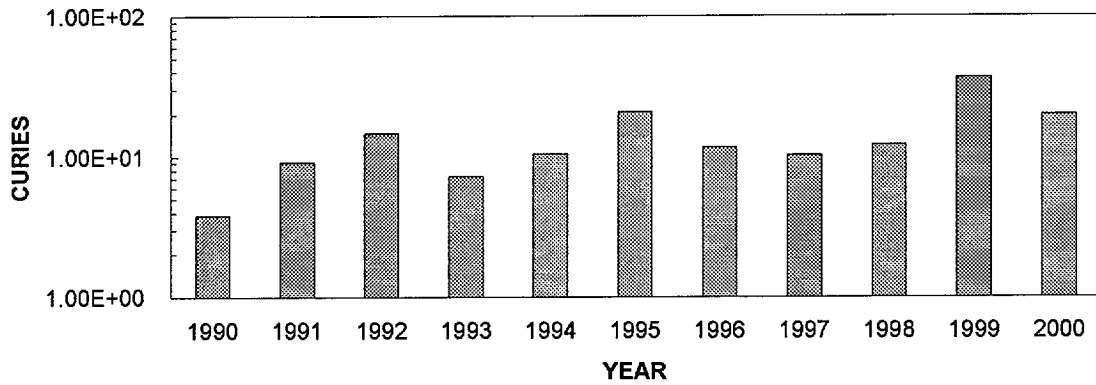
**UNIT 2 GASEOUS EFFLUENTS
RADIOIODINES**



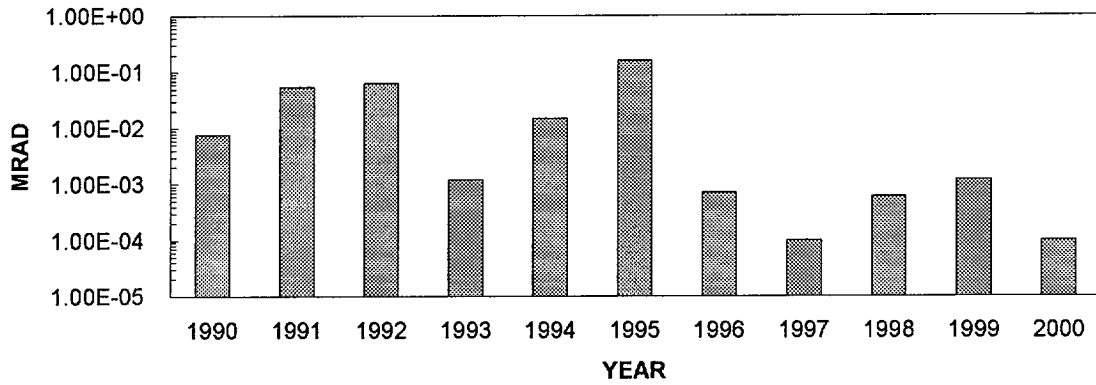
**UNIT 2 GASEOUS EFFLUENTS
PARTICULATES**



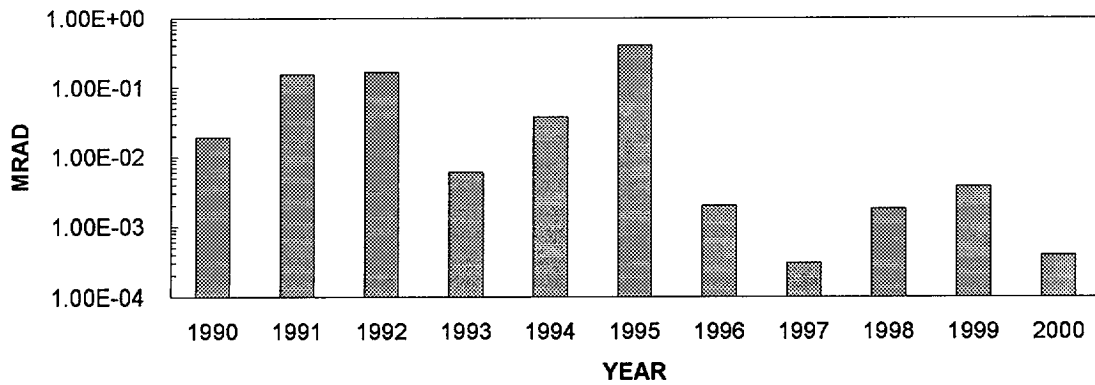
**UNIT 2 GASEOUS EFFLUENTS
TRITIUM**



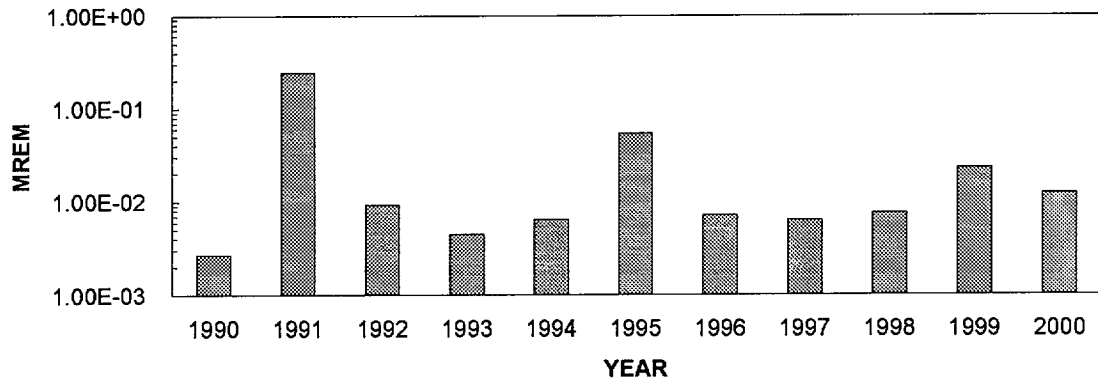
**UNIT 2 GASEOUS EFFLUENTS
GAMMA DOSE**



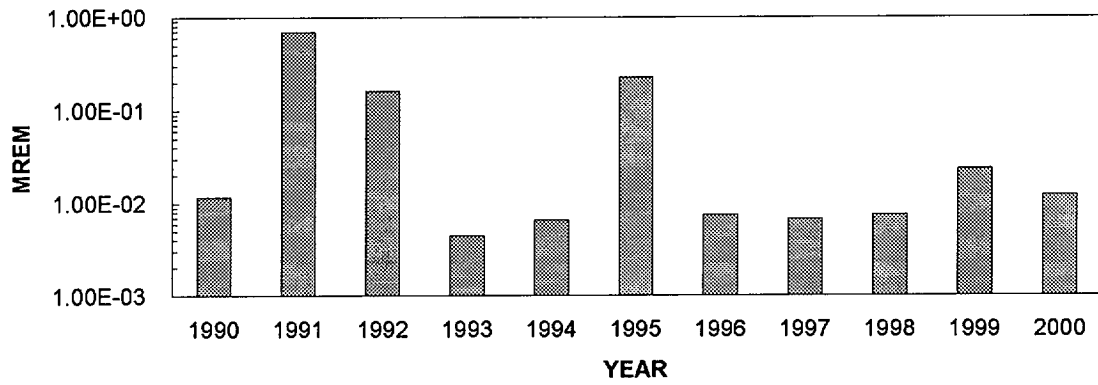
**UNIT 2 GASEOUS EFFLUENTS
BETA DOSE**



**UNIT 2 GASEOUS EFFLUENTS
TOTAL BODY DOSE**



**UNIT 2 GASEOUS EFFLUENTS
CRITICAL ORGAN DOSE**



8. SOLID WASTE SUMMARY

As required by Regulatory Guide 1.21, Rev. 1, a summary of data for solid wastes shipped offsite is provided in the annual Radioactive Effluent Release Report.

This summary covers shipments from January 1 through December 31, 2000. The summary for solid waste shipments is as follows:

REGULATORY GUIDE 1.21 REPORT
 EFFLUENT AND WASTE DISPOSAL ANNUAL SUMMARY REPORT
 SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
 JANUARY 1, 2000 THROUGH JUNE 30, 2000

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 ³ Ci	1.64E+01 1.14E-04	±2.5E+01
b.	Dry compressible waste, contaminated equip, etc.	m ³ Ci	1.78E+01 9.05E-01	±2.5E+01
c.	Irradiated components, control rods, etc.	m ³ Ci	0.00E+00 0.00E+00	0.00E+00
d.	Other (describe): Waste Oil	m ³ Ci	2.00E+01 7.58E-06	±2.5E+01

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

a. Spent resins, filter sludges, evaporator bottoms, etc.		
	%	Curies
CS-137	80.64	9.20E-05
CS-134	15.31	1.75E-05
CO-60	2.07	2.36E-06
NI-63	1.98	2.26E-06
b. Dry compressible waste, contaminated equipment, etc.		
	%	Curies
CS-137	68.96	6.24E-01
FE-55	7.03	6.36E-02
NI-63	4.43	4.01E-02
CO-60	4.39	3.97E-02
CE-144	4.16	3.77E-02
NB-95	3.08	2.79E-02
CO-58	2.40	2.17E-02
ZR-95	2.34	2.12E-02
C-14	1.99	1.80E-02
CR-51	0.89	8.06E-03
H-3	0.33	2.96E-03
c. Irradiated components, control rods, etc.		
	%	Curies
None		
d. Other (Waste Oil)		
	%	Curies
CS-137	79.84	6.05E-06
CO-60	11.15	8.45E-07
NI-63	7.76	5.88E-07
FE-55	1.25	9.50E-08

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
3	Flatbed/Sea Van	Oak Ridge, TN
1	Flatbed/Tank	Richland, WA

B. Irradiated Fuel Shipments (Disposition)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
None		

REGULATORY GUIDE 1.21 REPORT
 EFFLUENT AND WASTE DISPOSAL ANNUAL SUMMARY REPORT
 SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
 JULY 1, 2000 THROUGH DECEMBER 31, 2000

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 ³ Ci	0.00E+00 0.00E+00	0.00E+00
b.	Dry compressible waste, contaminated equip, etc.	m ³ Ci	1.35E+02 1.91E+00	±2.5E+01
c.	Irradiated components, control rods, etc.	m ³ Ci	0.00E+00 0.00E+00	0
d.	Other (describe):	m ³ Ci	0.00E+00 0.00E+00	0.00E+00

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

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

	%	Curies
None		

b. Dry compressible waste, contaminated equipment, etc.

	%	Curies
CS-137	40.76	7.76E-01
FE-55	14.36	2.73E-01
NB-95	11.56	2.20E-01
CO-58	9.00	1.71E-01
ZR-95	8.76	1.67E-01
NI-63	4.56	8.69E-02
CO-60	3.38	6.43E-02
CR-51	3.35	6.37E-02
CE-144	1.92	3.65E-02
H-3	1.23	2.34E-02
C-14	1.12	2.14E-02

c. Irradiated components, control rods, etc.

	%	Curies
None		

d. Other (Waste Oil)

	%	Curies
None		

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
3	Flatbed/Sea Van	Oak Ridge, TN
1	Flatbed/Tank	Richland, WA

B. Irradiated Fuel Shipments (Disposition)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
None		

9. UNPLANNED RELEASES

An unplanned release is defined as any release of radioactive material to the environment that does not meet the following criteria:

- A. Sample analysis prior to release, and
- B. Release calculations performed prior to release.

During 2000, there were three unplanned releases to an unrestricted area.

