Attachment 1

to

0CAN021001

Annual Radioactive Effluent Release Report for 2009

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, 2009

ANO-1 & 2 Annual Radioactive Effluent Release Report for 2009

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ANO-1 & 2 Annual Radioactive Effluent Release Report for 2009

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 5.6.3 and Unit 2 TS 6.6.3. 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 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 (ARERR) per other miscellaneous ODCM requirements.

I. Applicable Radioactive Ground Water Monitoring Program data.

This report covers the period from January 1 through December 31, 2009.

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, actions are taken 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 millirem (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 eight days

Less than or equal to 1500 mrem/yr to any organ

2. Dose - Noble Gases

Quarterly

Less than or equal to 5 millirads (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 10 CFR 20, 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/milliliter (μCi/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 ARERR. This summary covers releases from January 1 through December 31, 2009. The summary of liquid effluents for both Unit 1 and Unit 2 is as follows:

	Unit 1	Unit 2
Number of releases:	113	67
Total time for all releases (minutes):	430520	266636
Maximum time for a release (minutes):	10185	10155
Average time for a release (minutes):	3810	3980
Minimum time for a release (minutes):	64	85

The Unit 1 liquid releases consisted of:

113 Planned Releases

0 Unplanned Releases

The Unit 2 liquid releases consisted of:

67 Planned Releases

0 Unplanned Releases

ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
(ALL LIQUID EFFLUENTS)
January 1 through June 30, 2009

Unit 1

Type of Effluent	Units	Quarter 1	Quarter 2	Est. Total Error %
A. Fission and Activation Products				
1. Total Release (Not Including Tritium, Gases, Alpha)	Curies	5.699E-03	5.099E-03	25
2. Average Diluted Concentration During Period	µCi/ml	1.938E-11	1.480E-11	
3. Percent of Applicable Limit	%	6.460E-03	4.934E-03	
B. Tritium				
1. Total Release	Curies	4.096E+01	5.507E+01	25
2. Average Diluted Concentration During Period	µCi/ml	1.393E-07	1.599E-07	
3. Percent of Applicable Limit	%	4.643E-03	5.329E-03	
C. Dissolved and Entrained Gases				
1. Total Release	Curies	0.000E+00	0.000E+00	25
2. Average Diluted Concentration During Period	µCi/ml	0.000E+00	0.000E+00	
3. Percent of Applicable Limit	%	0.000+00	0.000E+00	
D. Gross Alpha Radioactivity				
1. Total Release	Curies	0.000E+00	0.000E+00	25
E. Waste Vol. Released (Pre-Dilution)	Liters	3.128E+06	8.223E+06	25
F. Volume of Dilution Water Used	Liters	2.940E+11	3.444E+11	25

ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
(ALL LIQUID EFFLUENTS)
July 1 through December 31, 2009

Unit 1

Type of Effluent	Units	Quarter 3	Quarter 4	Est. Total Error %
A. Fission and Activation Products				
1. Total Release (Not Including Tritium, Gases, Alpha)	Curies	4.530E-03	5.855E-03	25
2. Average Diluted Concentration During Period	µCi/ml	1.167E-11	1.769E-11	
3. Percent of Applicable Limit	%	3.889E-03	5.896E-03	
B. Tritium				
1. Total Release	Curies	7.132E+01	1.460E+02	25
2. Average Diluted Concentration During Period	µCi/ml	1.837E-07	4.410E-07	
3. Percent of Applicable Limit	%	6.123E-03	1.470E-02	
C. Dissolved and Entrained Gases				
1. Total Release	Curies	0.000E+00	5.712E-05	25
2. Average Diluted Concentration During Period	µCi/ml	0.000E+00	1.726E-13	
3. Percent of Applicable Limit	%	0.000E+00	8.628E-08	
D. Gross Alpha Radioactivity				
1. Total Release	Curies	0.000E+00	0.000E+00	25
E. Waste Vol. Released (Pre-Dilution)	Liters	8.673E+06	9.378E+06	25
F. Volume of Dilution Water Used	Liters	3.882E+11	3.310E+11	25

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 2009

		CONTINUOUS RELEASES		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
FE-59	CURIES	0.00E+00	0.00E+00	8.54E-06	0.00E+00
NA-24	CURIES	2.45E-05	0.00E+00	0.00E+00	0.00E+00
FE-55	CURIES	9.30E-04	0.00E+00	5.20E-04	0.00E+00
MN-54	CURIES	0.00E+00	0.00E+00	2.10E-05	4.15E-05
CS-134	CURIES	0.00E+00	0.00E+00	5.15E-04	6.31E-05
CR-51	CURIES	0.00E+00	0.00E+00	9.71E-05	2.47E-04
ZR-95	CURIES	0.00E+00	0.00E+00	2.52E-04	3.15E-04
CS-137	CURIES	0.00E+00	0.00E+00	5.76E-04	3.81E-04
SB-125	CURIES	0.00E+00	0.00E+00	2.20E-04	5.04E-04
NB-95	CURIES	0.00E+00	0.00E+00	4.35E-04	5.88E-04
CO-60	CURIES	0.00E+00	0.00E+00	2.33E-04	6.63E-04
CO-58	CURIES	0.00E+00	0.00E+00	1.87E-03	2.30E-03
H-3	CURIES	8.94E-03	5.14E-02	4.10E+01	5.51E+01
Total for Period	CURIES	9.89E-03	5.14E-02	4.10E+01	5.51E+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 2009

		CONTINUOUS RELEASES		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
TC-99M	CURIES	0.00E+00	0.00E+00	5.75E-05	0.00E+00
NB-97	CURIES	0.00E+00	0.00E+00	0.00E+00	6.49E-06
AG-110M	CURIES	0.00E+00	0.00E+00	2.64E-04	1.31E-05
NA-24	CURIES	0.00E+00	1.86E-05	6.61E-04	0.00E+00
MN-54	CURIES	0.00E+00	0.00E+00	2.36E-05	2.09E-05
SB-124	CURIES	0.00E+00	0.00E+00	0.00E+00	2.30E-05
I-131	CURIES	0.00E+00	0.00E+00	0.00E+00	3.39E-05
XE-133	CURIES	0.00E+00	0.00E+00	0.00E+00	5.71E-05
CS-134	CURIES	0.00E+00	0.00E+00	1.03E-04	1.05E-04
ZR-95	CURIES	0.00E+00	0.00E+00	1.72E-04	1.24E-04
SB-125	CURIES	0.00E+00	0.00E+00	6.90E-05	1.47E-04
NB-95	CURIES	0.00E+00	0.00E+00	2.62E-04	2.61E-04
CO-60	CURIES	0.00E+00	0.00E+00	3.02E-04	3.08E-04
FE-55	CURIES	0.00E+00	0.00E+00	1.11E-03	9.19E-04
CS-137	CURIES	0.00E+00	0.00E+00	5.50E-04	1.67E-03
CO-58	CURIES	0.00E+00	0.00E+00	9.55E-04	2.21E-03
H-3	CURIES	2.70E-02	3.95E-02	7.13E+01	1.46E+02
Total for Period	CURIES	2.70E-02	3.95E-02	7.13E+01	1.46E+02

ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
(ALL LIQUID EFFLUENTS)
January 1 through June 30, 2009

Unit 2

Type of Effluent	Units	Quarter 1	Quarter 2	Est. Total Error %
A. Fission and Activation Products				
1. Total Release (Not Including Tritium, Gases, Alpha)	Curies	9.826E-03	3.766E-03	25
2. Average Diluted Concentration During Period	µCi/ml	3.341E-11	1.093E-11	
3. Percent of Applicable Limit	%	1.114E-02	3.644E-03	
B. Tritium				
1. Total Release	Curies	3.518E+02	1.421E+02	25
2. Average Diluted Concentration During Period	µCi/ml	1.196E-06	4.126E-07	
3. Percent of Applicable Limit	%	3.988E-02	1.375E-02	
C. Dissolved and Entrained Gases				
1. Total Release	Curies	6.537E-02	4.111E-02	25
2. Average Diluted Concentration During Period	µCi/ml	2.223E-10	1.193E-10	
3. Percent of Applicable Limit	%	1.112E-04	5.966E-05	
D. Gross Alpha Radioactivity				
1. Total Release	Curies	0.000E+00	0.000E+00	25
E. Waste Vol. Released (Pre-Dilution)	Liters	9.926E+06	8.723E+06	25
F. Volume of Dilution Water Used	Liters	2.940E+11	3.444E+11	25

ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
(ALL LIQUID EFFLUENTS)
July 1 through December 31, 2009