On February 8, 2000, it was identified that the Unit 1 Waste Gas Decay Tank pressure for T18C had been decreasing over the previous several days. The T18C pressure dropped from 75 to 49 psig. The gas leaked from the tank isolation valve to the Unit 1 Radwaste Area Vent which was monitored at all times by the Radwaste Area Super Particulate Iodine Noble Gas monitor (SPING 2). Samples of the remaining contents of T18C were analyzed and an unplanned release (1GR2000-0019) was performed for the pressure drop of 75 to 49 psig. Based upon the results of the release permit, it was determined that the unplanned release did not result in any offsite dose release limits being exceeded. A second release was performed to release the remaining contents of T18C. An MAI was issued to investigate and repair the T18C leak. A copy of the unplanned release permit (1GR2000-0019) is included in Attachment 1. A Condition Report was issued to document the condition.

On February 10, 2000, it was determined that an unplanned release had occurred from T18D (Unit 1 Waste Gas Decay Tank). T18D had been previously declared inoperable due to the tank isolation valve leaking by its seat. However, due to the unavailability of other waste gas decay tanks, Operations had to align T18D to receive waste gas compressor discharge. There were no plans for using the waste gas compressor while the inoperable T18D was aligned. However, during this alignment, the Gaseous Radwaste Monitor (RI-4830) tripped while Chemistry personnel were in the process of sampling T18A and T18B for release purposes. The radmonitor trip resulted in T18D being pressurized up to 21 psig. Over the next 24-hour period, the tank pressure dropped from 21 psig to minimal pressure. The gas leaked from the tank isolation valve to the Unit 1 Radwaste Area Vent which was monitored at all times by the Radwaste Area SPING (SPING 2). Chemistry personnel obtained samples from the remaining gas in T18D and performed an unplanned release (1GR2000-0023) to document the activity released. Based upon the results of the release permit, it was determined that the unplanned release did not result in any offsite dose release limits being exceeded. A copy of the unplanned release permit (1GR2000-0023) is included in Attachment 2. An MAI to investigate and repair the leaking isolation valve had been previously submitted. A Condition Report was issued to document the condition.

On March 14, 2000, an unplanned steam release occurred following a manual trip of the Unit 1 reactor due to a main turbine control system failure. While starting up from 1P-00-002 at approximately 80 % power, the turbine generator valve limiter position switch stuck in the depressed position. This caused the turbine to start and uncontrolled run back. The reactor was tripped manually. As a result, a steam release occurred. The Chemistry department collected and analyzed samples from the steam source and performed an unplanned release permit (1GR2000-0038). Based upon the results of the release permit, it was determined that the unplanned release did not result in any offsite dose release limits being exceeded. A copy of the unplanned release permit (1GR2000-0038) is included in Attachment 3.

10. RADIATION INSTRUMENTATION

As required by ODCM Appendices 1 and 2, any radioactive effluent instrumentation inoperable for more than 30 days shall be reported in the annual Radioactive Effluent Release Report.

On March 16, 2000, at 1000 hrs, RX-9820 (SPING 1 Unit 1 Containment Purge Super Particulate Iodine and Noble Gas ventilation effluent monitor) exceeded the 30-day time clock pursuant to the Offsite Dose Calculation Manual (ODCM) L2.2.1. The time clock was entered on February 15, 2000, at 1000 hrs, due to Channel 10 (Effluent Monitor Flow) of SPING 1 indicating that the vent flow rate was at 7,700 SCFM during continuous ventilation. This value was below the procedurally required limit of 16,200 SCFM. Based upon this condition, Channel 10 of SPING 1 was declared inoperable and ODCM required actions were initiated and performed until the containment building Purge ventilation was secured at the end of 1R15. Condition Report CR-ANO-1-2000-0099 was issued to document the condition. The cause of the low Channel 10 reading is attributed to the flow transmitter loop being out of calibration. The current plan is to re-calibrate the existing flow transmitter (PDT-8003) to more accurately measure the new design flow of the vent (18,000 cfm) prior to the start of 1R16. It is expected that Channel 10 will return to operable status upon completion of the re-calibration.

No other radioactive effluent instrumentation was inoperable for longer than 30 days during 2000.

11. CHANGES TO THE PROCESS CONTROL PROGRAM

As required by ODCM Appendices 1 and 2, a description of changes made to the Process Control Program (PCP) shall be included in the annual Radioactive Effluent Release Report for the period in which the change was made effective.

During 2000, there were no changes made to the PCP.

12. CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL

In accordance with Unit 1 and Unit 2 TS, changes to the ODCM shall be included in the annual Radioactive Effluent Release Report for the period in which the change(s) was made effective.

During 2000, there were no changes made to the ODCM. Therefore a copy of the ODCM will not be included in the 2000 report.

13. LLD LEVELS

In accordance with ODCM Appendices 1 and 2, lower limits of detection (LLDs) higher than required shall be documented in the annual Radioactive Effluent Release Report.

During 2000, there were no LLDs higher than required.

14. RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

In accordance with ODCM Appendices 1 and 2 Limitations L2.6.1.A and L2.6.2.A, unavailability of milk or fresh, leafy vegetable samples, or an increase in an environmental sample location's calculated dose commitment must be identified in the annual Radioactive Effluent Release Report.

A. Changes in Sample Locations

During 2000, there were no instances where milk or fresh leafy vegetable samples were unavailable.

B. Increase in Calculated Dose Commitment

There were no environmental sampling locations identified during 2000 that would yield a calculated dose commitment greater than the values currently being calculated.

15. SUMMARY OF HOURLY METEOROLOGICAL DATA

In accordance with ODCM Appendices 1 and 2 Limitations L3.2.1.D.1, in lieu of including a summary of the meteorological data in this report, the 2000 data is retained at ANO. This data is available for NRC review.

16. DESCRIPTION OF MAJOR CHANGES TO RADIOACTIVE WASTE SYSTEMS

There were no major changes made to the Unit 1 liquid and gaseous or Unit 2 liquid and gaseous radwaste systems during 2000. However it was identified on 3/30/00, during an audit of Environmental Monitoring (QAP-28-00), that a discrepancy existed between the ANO ODCM/Reg. Guide 1.109 and the computer software for the calculation of annual skin dose. It was determined that a multiplier used for structural shielding was applied in an incorrect location in the effluent release software. After reviewing the condition, it was determined that the software error resulted in variations of skin dose rates of 3 to 30 percent, depending upon the individual isotope. The Chemistry department reviewed historical gaseous effluent release permits and determined that the highest software calculated skin dose rate by noble gas was approximately 1,000 mRem/year. Using the greatest error of 30 percent as mentioned above, a maximum value of approximately 1,300 mRem/year would have been attained. Based upon this information, it was determined that ANO did not exceed the ODCM limits for skin dose from noble gases during any single radioactive gaseous effluent release. As a result of the above condition, a computer spreadsheet has been developed to perform the corrected skin dose rate calculation. Additionally, an Operating Experience (OE) report was published documenting the error in the gaseous release software. Condition Report CR-ANO-C-2000-0087 was issued to document the above condition.

17. INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) EFFLUENT RELEASES

No effluent releases occurred from the ISFSI during 2000.

Arkansas Nuclear One
Unit 1 and Unit 2
Annual Radioactive Effluent Release Report
January 1 through December 31, 2000

Attachment 1

Gaseous Waste Release Permit
1GR2000-0019

Entergy Operations Inc.
Arkansas Nuclear One Unit 1
Gaseous Radioactive Waste Release Permit
Post-Release Permit Update

1GR2000-0019

PART III: ACTUAL RELEASE DATA

Release Point (33): T18C WASTE GAS DECAY TANK
Discharge Point (10): DISC. PT. 10 - 1 RAD WASTE AREA

Permit Issued: 08-feb-2000 13:35:31 Release Type: Batch

Sample entry number: 19

Average Waste Flow: 1.5722E-01 CFM
Total Waste Volume: 5.6599E+02 CF
Actual Release Start: 05-feb-2000 20:00:00 Initial Pressure : 75.00
Actual Release End: 08-feb-2000 08:00:00 Final Pressure : 49.00
Release Duration: 3600.0000 MIN

Performed By: *Dudley*

Date
2/8/00

Approved By: *Donald*

2/8/00

 Entergy Operations Inc.
 Arkansas Nuclear One Unit 1
 Gaseous Radioactive Waste Release Permit
 Post-Release Permit Update

1GR2000-0019

RELEASE ACTIVITY - Unit 1

Isotope	: Pre-Disp. : : Measured : : uCi/cc :	: Pre-Disp. : : Measured : : Conc/MPC :	: Pre-Disp. : : Measured : : Conc/Total :	: Conc/Total : : by : : Type :	: Release : : Rate : : uCi/sec :	: Curies : : Released :
H-3 O:	1.10E-07	5.51E-01	3.16E-05	1.00E+00	8.18E-06	1.77E-06
KR-85 N:	1.95E-03	6.50E+03	5.60E-01	5.60E-01	1.45E-01	3.13E-02
XE-131MN:	2.58E-05	6.46E+01	7.42E-03	7.42E-03	1.92E-03	4.14E-04
XE-133MN:	2.83E-05	9.44E+01	8.13E-03	8.13E-03	2.10E-03	4.54E-04
XE-133 N:	1.46E-03	4.88E+03	4.21E-01	4.21E-01	1.09E-01	2.35E-02
XE-135 N:	1.21E-05	1.21E+02	3.47E-03	3.47E-03	8.95E-04	1.93E-04
G-ALPHA0:	5.02E-15	2.51E-01	1.44E-12	4.56E-08	3.72E-13	8.05E-14
Totals :	3.48E-03	1.17E+04			2.58E-01	5.58E-02

Entergy Operations Inc.
Arkansas Nuclear One Unit 1
Gaseous Radioactive Waste Release Permit
Pre-Release Supplementary Data

1GR2000-0019

PART I: PRE-RELEASE DATA

Release Point (33): T18C WASTE GAS DECAY TANK
Discharge Point (10): DISC. PT. 10 - 1 RAD WASTE AREA

Permit Issued: 08-feb-2000 13:35:31 Release Type: Batch

Rad Monitor: (4830) RE-4830
Rad Monitor Bckgrnd: 8.6000E+03 CPM ✓

Estim. Waste Flow: 1.5722E-01 CFM ✓
Estim. Waste Volume: → 5.6599E+02 CF ✓
Estim. Release Start: 05-feb-2000 20:00:00 ✓ Initial Pressure : 75.00 ✓
Estim. Release End: 08-feb-2000 08:00:00 ✓ Final Pressure : 49.00 ✓
Estim. Duration: 3600.0000 MIN ✓

PART II: PRE-RELEASE CALCULATIONS

Sample Entry # : 19
Gas sample time: 07-feb-2000 22:29:00 Sampled by:

Gas Monitor Response: 5.06E+06 CPM
Total Body Dose Rate: 7.18E-05 mrem/yr % Limit = 0.0%
Skin Dose Rate: 5.48E-04 mrem/yr % Limit = 0.0%
Max Organ Dose Rate: 6.93E-08 mrem/yr % Limit = 0.0%

Max Monitor Setpoints: RE-4830 RX-9825
CPM uCi/cc

Noble Gas : 6.1E+06 1.2E-07

Flag:
Flags: A-Release Curies > Local Limit N-Noble Gas Dose Rate > Limit
S-Release Curies > Site Limit O-Organ Dose Rate > Limit

	Analysis Date	Measured Concen.	Est. Curies
Noble Gases	07-feb-2000 23:04:32 ✓	3.48E-03 uCi/cc	5.58E-02
Particulates	07-feb-2000 23:08:54 -	0.00E+00 uCi/cc	0.00E+00
Radioiodines	07-feb-2000 23:08:20 -	0.00E+00 uCi/cc	0.00E+00

Performed By: [Signature]

Date
2 / 8 / 00

Approved By: [Signature]

2 / 8 / 00

 Entergy Operations Inc.
 Arkansas Nuclear One Unit 1
 Gaseous Radioactive Waste Release Permit
 Pre-Release Supplementary Data

1GR2000-0019

ISOTOPIC IDENTIFICATION - Unit 1

Isotope	: Pre-Disp. : : Measured : : uCi/cc :	Pre-Disp. : Measured : Conc/MPC :	Pre-Disp. : Measured : Conc/Total :	Conc/Total : by : Type :	Release : Rate : uCi/sec :	Estimated : Curies : Released :
H-3 O:	1.10E-07 ✓	5.51E-01	3.16E-05	1.00E+00	8.18E-06	1.77E-06
KR-85 N:	1.95E-03 ✓	6.50E+03	5.60E-01	5.60E-01	1.45E-01	3.13E-02
XE-131MN:	2.58E-05 ✓	6.46E+01	7.42E-03	7.42E-03	1.92E-03	4.14E-04
XE-133MN:	2.83E-05 ✓	9.44E+01	8.13E-03	8.13E-03	2.10E-03	4.54E-04
XE-133 N:	1.46E-03 ✓	4.88E+03	4.21E-01	4.21E-01	1.09E-01	2.35E-02
XE-135 N:	1.21E-05 ✓	1.21E+02	3.47E-03	3.47E-03	8.95E-04	1.93E-04
G-ALPHA0:	5.02E-15	2.51E-01	1.44E-12	4.56E-08	3.72E-13	8.05E-14
Totals :	3.48E-03	1.17E+04			2.58E-01	5.58E-02

Entergy Operations Inc.
Arkansas Nuclear One
Unit 1
08-feb-2000 14:12:0

1GR2000- 0019

1. The noble gases Total Body dose rate = $7.176e-05$ mRem/yr. It must be ≤ 500 mRem/yr per ODCM L-2.4.1.A.1. If exceeding this limit, without delay restore the release rate to comply with this limit. During periods of containment purging the dose rate may be averaged over a one hour interval.
2. The noble gases Skin dose rate = $5.484e-04$ mRem/yr. It must be ≤ 3000 mRem/yr per ODCM L-2.4.1.A.1. If exceeding this limit, without delay restore the release rate to comply with this limit. During periods of containment purging the dose rate may be averaged over a one hour interval.
3. The ITP critical organ dose rate = $6.933e-08$ mRem/yr. It must be ≤ 1500 mRem/yr per ODCM L-2.4.1.A.2. If exceeding this limit, without delay restore the release rate to comply with this limit. During periods of containment purging the dose rate may be averaged over a one hour interval.
4. The quarterly Gamma Air dose = $1.335e-05$ mRad. If the dose exceeds 5 mRad per ODCM L-2.4.2.A.1 notify the NRC per ODCM L-2.4.2.A ACTION 1. The total dose limit is 10 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
5. The quarterly Beta Air dose = $7.923e-05$ mRad. If the dose exceeds 10 mRad per ODCM L-2.4.2.A.1 notify the NRC per ODCM L-2.4.2.A ACTION 1. The total dose limit is 20 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
6. The quarterly ITP dose = $1.955e-03$ mRem. If the dose exceeds 7.5 mRem per ODCM L-2.4.3.A.1 notify the NRC per ODCM L-2.4.3.A ACTION 1. The total dose limit is 15 mRem per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
7. The yearly Gamma Air dose = $1.335e-05$ mRad. If the dose exceeds 10 mRad per ODCM L-2.4.2.A.2 notify the NRC per ODCM L-2.4.2.A ACTION 1. The total dose limit is 20 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
8. The yearly Beta Air dose = $7.923e-05$ mRad. If the dose exceeds 20 mRad per ODCM L-2.4.2.A.2 notify the NRC per ODCM L-2.4.2.A ACTION 1. The total dose limit is 40 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
9. The yearly ITP dose = $1.955e-03$ mRem. If the dose exceeds 15 mRad per ODCM L-2.4.3.A.2 notify the NRC per ODCM L-2.4.3.A ACTION 1. The total dose limit is 30 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
10. The projected quarterly Gamma Air Dose = $3.204e-05$ mRad. If the dose exceeds 0.625 mRad ODCM L-2.4.4.A and ODCM L-2.4.4.B and releases being discharged without treatment notify the NRC per ODCM L-2.4.4 ACTION 1. Contact Engineering Programs to verify Treatment System Operability if the projected quarterly dose exceeds 0.625 mRad.

Entergy Operations Inc.
Arkansas Nuclear One
Unit 1
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1GR2000- 0019

11. The projected quarterly Beta Air Dose = $1.901e-04$ mRad. If the dose exceeds 1.25 mRad ODCM L-2.4.4.A and ODCM L-2.4.4.B and releases being discharged without treatment notify NRC per ODCM L-2.4.4 ACTIONS 1&2. Contact Engineering Programs to verify Treatment System Operability if the projected quarterly dose exceeds 1.25 mRad.
12. The projected quarterly ITP Dose = $4.693e-03$ mRem. If the dose exceeds 1.0 mRem ODCM L-2.4.4.A and releases are being discharged without treatment notify the NRC per ODCM L-2.4.4 ACTION 1 Contact Engineering Programs to verify Treatment System Operability if the projected quarterly dose exceeds 1.0 mRem.
13. Additional comments:

Gamma Air Dose for release = $8.352e-07$ mRad
Beta Air Dose for release = $7.742e-06$ mRad
ITP Dose for the release = $1.087e-09$ mRem ✓

ITP = I-131, H-3, and particulates with halflives > 8 days

Permit 1GR2000-0019

1.0 Sample ID T-18C (Waste Decay Tank) Planned Unplanned

2.0 RELEASE TIMES

2.1 Release Start Date 2-5-00 Time 2000

2.2 Corrected Release Start Date 2-5-00 Time 2000
~~2-8-00~~ ~~0800~~ 2-8-00
[Add time (Pathway) was secure to Release Start]

2.3 Release Stop Date 2-8-00 Time 0800

3.0 VOLUME

3.1 Total Volume for Release 5.6599E2 CF

3.2 Remarks (Enter brief description on how volume was derived.)

From VAX release program. Based on a loss of T-18C
pressure from 75-48 psig

4.0 SAMPLE INFORMATION M&TE LRD-017 Cal. Date 6-16-00

4.1 Gas Gamma Spec # 00-01470 Sample Date 2-7-00 Time 2231

4.2 Part Gamma Spec # 00-01472 Sample Date 2-7-00 Time 2229

4.3 Char Gamma Spec # 00-01471 Sample Date 2-7-00 Time 2229

4.4 H-3 File # 00-01473 Sample Date 2-7-00 Time 2222

5.0 Xe-133 Eq. Gas Activity 7.871E-2 uCi/cc

6.0 SCALING FACTORS

NOTE

If scaling factors are not applicable (e.g., MUT/VCT release sampled prior to release), enter 1 for all Section 6.0 values.

6.1 (Am) Current Activity 1.000 uCi/cc

6.2 Worst Hour Activity 1.000 uCi/cc

6.3 (Aa) Average Activity 1.000 uCi/cc

FORM TITLE:

MISCELLANEOUS NON-ROUTINE GASEOUS RELEASE SAMPLE REPORT

FORM NO.

1604.015D

CHANGE

013-03-0

7.0 H-3/GAS ANALYSIS

<u>Isotope</u>	<u>uCi/cc</u>	<u>Aa/Am</u>	<u>Total Curies</u>
H-3	1.10 E-7	1	1.77 E-6
KR-85	1.95 E-3	1	3.13 E-2
Xe-131M	2.58 E-5	1	4.14 E-4
Xe-133M	2.83 E-5	1	4.54 E-4
Xe-133	1.46 E-3	1	2.35 E-2
Xe-135	1.21 E-5	1	1.93 E-4

8.0 CHARCOAL (IODINE) ANALYSIS

<u>Isotope</u>	<u>uCi/cc</u>	<u>Total Curies</u>
N/A	N/A	N/A

9.0 PARTICULATE ANALYSIS

<u>Isotope</u>	<u>uCi/cc</u>	<u>Total Curies</u>
N/A	N/A	N/A

10.0 SUMMARY

(This data to be entered in the release permit.)

10.1 Sample ID T-18C Planned Unplanned
 Current Sample: Date 2-5-00 Time 2000
 Corrected Sample: Date 2-8-00 Time 0800
 Average Duct Flow Rate 1.5722 E-1 CFM
 (Am) Current Activity 7.871 E-2 uCi/cc
 Worst Hour Activity 7.871 E-2 uCi/cc
 (Aa) Average Activity 7.871 E-2 uCi/cc
 Xe-133 Eq. Gas Activity 7.871 E-2 uCi/cc

10.2 Isotope	uCi/cc
<u>H-3</u>	<u>1.10 E-7</u>
<u>Kr-85</u>	<u>1.25 E-3</u>
<u>Xe-131M</u>	<u>2.58 E-5</u>
<u>Xe-133M</u>	<u>2.83 E-5</u>
<u>Xe-133</u>	<u>1.46 E-3</u>
<u>Xe-135</u>	<u>1.21 E-5</u>
<u>N/A</u>	<u>N/A</u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>

Performed By: *Dudley*
 Supervisor: *M. J. [Signature]*

FORM TITLE: MISCELLANEOUS NON-ROUTINE GASEOUS RELEASE SAMPLE REPORT	FORM NO. 1604.015D	CHANGE 013-03-0
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Energy Operations : ANO - Nuclear Chemistry Department - 7-FEB-2000 23:20

Main Spectra: 00-01470 Bkg Spectra : 00-01457

Sample date : 7-FEB-2000 22:31:00 Isolation date : 7-FEB-2000 22:31:00
 Sample ID : T18C Gas 1GR- Sample Quantity : 1.65000E+03 ml
 Comments :
 Geometry : TABLE 222 1L GAS MARINELLI CAVE 2 SHELF 1

Calib date : 7-FEB-2000 19:28:47 Acquisition date : 7-FEB-2000 23:04:32
 keV/channel : 4.99854E-01 Elapsed live time : 0 00:15:00.00
 offset : 2.14795E-01 Percent deadtime : 0.2%

Decay limit : 8.00000 Peak Sensitivity : 4.66000
 Abundance : 30.00000 Energy tolerance : 1.50000
 Library : Libark Nuclear Chemist : AMOATS

Peak Search performed from channel : 100 to 4050

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
1	81.19	98168	8416	0.95	162.00	156	12	0.4	3.55E+01	XE-133
3	160.85	216	172	1.25	321.37	315	19	12.7	2.15E+00	XE-133
3	164.22	165	131	1.29	328.11	315	19	15.9		XE-131M
1	233.29	728	210	1.16	466.29	459	14	5.8	1.85E+00	XE-133M
1	249.83	2474	141	1.09	499.37	492	13	2.3	1.14E+00	XE-135
1	513.93	1061	15	1.29	1027.73	1023	11	3.2	1.07E+00	KR-85 SR-85
1	608.19*	31	5	1.85	1216.31	1210	13	23.7	3.14E-01	XE-135 RA-226 BI-214