Unit 2

Type of Effluent	Units	Quarter 3	Quarter 4	Est. Total Error %
A. Fission and Activation Products				
1. Total Release (Not Including Tritium, Gases, Alpha)	Curies	3.290E-02	3.698E-03	25
2. Average Diluted Concentration During Period	μCi/ml	8.474E-11	1.117E-11	
3. Percent of Applicable Limit	%	2.825E-02	3.724E-03	
B. Tritium				
1. Total Release	Curies	2.417E+02	2.071E+01	25
2. Average Diluted Concentration During Period	μCi/ml	6.226E-07	6.255E-08	
3. Percent of Applicable Limit	%	2.075E-02	2.085E-03	
C. Dissolved and Entrained Gases				
1. Total Release	Curies	2.641E+00	1.020E-03	25
2. Average Diluted Concentration During Period	μCi/ml	6.802E-09	3.082E-12	
3. Percent of Applicable Limit	%	3.401E-03	1.541E-06	
D. Gross Alpha Radioactivity				
1. Total Release	Curies	0.000E+00	0.000E+00	25
E. Waste Vol. Released (Pre-Dilution)	Liters	4.058E+06	3.008E+06	25
F. Volume of Dilution Water Used	Liters	3.882E+11	3.310E+11	25

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 2009

		CONTINUOUS RELEASES		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
NB-97	CURIES	0.00E+00	0.00E+00	8.62E-06	0.00E+00
CO-60	CURIES	0.00E+00	0.00E+00	6.85E-05	0.00E+00
AG-110M	CURIES	0.00E+00	0.00E+00	1.32E-04	0.00E+00
ZR-95	CURIES	0.00E+00	0.00E+00	1.67E-04	0.00E+00
CR-51	CURIES	0.00E+00	0.00E+00	4.90E-04	0.00E+00
NB-95	CURIES	0.00E+00	0.00E+00	2.06E-04	8.25E-06
CS-134	CURIES	0.00E+00	0.00E+00	4.38E-05	1.35E-05
CS-137	CURIES	0.00E+00	0.00E+00	8.14E-05	3.19E-05
CO-58	CURIES	0.00E+00	0.00E+00	7.71E-04	5.08E-05
SB-125	CURIES	0.00E+00	0.00E+00	5.65E-04	1.77E-04
XE-131M	CURIES	0.00E+00	0.00E+00	0.00E+00	6.75E-04
FE-55	CURIES	0.00E+00	0.00E+00	7.29E-03	3.48E-03
XE-133	CURIES	0.00E+00	0.00E+00	2.10E-02	7.89E-03
KR-85	CURIES	0.00E+00	0.00E+00	4.44E-02	3.25E-02
H-3	CURIES	4.51E-02	2.30E-02	3.52E+02	1.42E+02
Total for Period	CURIES	4.51E-02	2.30E-02	3.52E+02	1.42E+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 2009

		CONTINUOUS RELEASES		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
NB-97	CURIES	0.00E+00	0.00E+00	1.10E-05	0.00E+00
CS-136	CURIES	0.00E+00	0.00E+00	1.64E-05	0.00E+00
TE-132	CURIES	0.00E+00	0.00E+00	5.69E-05	0.00E+00
FE-59	CURIES	0.00E+00	0.00E+00	9.33E-05	0.00E+00
I-132	CURIES	0.00E+00	0.00E+00	1.11E-04	0.00E+00
LA-140	CURIES	0.00E+00	0.00E+00	2.67E-04	0.00E+00
XE-135	CURIES	0.00E+00	0.00E+00	1.15E-03	0.00E+00
SB-125	CURIES	0.00E+00	0.00E+00	1.50E-03	0.00E+00
FE-55	CURIES	0.00E+00	0.00E+00	1.12E-02	0.00E+00
XE-133M	CURIES	0.00E+00	0.00E+00	1.58E-02	0.00E+00
XE-131M	CURIES	0.00E+00	0.00E+00	4.32E-02	0.00E+00
KR-85	CURIES	0.00E+00	0.00E+00	4.23E-01	0.00E+00
SN-117M	CURIES	0.00E+00	0.00E+00	5.84E-05	1.07E-05
MN-54	CURIES	0.00E+00	0.00E+00	1.53E-04	3.20E-05
I-131	CURIES	0.00E+00	0.00E+00	3.50E-04	3.28E-05
AG-110M	CURIES	0.00E+00	0.00E+00	7.19E-04	4.70E-05
CO-60	CURIES	0.00E+00	0.00E+00	4.30E-04	6.93E-05
CS-134	CURIES	0.00E+00	1.32E-05	8.77E-04	5.66E-05
CS-137	CURIES	0.00E+00	1.29E-05	1.06E-03	6.85E-05
ZR-95	CURIES	0.00E+00	0.00E+00	9.96E-04	2.49E-04
NB-95	CURIES	0.00E+00	7.11E-06	1.30E-03	4.21E-04
XE-133	CURIES	0.00E+00	0.00E+00	2.16E+00	1.02E-03
CO-58	CURIES	0.00E+00	2.18E-04	5.80E-03	1.03E-03
CR-51	CURIES	0.00E+00	0.00E+00	7.90E-03	1.43E-03
H-3	CURIES	7.30E-03	2.56E-03	2.42E+02	2.07E+01
Total for Period	CURIES	7.30E-03	2.81E-03	2.44E+02	2.07E+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 ARERR. This summary covers releases from January 1 to December 31, 2009. The summary of gaseous effluents for both Unit 1 and Unit 2 is as follows:

	Unit 1	Unit 2
Number of releases:	176	167
Total time for all releases (minutes):	1493598	1094755
Maximum time for a release (minutes):	23057	10720
Average time for a release (minutes):	8486	6555
Minimum time for a release (minutes):	1	1

The Unit 1 gaseous releases consisted of:

176 Planned vent and tank releases

0 Unplanned releases

The Unit 2 gaseous releases consisted of:

163 Planned vent and tank releases

4 Unplanned releases (See Section 9)

ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
(ALL AIRBORNE EFFLUENTS)
January 1 through June 30, 2009

Unit 1

Type of Effluent	Units	Quarter 1	Quarter 2	Est. Total Error %
A. Fission and Activation Products				
1. Total Release	Curies	9.446E-01	0.000E+00	25
2. Average Release Rate for Period	µCi/Sec	1.215E-01	0.000E+00	
3. Percent of Applicable Limit	%	1.701E-03	0.000E+00	
B. Radioiodines				
1. Total Iodine-131	Curies	0.000E+00	0.000E+00	25
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	
C. Particulates				
1. Particulates (Half-Lives > 8 Days)	Curies	0.000E+00	0.000E+00	25
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	
D. Tritium				
1. Total Release	Curies	3.266E+00	7.137E+00	25
2. Average Release Rate for Period	µCi/Sec	4.200E-01	9.077E-01	
3. Percent of Applicable Limit	%	5.879E-04	1.271E-03	

ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
(ALL AIRBORNE EFFLUENTS)
July 1 through December 31, 2009

Unit 1

Type of Effluent	Units	Quarter 3	Quarter 4	Est. Total Error %
A. Fission and Activation Products				
1. Total Release	Curies	7.755E-04	0.000E+00	25
2. Average Release Rate for Period	µCi/Sec	9.756E-05	0.000E+00	
3. Percent of Applicable Limit	%	1.366E-06	0.000E+00	
B. Radioiodines				
1. Total Iodine-131	Curies	5.201E-06	0.000E+00	25
2. Average Release Rate for Period	µCi/Sec	6.543E-07	0.000E+00	
3. Percent of Applicable Limit	%	1.832E-06	0.000E+00	
C. Particulates				
1. Particulates (Half-Lives > 8 Days)	Curies	0.000E+00	0.000E+00	25
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	
D. Tritium				
1. Total Release	Curies	4.855E+00	3.980E+00	25
2. Average Release Rate for Period	µCi/Sec	6.108E-01	5.007E-01	
3. Percent of Applicable Limit	%	8.551E-04	7.010E-04	

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 2009**

		CONTINUOUS RELEASES		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
Fission Gases					
XE-133	CURIES	0.00E+00	0.00E+00	2.16E-04	0.00E+00
KR-85	CURIES	0.00E+00	0.00E+00	9.44E-01	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	9.45E-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	3.27E+00	7.14E+00
Total for Period	CURIES	0.00E+00	0.00E+00	3.27E+00	7.14E+00

ANO-1 & 2 Annual Radioactive Effluent Release Report for 2009

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 2009**

		CONTINUOUS RELEASES		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
Fission Gases					
KR-85	CURIES	0.00E+00	0.00E+00	7.76E-04	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	7.76E-04	0.00E+00
Iodines					
I-133	CURIES	0.00E+00	0.00E+00	2.50E-06	0.00E+00
I-131	CURIES	0.00E+00	0.00E+00	5.20E-06	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	7.70E-06	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	4.85E+00	3.98E+00
Total for Period	CURIES	0.00E+00	0.00E+00	4.85E+00	3.98E+00

ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
(ALL AIRBORNE EFFLUENTS)
January 1 through June 30, 2009

Unit 2

Type of Effluent	Units	Quarter 1	Quarter 2	Est. Total Error %
A. Fission and Activation Products				
1. Total Release	Curies	2.313E+01	8.831E+00	25
2. Average Release Rate for Period	µCi/Sec	2.975E+00	1.123E+00	
3. Percent of Applicable Limit	%	4.164E-02	1.572E-02	
B. Radioiodines				
1. Total Iodine-131	Curies	9.067E-06	1.670E-06	25
2. Average Release Rate for Period	µCi/Sec	1.166E-06	2.124E-07	
3. Percent of Applicable Limit	%	3.265E-06	5.946E-07	
C. Particulates				
1. Particulates (Half-Lives > 8 Days)	Curies	0.000E+00	0.00E+00	25
2. Average Release Rate for Period	µCi/Sec	0.000E+00	0.00E+00	
3. Percent of Applicable Limit	%	0.000E+00	0.00E+00	
4. Gross Alpha Radioactivity	Curies	0.000E+00	0.000E+00	
D. Tritium				
1. Total Release	Curies	6.477E+00	8.050E+00	25
2. Average Release Rate for Period	µCi/Sec	8.330E-01	1.024E+00	
3. Percent of Applicable Limit	%	1.166E-03	1.433E-03	

ANO-1 & 2 Annual Radioactive Effluent Release Report for 2009

ANNUAL SUMMATION FOR ALL RELEASES BY QUARTER
(ALL AIRBORNE EFFLUENTS)
July 1 through December 31, 2009

Unit 2

Type of Effluent	Units	Quarter 3	Quarter 4	Est. Total Error %
A. Fission and Activation Products				
1. Total Release	Curies	2.887E+02	0.000E+00	25
2. Average Release Rate for Period	µCi/Sec	3.631E+01	0.000E+00	
3. Percent of Applicable Limit	%	5.084E-01	0.000E+00	
B. Radioiodines				
1. Total Iodine-131	Curies	6.322E-04	1.952E-05	25
2. Average Release Rate for Period	µCi/Sec	7.953E-05	2.455E-06	
3. Percent of Applicable Limit	%	2.227E-04	6.875E-06	
C. Particulates				
1. Particulates (Half-Lives > 8 Days)	Curies	0.000E+00	0.000E+00	25
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	
D. Tritium				
1. Total Release	Curies	1.752E+01	3.796E+00	25
2. Average Release Rate for Period	µCi/Sec	2.204E+00	4.776E-01	
3. Percent of Applicable Limit	%	3.085E-03	6.686E-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 2009

		CONTINUOUS RELEASES		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 1	QUARTER 2	QUARTER 1	QUARTER 2
Fission Gases					
AR-41	CURIES	0.00E+00	0.00E+00	1.49E-01	0.00E+00
KR-85	CURIES	0.00E+00	0.00E+00	3.68E+00	0.00E+00
XE-135	CURIES	0.00E+00	0.00E+00	3.90E-02	1.78E+00
XE-133	CURIES	0.00E+00	0.00E+00	1.93E+01	7.05E+00
Total for Period	CURIES	0.00E+00	0.00E+00	2.31E+01	8.83E+00
Iodines					
I-131	CURIES	0.00E+00	0.00E+00	9.07E-06	1.67E-06
Total for Period	CURIES	0.00E+00	0.00E+00	9.07E-06	1.67E-06
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	6.48E+00	8.05E+00
Total for Period	CURIES	0.00E+00	0.00E+00	6.48E+00	8.05E+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 2009