Nuclide Line Activity Report

Sample ID : T18C Gas 1GR-

Acquisition date : 7-FEB-2000 23:04:32

Nuclide	Sbhr	Energy	Area	%Abn	Eff	uCi/unit	1 Sig Err
KR-85	FG	513.98	1061.	0.43*	2.301E-03	1.951E-03	6.220E-05
SR-85	FP	513.99	1061.	99.28*	2.301E-03	8.451E-06	2.695E-07
XE-131M	FG	163.93	165.	1.96*	5.926E-03	2.584E-05	4.105E-06
XE-133	FG	81.00	98168.	37.10*	3.300E-03	1.465E-03	5.446E-06
		160.60	216.	0.06	5.966E-03	1.019E-03	1.300E-04
XE-133M	FG	233.20	728.	10.30*	4.583E-03	2.832E-05	1.639E-06
XE-135	FG	249.79	2474.	90.30*	4.355E-03	1.207E-05	2.730E-07
		608.18	31.	2.91	2.063E-03	1.004E-05	2.375E-06
BI-214	NP	609.32	31.	46.09*	2.063E-03	1.727E-06	4.088E-07
RA-226	NP	351.99	0.	37.10*	2.063E-03	0.000E+00	0.000E+00
		609.32	31.	46.09	2.063E-03	6.010E-07	1.423E-07

Unidentified Energy Lines

None

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Page : 2

Sample ID : T18C Gas 1GR-

Acquisition date : 7-FEB-2000 23:04:32

Total number of peaks in spectrum 7
 Number of peaks identified by NID 7 100.00%

Nuclide	Sbhr	Halflife	Decay	uCi/unit	1 Sig Err
KR-85	FG	10.73Y	1.000	1.951E-03	6.220E-05

XE-131M	FG	11.80D	1.002	2.584E-05	4.105E-06
XE-133	FG	5.29D	1.004	1.465E-03	5.446E-06
XE-133M	FG	2.26D	1.009	2.832E-05	1.639E-06
XE-135	FG	9.08H	1.054	1.207E-05	2.730E-07
SR-85	FP	64.73D	1.000	8.451E-06	2.695E-07
BI-214	NP	26.80M	2.874	1.727E-06	4.088E-07
RA-226	NP	1600.00Y	1.000	0.000E+00	0.000E+00

Interference correction summary

Isotope uCi/cc Corrections applied BPS : below peak sensitivity

KR-85 = 1.951E-03

SR-85 = 0.000E+00 bps: KR-85

XE-131M = 2.584E-05

XE-133 = 1.465E-03

XE-133M = 2.832E-05

XE-135 = 1.207E-05

BI-214 = 0.000E+00 bps: XE-135

Xe-133eq= 7.871E-02

Interference report Completed

WGDT Projected Max Curie Report

Sample ID : T18C GAS 1GR-

Sampled : 7-FEB-2000 22:31:00

Acquired: 7-FEB-2000 23:04:32

Nuclide	Xe-133DE Ci
KR-85	9.06694E-03
XE-131M	6.82624E-04
XE-133	1.24348E-01
XE-133M	2.05256E-03
XE-135	6.30543E-03
Total Xe-133de	1.42456E-01

Percent of 72782. Ci limit = 1.95729E-04

Entergy Operations : ANO - Nuclear Chemistry Department - 7-FEB-2000 23:24

Main Spectra: 00-01471 Bkg Spectra : 00-01461
 Sample date : 7-FEB-2000 22:29:00 Isolation date : 7-FEB-2000 22:29:00
 Sample ID : T18C Char 1GR- Sample Quantity : 5.00000E+04 cc
 Comments :
 Geometry : TABLE 332 F&J Char Cart CAVE 3 SHELF 3

 Calib date : 7-FEB-2000 20:27:10 Acquisition date : 7-FEB-2000 23:08:20
 keV/channel : 4.99801E-01 Elapsed live time: 0 00:15:00.00
 offset : 4.08447E-02 Percent deadtime : 2.9%

 Decay limit : 8.00000 Peak Sensitivity : 4.66000
 Abundance : 30.00000 Energy tolerance : 1.50000
 Library : libark Nuclear Chemist : AMOATS

Peak Search performed from channel : 100 to 4050

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
5	63.00	5192	38206	1.70	125.97	124	13	5.6	5.95E+00	
5	64.75	11930	103503	2.42	129.46	124	13	5.1		
1	81.10	1303278	119929	0.91	162.18	156	12	0.1	4.93E+02	XE-133 XE-133 BA-133
1	160.84	3334	4348	1.62	321.73	316	11	4.6	2.48E+01	XE-133
1	163.95	1013	844	0.96	327.95	326	6	6.6	1.42E+01	XE-131M
1	233.13	6341	646	1.07	466.37	461	11	1.5	1.49E+00	XE-133M
1	249.62	21402	579	1.07	499.35	494	12	0.7	3.16E+00	XE-135
1	302.71	226	65	1.16	605.58	602	9	10.3	6.85E+00	BA-133 XE-133
1	358.06	41	29	1.37	716.32	714	10	29.8	2.16E+00	XE-135
1	383.69	94	47	1.70	767.60	762	15	20.6	1.97E+00	BA-133 XE-133
1	407.79	51	33	1.06	815.83	813	10	24.1	9.46E-01	XE-135
1	513.71	70	11	1.64	1027.75	1024	8	16.2	1.79E+00	KR-85 SR-85
1	607.88*	335	4	1.51	1216.17	1210	15	5.9	8.21E-01	XE-135 RA-226 BI-214

Nuclide Line Activity Report

Sample ID : T18C Char 1GR- Acquisition date : 7-FEB-2000 23:08:20

Nuclide	Sbhr	Energy	Area	%Abn	Eff	uCi/unit	1 Sig Err
KR-85	FG	513.98	70.	0.43*	1.043E-02	9.323E-07	1.509E-07
SR-85	FP	513.99	70.	99.28*	1.043E-02	4.039E-09	6.539E-10
XE-131M	FG	163.93	1013.	1.96*	2.700E-02	1.152E-06	7.566E-08
BA-133	FP	81.01	1303278.	32.75	1.631E-02	1.465E-04	1.508E-07
		302.71	226.	18.62	1.657E-02	4.394E-08	4.513E-09
		355.86	0.	62.27*	1.657E-02	0.000E+00	0.000E+00
		383.70	94.	8.84	1.367E-02	4.666E-08	9.628E-09
XE-133	FG	79.62	1303278.	0.22	1.631E-02	2.191E-02	2.255E-05
		81.00	1303278.	37.10*	1.631E-02	1.299E-04	1.337E-07
		160.60	3334.	0.06	2.719E-02	1.138E-04	5.195E-06
		302.85	226.	0.00	1.657E-02	1.643E-04	1.688E-05

Nuclide Line Activity Report

Sample ID : T18C Char 1GR- Acquisition date : 7-FEB-2000 23:08:20

Nuclide	Sbhr	Energy	Area	%Abn	Eff	uCi/unit	1 Sig Err
XE-133	FG	383.85	94.	0.00	1.367E-02	1.801E-04	3.717E-05

Page : 2

XE-133M	FG	233.20	6341.	10.30*	2.030E-02	1.840E-06	2.750E-08
XE-135	FG	249.79	21402.	90.30*	1.918E-02	7.881E-07	5.706E-09
		358.39	41.	0.22	1.444E-02	8.261E-07	2.461E-07
		407.99	51.	0.36	1.297E-02	6.978E-07	1.684E-07
		608.18	335.	2.91	8.921E-03	8.227E-07	4.823E-08
BI-214	NP	609.32	335.	46.09*	8.921E-03	1.641E-07	9.619E-09
RA-226	NP	351.99	0.	37.10*	8.921E-03	0.000E+00	0.000E+00
		609.32	335.	46.09	8.921E-03	4.889E-08	2.866E-09

Unidentified Energy Lines

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
5	63.00	5192	38206	1.70	125.97	124	13	5.77E+00	5.6	6.61E-01	
5	64.75	11930	103503	2.42	129.46	124	13	1.33E+01	5.1	7.66E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of peaks in spectrum	13
Number of peaks identified by NID	11 84.62%

Nuclide	Sbhr	Half-life	Decay	uCi/unit	1 Sig	Err
KR-85	FG	10.73Y	1.000	9.323E-07	1.509E-07	
XE-131M	FG	11.80D	1.002	1.152E-06	7.566E-08	
XE-133	FG	5.29D	1.004	1.299E-04	1.337E-07	
XE-133M	FG	2.26D	1.010	1.840E-06	2.750E-08	
XE-135	FG	9.08H	1.062	7.881E-07	5.706E-09	
SR-85	FP	64.73D	1.000	4.039E-09	6.539E-10	
BA-133	FP	10.70Y	1.000	0.000E+00	0.000E+00	
BI-214	NP	26.80M	3.356	1.641E-07	9.619E-09	
RA-226	NP	1600.00Y	1.000	0.000E+00	0.000E+00	

Interference correction summary

Isotope	uCi/cc	Corrections applied BPS : below peak sensitivity
KR-85	= 9.323E-07	
SR-85	= 0.000E+00	bps: KR-85
XE-131M	= 1.152E-06	
XE-133	= 1.299E-04	
XE-133M	= 1.840E-06	

Isotope	uCi/cc	Corrections applied BPS : below peak sensitivity
XE-135	= 7.881E-07	
BI-214	= 0.000E+00	bps: XE-135
Cs-137eq	= 1.229E-04	
Xe-133eq	= 1.510E-04	

Interference correction summary	Page : 3
Sample ID : T18C Char 1GR-	Acquisition date : 7-FEB-2000 23:08:20

Isotope	uCi/cc	Corrections applied BPS : below peak sensitivity
XE-135	= 7.881E-07	
BI-214	= 0.000E+00	bps: XE-135
Cs-137eq	= 1.229E-04	
Xe-133eq	= 1.510E-04	

Interference report Completed

Entergy Operations : ANO - Nuclear Chemistry Department - 7-FEB-2000 23:24

Main Spectra: 00-01472 Bkg Spectra : 00-01469

Sample date : 7-FEB-2000 22:29:00 Isolation date : 7-FEB-2000 22:29:00
 Sample ID : T18C Part 1GR- Sample Quantity : 5.000000E+04 ml
 Comments :
 Geometry : Table 417 2 IN PART FLTR CAVE 4 SHELF 1

Calib date : 7-FEB-2000 21:52:28 Acquisition date : 7-FEB-2000 23:08:54
 keV/channel : 4.99051E-01 Elapsed live time : 0 00:15:00.00
 offset : 2.19775E-01 Percent deadtime : 0.0%

Decay limit : 8.00000 Peak Sensitivity : 4.66000
 Abundance : 30.00000 Energy tolerance : 1.50000
 Library : Libark Nuclear Chemist : AMOATS

Peak Search performed from channel : 100 to 4050

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
1	81.27	42	18	1.73	162.41	159	8	25.4	8.06E-01	XE-133
1	351.91*	28	2	1.97	704.72	700	9	38.7	2.44E-01	PB-214

Nuclide Line Activity Report

Sample ID : T18C Part 1GR- Acquisition date : 7-FEB-2000 23:08:54

Nuclide	Sbhr	Energy	Area	%Abn	Eff	uCi/unit	1 Sig	Err
XE-133	FG	81.00	42.	37.10*	4.460E-02	1.524E-09	3.875E-10	
PB-214	NP	295.22	0.	19.20*	4.460E-02	0.000E+00	0.000E+00	
		351.99	28.	37.10	2.945E-02	5.255E-09	2.033E-09	

Unidentified Energy Lines

None

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of peaks in spectrum 2
 Number of peaks identified by NID 2 100.00%

Nuclide	Sbhr	Halflife	Decay	uCi/unit	1 Sig	Err
XE-133	FG	5.29D	1.004	1.524E-09	3.875E-10	
PB-214	NP	26.80M	3.387	0.000E+00	0.000E+00	

Interference correction summary

Isotope uCi/cc Corrections applied BPS : below peak sensitivity

XE-133 = 1.524E-09

Cs-137eq= 2.856E-09

Xe-133eq= 2.546E-09

Interference report Completed

ANO - Nuclear Chemistry : Gross Beta & Tritium Report : 8-FEB-2000 00:12

Analysis Num: 00-01473

Sample date : 7-FEB-2000 22:22:00
 Sample ID : T-18C H3
 Instrument : Packard 2300TR

Background Data

H-3 [cpm] : 16.61
 Beta [cpm] : 23.22
 Count time [min] : 10.00
 QIP [glass bkg] : 377.00
 H-3 MDA [uCi/ml] : 3.637E-09
 Beta MDA [uCi/ml] : 4.913E-09

Sample Data

H-3 [cpm] : 240.76
 H-3 [dpm] : 611.45
 Count time [min] : 10.00
 Beta [cpm] : 0.00
 Beta [dpm] : 0.00
 Volume [ml] : 2500.00

	<u>Activity</u>	<u>Error</u>	
Beta <	4.913E-09	N/A	uCi/ml
H-3 =	1.102E-07	+/- 1.768E-09	uCi/ml

Calculated by : AMOATS

Arkansas Nuclear One
Unit 1 and Unit 2
Annual Radioactive Effluent Release Report
January 1 through December 31, 2000

Attachment 2

Gaseous Waste Release Permit
1GR2000-0023

Entergy Operations Inc.
Arkansas Nuclear One Unit 1
Gaseous Radioactive Waste Release Permit
Post-Release Permit Update

1GR2000-0023

PART III: ACTUAL RELEASE DATA

Release Point (34): T18D WASTE GAS DECAY TANK
Discharge Point (10): DISC. PT. 10 - 1 RAD WASTE AREA

Permit Issued: 12-feb-2000 20:35:15 Release Type: Batch

Sample entry number: 23

Average Waste Flow: 7.9819E-01 CFM
Total Waste Volume: 2.3946E+02 CF
Actual Release Start: 10-feb-2000 13:53:00 Initial Pressure : 21.00
Actual Release End: 10-feb-2000 18:53:00 Final Pressure : 10.00
Release Duration: 300.0000 MIN

Performed By: 

Date
2 / 12 / 00

Approved By: 

2 / 13 / 00

 Entergy Operations Inc.
 Arkansas Nuclear One Unit 1
 Gaseous Radioactive Waste Release Permit
 Post-Release Permit Update

1GR2000-0023

RELEASE ACTIVITY - Unit 1

Isotope	Pre-Disp. : Measured : uCi/cc	Pre-Disp. : Measured : Conc/MPC	Pre-Disp. : Measured : Conc/Total:	Conc/Total : by : Type	Release : Rate : uCi/sec	Curies : Released
H-3 O:	2.40E-07	1.20E+00	6.75E-05	1.00E+00	9.06E-05	1.63E-06
KR-85 N:	2.47E-03	8.24E+03	6.94E-01	6.94E-01	9.31E-01	1.68E-02
XE-131MN:	2.06E-05	5.14E+01	5.77E-03	5.77E-03	7.74E-03	1.39E-04
XE-133MN:	1.17E-05	3.90E+01	3.28E-03	3.28E-03	4.40E-03	7.93E-05
XE-133 N:	1.06E-03	3.53E+03	2.97E-01	2.97E-01	3.99E-01	7.17E-03
G-ALPHAO:	5.02E-15	2.51E-01	1.41E-12	2.09E-08	1.89E-12	3.40E-14
Totals :	3.56E-03	1.19E+04	:	:	1.34E+00	2.41E-02

Entergy Operations Inc.
Arkansas Nuclear One Unit 1
Gaseous Radioactive Waste Release Permit 1GR2000-0023
Pre-Release Supplementary Data

PART I: PRE-RELEASE DATA

Release Point (34): T18D WASTE GAS DECAY TANK
Discharge Point (10): DISC. PT. 10 - 1 RAD WASTE AREA

Permit Issued: 12-feb-2000 20:35:15 Release Type: Batch

Rad Monitor: (4830) RE-4830
Rad Monitor Bckgrnd: 1.8000E+03 CPM

Estim. Waste Flow: 7.9819E-01 CFM
Estim. Waste Volume: 2.3946E+02 CF
Estim. Release Start: 10-feb-2000 13:53:00 Initial Pressure : 21.00
Estim. Release End: 10-feb-2000 18:53:00 Final Pressure : 10.00
Estim. Duration: 300.0000 MIN

PART II: PRE-RELEASE CALCULATIONS

Sample Entry # : 23
Gas sample time: Sampled by:

Gas Monitor Response: 2.31E+05 CPM
Total Body Dose Rate: 2.63E-04 mrem/yr % Limit = 0.0%
Skin Dose Rate: 3.04E-03 mrem/yr % Limit = 0.0%
Max Organ Dose Rate: 7.68E-07 mrem/yr % Limit = 0.0%

Max Monitor Setpoints: RE-4830 RX-9825
CPM uCi/cc

Noble Gas : 2.8E+05 4.3E-03

Flag:
Flags: A-Release Curies > Local Limit N-Noble Gas Dose Rate > Limit
S-Release Curies > Site Limit O-Organ Dose Rate > Limit

Analysis Date	Measured Concen.	Est. Curies
Noble Gases	3.56E-03 uCi/cc	2.41E-02
Particulates	0.00E+00 uCi/cc	0.00E+00
Radioiodines	0.00E+00 uCi/cc	0.00E+00

Performed By: *D. McE...*
Approved By: *[Signature]*

Date
2 / 12 / 00
2 / 13 / 00

 Entergy Operations Inc.
 Arkansas Nuclear One Unit 1
 Gaseous Radioactive Waste Release Permit
 Pre-Release Supplementary Data

1GR2000-0023

ISOTOPIC IDENTIFICATION - Unit 1

Isotope	Pre-Disp. : Measured : uCi/cc	Pre-Disp. : Measured : Conc/MPC	Pre-Disp. : Measured : Conc/Total	Conc/Total : by Type	Release : Rate : uCi/sec	Estimated : Curies : Released
H-3 O:	2.40E-07	1.20E+00	6.75E-05	1.00E+00	9.06E-05	1.63E-06
KR-85 N:	2.47E-03	8.24E+03	6.94E-01	6.94E-01	9.31E-01	1.68E-02
XE-131MN:	2.06E-05	5.14E+01	5.77E-03	5.77E-03	7.74E-03	1.39E-04
XE-133MN:	1.17E-05	3.90E+01	3.28E-03	3.28E-03	4.40E-03	7.93E-05
XE-133 N:	1.06E-03	3.53E+03	2.97E-01	2.97E-01	3.99E-01	7.17E-03
G-ALPHAO:	5.02E-15	2.51E-01	1.41E-12	2.09E-08	1.89E-12	3.40E-14
Totals :	3.56E-03	1.19E+04			1.34E+00	2.41E-02

Entergy Operations Inc.
Arkansas Nuclear One
Unit 1
12-feb-2000 20:40:0

1GR2000- 0023

1. The noble gases Total Body dose rate = $2.626e-04$ mRem/yr. It must be ≤ 500 mRem/yr per ODCM L-2.4.1.A.1. If exceeding this limit, without delay restore the release rate to comply with this limit. During periods of containment purging the dose rate may be averaged over a one hour interval.
2. The noble gases Skin dose rate = $3.043e-03$ mRem/yr. It must be ≤ 3000 mRem/yr per ODCM L-2.4.1.A.1. If exceeding this limit, without delay restore the release rate to comply with this limit. During periods of containment purging the dose rate may be averaged over a one hour interval.
3. The ITP critical organ dose rate = $7.679e-07$ mRem/yr. It must be ≤ 1500 mRem/yr per ODCM L-2.4.1.A.2. If exceeding this limit, without delay restore the release rate to comply with this limit. During periods of containment purging the dose rate may be averaged over a one hour interval.
4. The quarterly Gamma Air dose = $1.629e-05$ mRad. If the dose exceeds 5 mRad per ODCM L-2.4.2.A.1 notify the NRC per ODCM L-2.4.2.A ACTION 1. The total dose limit is 10 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
5. The quarterly Beta Air dose = $1.211e-04$ mRad. If the dose exceeds 10 mRad per ODCM L-2.4.2.A.1 notify the NRC per ODCM L-2.4.2.A ACTION 1. The total dose limit is 20 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
6. The quarterly ITP dose = $2.109e-03$ mRem. If the dose exceeds 7.5 mRem per ODCM L-2.4.3.A.1 notify the NRC per ODCM L-2.4.3.A ACTION 1. The total dose limit is 15 mRem per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
7. The yearly Gamma Air dose = $1.629e-05$ mRad. If the dose exceeds 10 mRad per ODCM L-2.4.2.A.2 notify the NRC per ODCM L-2.4.2.A ACTION 1. The total dose limit is 20 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
8. The yearly Beta Air dose = $1.211e-04$ mRad. If the dose exceeds 20 mRad per ODCM L-2.4.2.A.2 notify the NRC per ODCM L-2.4.2.A ACTION 1. The total dose limit is 40 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
9. The yearly ITP dose = $2.109e-03$ mRem. If the dose exceeds 15 mRad per ODCM L-2.4.3.A.2 notify the NRC per ODCM L-2.4.3.A ACTION 1. The total dose limit is 30 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
10. The projected quarterly Gamma Air Dose = $3.675e-05$ mRad. If the dose exceeds 0.625 mRad ODCM L-2.4.4.A and ODCM L-2.4.4.B and releases being discharged without treatment notify the NRC per ODCM L-2.4.4 ACTION 1. Contact Engineering Programs to verify Treatment System Operability if the projected quarterly dose exceeds 0.625 mRad.

Entergy Operations Inc.
Arkansas Nuclear One
Unit 1
12-feb-2000 20:40:0

1GR2000- 0023

11. The projected quarterly Beta Air Dose = $2.731e-04$ mRad. If the dose exceeds 1.25 mRad ODCM L-2.4.4.A and ODCM L-2.4.4.B and releases being discharged without treatment notify NRC per ODCM L-2.4.4 ACTIONS 1&2. Contact Engineering Programs to verify Treatment System Operability if the projected quarterly dose exceeds 1.25 mRad.
12. The projected quarterly ITP Dose = $4.756e-03$ mRem. If the dose exceeds 1.0 mRem ODCM L-2.4.4.A and releases are being discharged without treatment notify the NRC per ODCM L-2.4.4 ACTION 1 Contact Engineering Programs to verify Treatment System Operability if the projected quarterly dose exceeds 1.0 mRem.
13. Additional comments:

Gamma Air Dose for release = $2.546e-07$ mRad
Beta Air Dose for release = $3.593e-06$ mRad
ITP Dose for the release = $1.003e-09$ mRem

ITP = I-131, H-3, and particulates with halflives > 8 days

Permit IGR 2000-0023

1.0 Sample ID 718D Planned Unplanned

2.0 RELEASE TIMES

2.1 Release Start Date 2/10/00 Time 1353

2.2 Corrected Release Start Date 2/10/00 Time 1353
[Add time (Pathway) was secure to Release Start]

2.3 Release Stop Date 2/10/00 Time 1853

3.0 VOLUME

3.1 Total Volume for Release 239.46 CF

3.2 Remarks (Enter brief description on how volume was derived.)

4.0 SAMPLE INFORMATION M&TE CR0-017 Cal. Date 6-16-00

4.1 Gas Gamma Spec # 00-01587 Sample Date 2/10/00 Time 1613

4.2 Part Gamma Spec # 00-01589 Sample Date 2/10/00 Time 1635

4.3 Char Gamma Spec # 00-01588 Sample Date 2/10/00 Time 1635

4.4 H-3 File # 00-01590 Sample Date 2/10/00 Time 1623

5.0 Xe-133 Eq. Gas Activity 9.881 E-2 uCi/cc

6.0 SCALING FACTORS

NOTE
If scaling factors are not applicable (e.g., MUT/VCT release sampled prior to release), enter 1 for all Section 6.0 values.

6.1 (Am) Current Activity 1 uCi/cc

6.2 Worst Hour Activity 1 uCi/cc

6.3 (Aa) Average Activity 1 uCi/cc

FORM TITLE: MISCELLANEOUS NON-ROUTINE GASEOUS RELEASE SAMPLE REPORT	FORM NO. 1604.015D	CHANGE 013-06-0
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7.0 H-3/GAS ANALYSIS

<u>Isotope</u>	<u>uCi/cc</u>	<u>Aa/Am</u>	<u>Total Curies</u>
H-3	2.404 E-7	1	1.63E-6
KR-85	2.41 E-3	1	1.68E-2
Xe-131m	2.06E-5	1	1.39E-4
Xe-133m	1.17E-5	1	1.93E-5
Xe-133	1.06E-3	1	7.17E-3

8.0 CHARCOAL (IODINE) ANALYSIS

<u>Isotope</u>	<u>uCi/cc</u>	<u>Total Curies</u>
NA	NA	NA
↓	↓	↓
↓	↓	↓
↓	↓	↓
↓	↓	↓

9.0 PARTICULATE ANALYSIS

<u>Isotope</u>	<u>uCi/cc</u>	<u>Total Curies</u>
NA	NA	NA
↓	↓	↓
↓	↓	↓
↓	↓	↓
↓	↓	↓

10.0 SUMMARY

(This data to be entered in the release permit.)

10.1 Sample ID T180 Planned Unplanned
 Current Sample: Date 2/10/00 Time 1253
 Corrected Sample: Date 2/10/00 Time 1253
 Average Duct Flow Rate 7.94E-1 CFM
 (Am) Current Activity 1 uCi/cc
 Worst Hour Activity 1 uCi/cc
 (Aa) Average Activity 1 uCi/cc
 Xe-133 Eq. Gas Activity 9.981E-2 uCi/cc

10.2 Isotope mg 2/10/00 uCi/cc
~~H-3~~ 2.471E-3 2.404E-7
~~KR85~~ 2.471E-3
~~Xe 131m~~ 2.056E-3
~~Xe 133m~~ 1.058E-3
~~Xe 133~~ 1.169E-5
~~NA~~ NA

Performed By: MJ Nola
 Supervisor: MJ Nola

FORM TITLE: MISCELLANEOUS NON-ROUTINE GASEOUS RELEASE SAMPLE REPORT	FORM NO. 1604.015D	CHANGE 013-06-0
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Entergy Operations : ANO - Nuclear Chemistry Department - 10-FEB-2000 17:53

Main Spectra: 00-01589

Bkg Spectra : 00-01562

Sample date : 10-FEB-2000 16:35:0

Isolation date : 10-FEB-2000 16:35:0

Sample ID : T18D Part 1GR-

Sample Quantity : 6.00000E+04 ml

Comments :

Geometry : TABLE 317 2 IN PART FLTR CAVE 3 SHELF 1

Calib date : 9-FEB-2000 19:56:34

Acquisition date : 10-FEB-2000 17:37:3

keV/channel : 4.99840E-01

Elapsed live time: 0 00:15:00.00

offset : 2.44873E-02

Percent deadtime : 0.0%

Decay limit : 8.00000

Peak Sensitivity : 4.66000

Abundance : 30.00000

Energy tolerance : 1.50000

Library : Libark

Nuclear Chemist : AMOLINA

Peak Search performed from channel : 100 to 4050

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
1	81.10*	907	88	0.92	162.20	157	11	4.1	2.06E+00	XE-133
										XE-133
1	609.16*	26	2	1.81	1218.66	1214	11	30.1	8.83E-01	RA-226
										BI-214

Nuclide Line Activity Report

Sample ID : T18D Part 1GR-

Acquisition date : 10-FEB-2000 17:37:31

Nuclide	Sbhr	Energy	Area	%Abn	Eff	uCi/unit	1 Sig	Err
XE-133	FG	79.62	907.	0.22	6.666E-02	3.115E-06	1.282E-07	
		81.00	907.	37.10*	6.666E-02	1.847E-08	7.605E-10	
BI-214	NP	609.32	26.	46.09*	2.779E-02	6.143E-09	1.847E-09	
RA-226	NP	351.99	0.	37.10*	2.779E-02	0.000E+00	0.000E+00	
		609.32	26.	46.09	2.779E-02	1.010E-09	3.038E-10	

Unidentified Energy Lines

None

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of peaks in spectrum

2

Number of peaks identified by NID

2 100.00%

Nuclide	Sbhr	Halflife	Decay	uCi/unit	1 Sig	Err
XE-133	FG	5.29D	1.006	1.847E-08	7.605E-10	
BI-214	NP	26.80M	6.080	6.143E-09	1.847E-09	
RA-226	NP	1600.00Y	1.000	0.000E+00	0.000E+00	

Interference correction summary

Sample ID : T18D Part 1GR-

Page : 2
Acquisition date : 10-FEB-2000 17:37:31

Isotope uCi/cc Corrections applied BPS : below peak sensitivity

XE-133 = 1.847E-08

BI-214 = 6.143E-09

Cs-137eq= 2.163E-08

Xe-133eq= 1.881E-08

Interference report Completed

Entergy Operations : ANO - Nuclear Chemistry Department - 10-FEB-2000 17:34

Main Spectra: 00-01588

Bkg Spectra : 00-01562

Sample date : 10-FEB-2000 16:35:0

Isolation date : 10-FEB-2000 16:35:0

Sample ID : T18D Char 1GR-

Sample Quantity : 6.00000E+04 cc

Comments :

Geometry : TABLE 331 F&J Char Cart CAVE 3 SHELF 1

Calib date : 9-FEB-2000 19:56:34

Acquisition date : 10-FEB-2000 17:18:2

keV/channel : 4.99840E-01

Elapsed live time: 0 00:15:00.00

offset : 2.44873E-02

Percent deadtime : 5.9%

Decay limit : 8.00000

Peak Sensitivity : 4.66000

Abundance : 30.00000

Energy tolerance : 1.50000

Library : Libark

Nuclear Chemist : AMOLINA

Peak Search performed from channel : 100 to 4050

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
1	62.75	10557	117785	2.83	125.48	124	6	5.1	1.80E+01	
2	78.60	10737	178336	1.10	157.19	155	14	5.5	2.26E+03	BA-133
2	81.07*	2721614	124956	0.93	162.14	155	14	0.1		XE-133
										XE-133
										BA-133
10	95.00	1640	12719	1.62	190.02	187	10	11.2	2.62E+00	
3	158.38*	944	6228	1.62	316.81	315	12	12.1	2.80E+02	XE-135
										SN-117M
3	161.05	14741	12312	2.22	322.16	315	12	1.8		XE-133
1	163.97	2062	2004	0.87	328.00	326	7	6.2	3.99E+01	XE-131M
1	233.04*	7433	480	1.05	466.18	461	11	1.3	3.33E+00	XE-133M
1	249.51	386	172	1.12	499.13	493	13	8.7	4.09E-01	XE-135
1	302.62	379	127	1.18	605.38	599	13	8.2	5.29E-01	BA-133
										XE-133
1	383.55	180	25	1.25	767.30	762	10	9.2	8.87E-01	BA-133
										XE-133
8	513.60	51	6	1.36	1027.48	1017	19	17.1		KR-85
										SR-85

Nuclide Line Activity Report

Sample ID : T18D Char 1GR-

Acquisition date : 10-FEB-2000 17:18:27

Nuclide	Sbhr	Energy	Area	%Abn	Eff	uCi/unit	1 Sig	Err
KR-85	FG	513.98	51.	0.43*	1.043E-02	5.684E-07	9.728E-08	
SR-85	FP	513.99	51.	99.28*	1.043E-02	2.463E-09	4.215E-10	
SN-117M	AP	158.56	944.	86.30*	2.733E-02	2.006E-08	2.432E-09	
XE-131M	FG	163.93	2062.	1.96*	2.700E-02	1.954E-06	1.203E-07	
BA-133	FP	79.59	10737.	2.43	1.514E-02	1.461E-05	7.979E-07	
		81.01	2721614.	32.75	1.630E-02	2.552E-04	1.645E-07	
		302.71	379.	18.62	1.658E-02	6.152E-08	5.035E-09	
		355.86	0.	62.27*	1.658E-02	0.000E+00	0.000E+00	
		383.70	180.	8.84	1.367E-02	7.454E-08	6.868E-09	
XE-133	FG	79.62	10737.	0.22	1.514E-02	1.621E-04	8.855E-06	
		81.00	2721614.	37.10*	1.630E-02	2.263E-04	1.459E-07	
		160.60	14741.	0.06	2.718E-02	4.195E-04	7.487E-06	
		302.85	379.	0.00	1.658E-02	2.302E-04	1.884E-05	

Nuclide Line Activity Report
 Sample ID : T18D Char 1GR-

Page : 2
 Acquisition date : 10-FEB-2000 17:18:27

Nuclide	Sbhr	Energy	Area	%Abn	Eff	uCi/unit	1 Sig	Err
XE-133	FG	383.85	180.	0.00	1.367E-02	2.878E-04	2.652E-05	
XE-133M	FG	233.20	7433.	10.30*	2.030E-02	1.798E-06	2.352E-08	
XE-135	FG	158.19	944.	0.29	2.733E-02	6.365E-06	7.716E-07	
		249.79	386.	90.30*	1.918E-02	1.189E-08	1.037E-09	

Unidentified Energy Lines

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	62.75	10557	117785	2.83	125.48	124	6	1.17E+01	5.1	6.45E-01	
10	95.00	1640	12719	1.62	190.02	187	10	1.82E+00	11.2	2.16E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of peaks in spectrum 12
 Number of peaks identified by NID 10 83.33%

Nuclide	Sbhr	Halflife	Decay	uCi/unit	1 Sig	Err
KR-85	FG	10.73Y	1.000	5.684E-07	9.728E-08	
XE-131M	FG	11.80D	1.002	1.954E-06	1.203E-07	
XE-133	FG	5.29D	1.005	2.263E-04	1.459E-07	
XE-133M	FG	2.26D	1.011	1.798E-06	2.352E-08	
XE-135	FG	9.08H	1.068	1.189E-08	1.037E-09	
SR-85	FP	64.73D	1.000	2.463E-09	4.215E-10	
BA-133	FP	10.70Y	1.000	0.000E+00	0.000E+00	
SN-117M	AP	14.00D	1.002	2.006E-08	2.432E-09	

Interference correction summary

Isotope uCi/cc Corrections applied BPS : below peak sensitivity

KR-85 = 5.684E-07

SR-85 = 0.000E+00 bps: KR-85

SN-117M = 2.006E-08

XE-131M = 1.954E-06

XE-133 = 2.263E-04

XE-133M = 1.798E-06

XE-135 = 1.189E-08

Cs-137eq= 2.096E-04

Xe-133eq= 2.576E-04

Interference report Completed

Entergy Operations : ANO - Nuclear Chemistry Department - 10-FEB-2000 17:34

Main Spectra: 00-01587 Bkg Spectra : 00-01561

Sample date : 10-FEB-2000 16:13:0 Isolation date : 10-FEB-2000 16:13:0
Sample ID : T18D Gas 1GR- Sample Quantity : 1.65000E+03 ml
Comments :
Geometry : TABLE 422 1L GAS MARINELLI CAVE 4 SHELF 1

Calib date : 9-FEB-2000 20:43:44 Acquisition date : 10-FEB-2000 17:18:3
keV/channel : 4.99286E-01 Elapsed live time: 0 00:15:00.00
offset : 1.99731E-01 Percent deadtime : 0.5%

Decay limit : 8.00000 Peak Sensitivity : 4.66000
Abundance : 30.00000 Energy tolerance : 1.50000
Library : Libark Nuclear Chemist : AMOLINA

Peak Search performed from channel : 100 to 4050

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
1	63.18	1961	14155	2.64	126.14	119	14	13.1	2.35E+00	
1	81.17	166644	16345	1.25	162.17	155	14	0.3	3.88E+01	XE-133
7	160.87	290	236	1.45	321.79	317	17	11.3	1.62E+00	XE-133
7	164.21	220	163	1.33	328.49	317	17	13.3		XE-131M
1	233.31	517	159	1.10	466.89	461	11	6.3	3.52E+00	XE-133M
1	513.84	2721	58	1.48	1028.76	1020	18	2.0	2.51E+00	KR-85 SR-85

Nuclide Line Activity Report

Sample ID : T18D Gas 1GR-

Acquisition date : 10-FEB-2000 17:18:33

Nuclide	Sbhr	Energy	Area	%Abn	Eff	uCi/unit	1 Sig	Err
KR-85	FG	513.98	2721.	0.43*	4.660E-03	2.471E-03	5.003E-05	
SR-85	FP	513.99	2721.	99.28*	4.660E-03	1.071E-05	2.168E-07	
XE-131M	FG	163.93	220.	1.96*	9.960E-03	2.056E-05	2.733E-06	
XE-133	FG	81.00	166644.	37.10*	7.779E-03	1.058E-03	3.113E-06	
		160.60	290.	0.06	1.003E-02	8.143E-04	9.213E-05	
XE-133M	FG	233.20	517.	10.30*	7.932E-03	1.169E-05	7.406E-07	

Unidentified Energy Lines

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	63.18	1961	14155	2.64	126.14	119	14	2.18E+00	13.1	4.62E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of peaks in spectrum : 6
Number of peaks identified by NID : 5 83.33%

Nuclide	Sbhr	Halflife	Decay	uCi/unit	1 Sig	Err
KR-85	FG	10.73Y	1.000	2.471E-03	5.003E-05	
XE-131M	FG	11.80D	1.003	2.056E-05	2.733E-06	
XE-133	FG	5.29D	1.007	1.058E-03	3.113E-06	
XE-133M	FG	2.26D	1.016	1.169E-05	7.406E-07	

Summary of Nuclide Activity
Sample ID : T18D Gas 1GR-

Page : 2
Acquisition date : 10-FEB-2000 17:18:33

Total number of peaks in spectrum	6					
Number of peaks identified by NID	5 83.33%					
Nuclide	Sbhr	Halflife	Decay	uCi/unit	1 Sig	Err
SR-85	FP	64.73D	1.001	1.071E-05	2.168E-07	

Interference correction summary

Isotope uCi/cc Corrections applied BPS : below peak sensitivity

KR-85 = 2.471E-03 ✓

SR-85 = 0.000E+00 bps: KR-85

XE-131M = 2.056E-05 ✓

XE-133 = 1.058E-03 ✓

XE-133M = 1.169E-05 ✓

Xe-133eq= 9.881E-02

Interference report Completed

WGDT Projected Max Curie Report

Sample ID : T18D GAS 1GR-

Sampled : 10-FEB-2000 16:13:00
Acquired: 10-FEB-2000 17:18:33

Nuclide	Xe-133DE Ci
KR-85	1.14879E-02
XE-131M	5.43055E-04
XE-133	8.98019E-02
XE-133M	8.47437E-04
Total Xe-133de	1.02680E-01

Percent of 72782. Ci limit = 1.41079E-04

ANO - Nuclear Chemistry : Gross Beta & Tritium Report : 10-FEB-2000 18:05

Analysis Num: 00-01590

Sample date : 10-FEB-2000 16:23:0
 Sample ID : T-18D H3
 Instrument : Packard 2300TR

Background Data

H-3 [cpm] : 17.68
 Beta [cpm] : 23.45
 Count time [min] : 10.00
 QIP [glass bkg] : 374.00
 H-3 MDA [uCi/ml] : 3.204E-09
 Beta MDA [uCi/ml] : 4.131E-09

Sample Data

H-3 [cpm] : 605.37
 H-3 [dpm] : 1600.89
 Count time [min] : 10.00
 Beta [cpm] : 0.00
 Beta [dpm] : 0.00
 Volume [ml] : 3000.00

X

	<u>Activity</u>	<u>Error</u>	
Beta <	4.131E-09	N/A	uCi/ml
H-3 =	2.404E-07 ✓	+/- 2.337E-09	uCi/ml

Calculated by : AMOLINA

Protocol #: 3 Name: 5 mls. 3 Cnts 10-Feb-2000 17:27
 Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg=17.68 %2 Sigma=0.00
 Region B: LL-UL=18.6-2000 Lcr= 0 Bkg=23.45 %2 Sigma=0.00
 Region C: LL-UL= 0.0- 0.0 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
 Time = 10.00 QIP = tSIE ES Terminator = Count
 Tritium Activities < 1E-5
 Conventional DPM
 Nuclide 1 = 228769 Nuclide 2 = 115250

S#	TIME	CPMA	DPM1	CPMB	DPM2	tSIE	FLAG
1	10.00	598.34	1540.62	1.43	1.31	378.	
1	10.00	608.54	1627.12	2.23	2.16	357.	
1	10.00	609.22	1634.92	2.35	2.29	355.	
	10.00	605.37	1600.89	2.00	1.92	363.	A

T-18D
 v=3000cc

Arkansas Nuclear One
Unit 1 and Unit 2
Annual Radioactive Effluent Release Report
January 1 through December 31, 2000

Attachment 3

Gaseous Waste Release Permit
1GR2000-0038

Entergy Operations Inc.
Arkansas Nuclear One Unit 1
Gaseous Radioactive Waste Release Permit
Post-Release Permit Update

1GR2000-0038 ✓

PART III: ACTUAL RELEASE DATA

Release Point (37): NRG-UNIT ONE TRIP ✓
Discharge Point (11): DISC. PT. 11 - NRG 1 & 2

Permit Issued: 14-mar-2000 06:35:45 Release Type: Batch

Sample entry number: 38

Average Waste Flow: 1.0155E+06 CFM ✓
Total Waste Volume: 5.0776E+06 CF ✓
Actual Release Start: 14-mar-2000 00:07:00 ✓
Actual Release End: 14-mar-2000 00:12:00 ✓
Release Duration: 5.0000 MIN ✓

Performed By: *D. Mc [Signature]*
Approved By: *[Signature]*

Date
3/14/00
3/14/00

 Entergy Operations Inc.
 Arkansas Nuclear One Unit 1
 Gaseous Radioactive Waste Release Permit
 Post-Release Permit Update

1GR2000-0038

RELEASE ACTIVITY - Unit 1

Isotope	Pre-Disp. : Measured : uCi/cc	Pre-Disp. : Measured : Conc/MPC	Pre-Disp. : Measured : Conc/Total:	Conc/Total: by Type	Release : Rate : uCi/sec	Curies : Released
H-3 O:	1.90E-09	9.48E-03	1.00E+00	1.00E+00	9.09E-01	2.73E-04
G-ALPHA0:	3.40E-15	1.70E-01	1.79E-06	1.79E-06	1.63E-06	4.89E-10
Totals :	1.90E-09	1.79E-01	:	:	9.09E-01	2.73E-04

Entergy Operations Inc.
Arkansas Nuclear One Unit 1
Gaseous Radioactive Waste Release Permit
Pre-Release Supplementary Data

1GR2000-0038 ✓

PART I: PRE-RELEASE DATA

Release Point (37): NRG-UNIT ONE TRIP ✓
Discharge Point (11): DISC. PT. 11 - NRG 1 & 2

Permit Issued: 14-mar-2000 06:35:45 Release Type: Batch

Rad Monitor: ()
Rad Monitor Bckgrnd: 0.0000E+00

Estim. Waste Flow: 1.0155E+06 CFM ✓
Estim. Waste Volume: 5.0776E+06 CF ✓
Estim. Release Start: 14-mar-2000 00:07:00 ✓
Estim. Release End: 14-mar-2000 00:12:00 ✓
Estim. Duration: 5.0000 MIN ✓

PART II: PRE-RELEASE CALCULATIONS

Sample Entry # : 38
Gas sample time: Sampled by:

Gas Monitor Response: 0.00E+00
Total Body Dose Rate: 0.00E+00 mrem/yr % Limit = 0.0%
Skin Dose Rate: 0.00E+00 mrem/yr % Limit = 0.0%
Max Organ Dose Rate: 7.71E-03 mrem/yr % Limit = 0.0%

Max Monitor Setpoints:

Noble Gas : 0.0E+00

Flag:
Flags: A-Release Curies > Local Limit N-Noble Gas Dose Rate > Limit
S-Release Curies > Site Limit O-Organ Dose Rate > Limit

Analysis Date	Measured Concen.	Est. Curies
Noble Gases	0.00E+00 uCi/cc	0.00E+00
Particulates	0.00E+00 uCi/cc	0.00E+00
Radioiodines	0.00E+00 uCi/cc	0.00E+00

Performed By: *L.M. [Signature]*
Approved By: *[Signature]*

Date
3/14/00
3/14/00

 Entergy Operations Inc.
 Arkansas Nuclear One Unit 1
 Gaseous Radioactive Waste Release Permit
 Pre-Release Supplementary Data

1GR2000-0038

ISOTOPIC IDENTIFICATION - Unit 1

Isotope	: Pre-Disp. : : Measured : : uCi/cc :	Pre-Disp. : : Measured : : Conc/MPC :	Pre-Disp. : : Measured : : Conc/Total:	Conc/Total: : by : Type :	Release : Rate : uCi/sec :	Estimated : Curies : Released
H-3 O:	1.90E-09 ✓	9.48E-03	1.00E+00	1.00E+00	9.09E-01	2.73E-04
G-ALPHA O:	3.40E-15	1.70E-01	1.79E-06	1.79E-06	1.63E-06	4.89E-10
Totals :	1.90E-09	1.79E-01	:	:	9.09E-01	2.73E-04

Entergy Operations Inc.
Arkansas Nuclear One
Unit 1
14-mar-2000 06:43:0

1GR2000- 0038

1. The noble gases Total Body dose rate = $0.000e+00$ mRem/yr. It must be ≤ 500 mRem/yr per ODCM L-2.4.1.A.1. If exceeding this limit, without delay restore the release rate to comply with this limit. During periods of containment purging the dose rate may be averaged over a one hour interval.
2. The noble gases Skin dose rate = $0.000e+00$ mRem/yr. It must be ≤ 3000 mRem/yr per ODCM L-2.4.1.A.1. If exceeding this limit, without delay restore the release rate to comply with this limit. During periods of containment purging the dose rate may be averaged over a one hour interval.
3. The ITP critical organ dose rate = $7.709e-03$ mRem/yr. It must be ≤ 1500 mRem/yr per ODCM L-2.4.1.A.2. If exceeding this limit, without delay restore the release rate to comply with this limit. During periods of containment purging the dose rate may be averaged over a one hour interval.
4. The quarterly Gamma Air dose = $2.180e-03$ mRad. If the dose exceeds 5 mRad per ODCM L-2.4.2.A.1 notify the NRC per ODCM L-2.4.2.A ACTION 1. The total dose limit is 10 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
5. The quarterly Beta Air dose = $2.029e-02$ mRad. If the dose exceeds 10 mRad per ODCM L-2.4.2.A.1 notify the NRC per ODCM L-2.4.2.A ACTION 1. The total dose limit is 20 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
6. The quarterly ITP dose = $3.182e-03$ mRem. If the dose exceeds 7.5 mRem per ODCM L-2.4.3.A.1 notify the NRC per ODCM L-2.4.3.A ACTION 1. The total dose limit is 15 mRem per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
7. The yearly Gamma Air dose = $2.180e-03$ mRad. If the dose exceeds 10 mRad per ODCM L-2.4.2.A.2 notify the NRC per ODCM L-2.4.2.A ACTION 1. The total dose limit is 20 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
8. The yearly Beta Air dose = $2.029e-02$ mRad. If the dose exceeds 20 mRad per ODCM L-2.4.2.A.2 notify the NRC per ODCM L-2.4.2.A ACTION 1. The total dose limit is 40 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
9. The yearly ITP dose = $3.182e-03$ mRem. If the dose exceeds 15 mRad per ODCM L-2.4.3.A.2 notify the NRC per ODCM L-2.4.3.A ACTION 1. The total dose limit is 30 mRad per ODCM L-2.5.1.A. The NRC must be notified if this value is exceeded per ODCM L-2.5.1.A ACTIONS 1 and 2.
10. The projected quarterly Gamma Air Dose = $2.747e-03$ mRad. If the dose exceeds 0.625 mRad ODCM L-2.4.4.A and ODCM L-2.4.4.B and releases being discharged without treatment notify the NRC per ODCM L-2.4.4 ACTION 1. Contact Engineering Programs to verify Treatment System Operability if the projected quarterly dose exceeds 0.625 mRad.

Entergy Operations Inc.
Arkansas Nuclear One
Unit 1
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11. The projected quarterly Beta Air Dose = $2.556e-02$ mRad. If the dose exceeds 1.25 mRad ODCM L-2.4.4.A and ODCM L-2.4.4.B and releases being discharged without treatment notify NRC per ODCM L-2.4.4 ACTIONS 1&2. Contact Engineering Programs to verify Treatment System Operability if the projected quarterly dose exceeds 1.25 mRad.
12. The projected quarterly ITP Dose = $4.010e-03$ mRem. If the dose exceeds 1.0 mRem ODCM L-2.4.4.A and releases are being discharged without treatment notify the NRC per ODCM L-2.4.4 ACTION 1 Contact Engineering Programs to verify Treatment System Operability if the projected quarterly dose exceeds 1.0 mRem.
13. Additional comments:

Gamma Air Dose for release = $0.000e+00$ mRad
Beta Air Dose for release = $0.000e+00$ mRad
ITP Dose for the release = $1.679e-07$ mRem

ITP = I-131, H-3, and particulates with halflives > 8 days

Permit 16A 2000-00381.0 SAMPLE ID U1 Steam Release Planned Unplanned

2.0 RELEASE TIMES

2.1 Release Start Date 3-14-00 Time 00072.2 Corrected Release Start Date 3-14-00 Time 0007
[Add time (Safety) was secure to Release Start]2.3 Release Stop Date 3-14-00 Time 0012

3.0 VOLUME

3.1 Complete the following table for the appropriate atmospheric dump valves and main steam safety valves:

Valve	No. Min. Open	Capacity (CF/min)	Volume Released
U1 ADV (CV-2618)	0.0	156,228	0
U1 ADV (CV-2668)	0.0	156,228	0
U1 MSSV (PSV-2684)	1.0	377,519	377519
U1 MSSV (PSV-2685)	0.5	377,519	188760
U1 MSSV (PSV-2686)	1.0	377,519	377519
U1 MSSV (PSV-2687)	1.0	377,519	377519
U1 MSSV (PSV-2688)	1.0	377,519	377519
U1 MSSV (PSV-2689)	0.5	377,519	188760
U1 MSSV (PSV-2690)	0.25	377,519	94380
U1 MSSV (PSV-2691)	0.2	377,519	75504
U1 MSSV (PSV-2692)	0.0	377,519	0
U1 MSSV (PSV-2693)	0.0	377,519	0
U1 MSSV (PSV-2694)	0.5	377,519	188760
U1 MSSV (PSV-2695)	0.5	377,519	188760
U1 MSSV (PSV-2696)	0.5	377,519	188760
U1 MSSV (PSV-2697)	1.0	377,519	377519
U1 MSSV (PSV-2698)	0.5	377,519	188760
U1 MSSV (PSV-2699)	5.0	377,519	1887595
			=====
Total Volume Released			5077634

FORM TITLE:

STEAM RELEASE SAMPLE REPORT

FORM NO.

1604.015C

CHANGE

013-03-0

Valve	No. Min. Open	Capacity (CF/min)	Volume Released
U2 ADV (2CV-1001)		651,790	NA
U2 ADV (2CV-1001)		651,790	
U2 MSSV (2PSV-1002)		705,720	
U2 MSSV (2PSV-1003)		723,165	
U2 MSSV (2PSV-1004)		723,165	
U2 MSSV (2PSV-1005)		740,160	
U2 MSSV (2PSV-1006)		740,160	
U2 MSSV (2PSV-1052)		705,720	
U2 MSSV (2PSV-1053)		723,165	
U2 MSSV (2PSV-1054)		723,165	
U2 MSSV (2PSV-1055)		740,160	
U2 MSSV (2PSV-1056)		740,160	
Total Volume Released			***** ↓

4.0 SAMPLE INFORMATION

4.1 Main Steam Gamma Spec # 00-02943 Sample Date 3-14-00 Time 0030

4.2 H-3 File # 00-02944 Sample Date 3-14-00 Time 0030

5.0 MAIN STEAM ANALYSIS

5.1 $uCi/cc(LIQ) * 6.243E-4 = uCi/cc(GAS)$

Isotope	uCi/cc(LIQ)	uCi/cc(GAS)
H-3	3.038 E-6	1.897 E-9
Others	SMDA	NA
↓	↓	↓
↓	↓	↓

Performed By: Doyle Mc Eady
 Supervisor: [Signature]

FORM TITLE: STEAM RELEASE SAMPLE REPORT	FORM NO. 1604.015C	CHANGE 013-03-0
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Entergy Operations : ANO - Nuclear Chemistry Department - 14-MAR-2000 01:43

Main Spectra: 00-02943

Bkg Spectra : 00-02937

Sample date : 14-MAR-2000 00:30:0 Isolation date : 14-MAR-2000 00:30:0
Sample ID : 1 CPD Sample Quantity : 3.91700E+03 ml
Comments :
Geometry : TABLE 307 3.9 L LIQ CAVE 3 SHELF 1

Calib date : 13-MAR-2000 19:11:2 Acquisition date : 14-MAR-2000 01:12:4
keV/channel : 4.99800E-01 Elapsed live time: 0 00:30:00.00
offset : 2.44873E-02 Percent deadtime : 0.0%

Decay limit : 8.00000 Peak Sensitivity : 3.00000
Abundance : 30.00000 Energy tolerance : 1.50000
Library : Libark Nuclear Chemist : AMOATS

Peak Search performed from channel : 100 to 4050

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw %Err	Fit	Nuclides
1	557.16	19	2	1.69	1114.71	1111	8 35.2	7.01E-01	Y-91M

Nuclide Line Activity Report

Sample ID : 1 CPD

Acquisition date : 14-MAR-2000 01:12:44

Nuclide	Sbhr	Energy	Area	%Abn	Eff	uCi/unit	1 Sig	Err
Y-91M	FP	557.57	19.	95.10*	2.129E-03	8.108E-08	2.852E-08	

Unidentified Energy Lines

None

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of peaks in spectrum 1
Number of peaks identified by NID 1 100.00%

Nuclide	Sbhr	Halflife	Decay	uCi/unit	1 Sig	Err
Y-91M	FP	49.71M	2.221	8.108E-08	2.852E-08	

Interference correction summary

Isotope uCi/cc Corrections applied BPS : below peak sensitivity

~~Y-91M = 8.108E-08~~ *pl*

Cs-137eq= 4.617E-08

Xe-133eq= 7.843E-08

Interference report Completed

Analysis Num: 00-02944

Sample date : 14-MAR-2000 00:30:0
 Sample ID : 1CPD B&H3
 Instrument : Packard 2300TR

X

Background Data

Sample Data

H-3 [cpm] : 16.14
 Beta [cpm] : 24.53
 Count time [min] : 10.00
 QIP [glass bkg] : 377.00
 H-3 MDA [uCi/ml] : 1.773E-06
 Beta MDA [uCi/ml] : 2.582E-06

H-3 [cpm] : 13.10
 H-3 [dpm] : 33.72
 Count time [min] : 10.00
 Beta [cpm] : 0.00
 Beta [dpm] : 0.00
 Volume [ml] : 5.00

	Activity	Error	
Beta <	2.582E-06	N/A	uCi/ml
H-3 =	3.038E-06 ✓	+/- 2.062E-07	uCi/ml

Calculated by : AMOATS

Protocol #: 3 Name: 5 mls. 3 Cnts 14-Mar-2000 01:32
 Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg=16.14 %2 Sigma=0.00
 Region B: LL-UL=18.6-2000 Lcr= 0 Bkg=24.53 %2 Sigma=0.00
 Region C: LL-UL= 0.0- 0.0 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
 Time = 10.00 QIP = tSIE ES Terminator = Count
 Tritium Activies < 1E-5
 Conventional DPM
 Nuclide 1 = 228769 Nuclide 2 = 115250

cpd

S#	TIME	CPMA	DPM1	CPMB	DPM2	tSIE FLAG
1	10.00	12.60	32.35	0.00	0.00	379.
1	10.00	12.44	32.06	0.00	0.00	377.
1	10.00	14.26	36.75	0.00	0.00	377.
	10.00	<u>13.10</u>	<u>33.72</u>	0.00	0.00	378. A