		CONTINUOUS RELEASES		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
Fission Gases					
KR-88	CURIES	0.00E+00	0.00E+00	2.85E-01	0.00E+00
XE-135M	CURIES	0.00E+00	0.00E+00	3.11E-01	0.00E+00
XE-131M	CURIES	0.00E+00	0.00E+00	5.10E-01	0.00E+00
KR-85M	CURIES	0.00E+00	0.00E+00	5.61E-01	0.00E+00
XE-133M	CURIES	0.00E+00	0.00E+00	1.68E+00	0.00E+00
AR-41	CURIES	0.00E+00	0.00E+00	7.48E+00	0.00E+00
KR-85	CURIES	0.00E+00	0.00E+00	7.95E+00	0.00E+00
XE-135	CURIES	0.00E+00	0.00E+00	1.01E+01	0.00E+00
XE-133	CURIES	0.00E+00	0.00E+00	2.60E+02	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	2.89E+02	0.00E+00
Iodines					
I-132	CURIES	0.00E+00	0.00E+00	2.76E-07	0.00E+00
I-133	CURIES	0.00E+00	0.00E+00	5.43E-06	0.00E+00
I-131	CURIES	0.00E+00	0.00E+00	6.32E-04	1.95E-05
Total for Period	CURIES	0.00E+00	0.00E+00	6.38E-04	1.95E-05
Particulates					
RB-88	CURIES	0.00E+00	0.00E+00	5.95E-05	0.00E+00
Total for Period	CURIES	0.00E+00	0.00E+00	5.95E-05	0.00E+00
Other					
H-3	CURIES	0.00E+00	0.00E+00	1.75E+01	3.80E+00
Total for Period	CURIES	0.00E+00	0.00E+00	1.75E+01	3.80E+00

5. SUMMARY OF RADIATION DOSES

The following is a summary of the annual radiation doses due to radiological effluents during 2009 calculated in accordance with the ODCM.

UNIT 1

Liquid Radwaste Effluents

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

Organ	Qtr 1	%	Qtr 2	%	Qtr 3	%	Qtr 4	%	Year	%
TBody	0.0008	0.05	0.0003	0.02	0.0004	0.03	0.0010	0.07	0.0025	0.08
Bone	0.0005	0.01	0.0002	0.00	0.0003	0.01	0.0009	0.02	0.0019	0.02
Liver	0.0010	0.02	0.0004	0.01	0.0005	0.01	0.0015	0.03	0.0034	0.03
Thyroid	0.0001	0.00	0.0001	0.00	0.0003	0.00	0.0002	0.00	0.0005	0.00
Kidney	0.0004	0.01	0.0002	0.00	0.0002	0.00	0.0006	0.01	0.0014	0.01
Lung	0.0002	0.00	0.0001	0.00	0.0001	0.00	0.0004	0.01	0.0008	0.01
GI-LLI	0.0002	0.00	0.0002	0.00	0.0001	0.00	0.0003	0.01	0.0008	0.01

GI-LLI = Gastrointestinal – Lower Large Intestine

Gaseous Radwaste Effluents

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

Organ	Qtr 1	%	Qtr 2	%	Qtr 3	%	Qtr 4	%	Year	%
TBody	0.0020	0.03	0.0044	0.06	0.0030	0.04	0.0025	0.03	0.0118	0.08
Bone	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00
Liver	0.0020	0.03	0.0044	0.06	0.0030	0.04	0.0025	0.03	0.0118	0.08
Thyroid	0.0020	0.03	0.0044	0.06	0.0041	0.05	0.0025	0.03	0.0130	0.09
Kidney	0.0020	0.03	0.0044	0.06	0.0030	0.04	0.0025	0.03	0.0118	0.08
Lung	0.0020	0.03	0.0044	0.06	0.0030	0.04	0.0025	0.03	0.0118	0.08
GI-LLI	0.0020	0.03	0.0044	0.06	0.0030	0.04	0.0025	0.03	0.0118	0.08

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

Type	Qtr 1	%	Qtr 2	%	Qtr 3	%	Qtr 4	%	Year	%
Gamma	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00
Beta	0.0002	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0002	0.00

UNIT 2

Liquid Radwaste Effluents

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

Organ	Qtr 1	%	Qtr 2	%	Qtr 3	%	Qtr 4	%	Year	%
TBody	0.0006	0.04	0.0002	0.02	0.0013	0.09	0.0001	0.01	0.0023	0.08
Bone	0.0001	0.00	0.0000	0.00	0.0008	0.02	0.0001	0.00	0.0010	0.01
Liver	0.0007	0.01	0.0003	0.01	0.0017	0.03	0.0001	0.00	0.0028	0.03
Thyroid	0.0006	0.01	0.0002	0.00	0.0008	0.01	0.0000	0.00	0.0013	0.01
Kidney	0.0006	0.01	0.0002	0.00	0.0008	0.02	0.0001	0.00	0.0016	0.02
Lung	0.0006	0.01	0.0002	0.00	0.0005	0.01	0.0000	0.00	0.0013	0.01
GI-LLI	0.0006	0.01	0.0002	0.00	0.0006	0.01	0.0001	0.00	0.0015	0.02

Gaseous Radwaste Effluents

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

Organ	Qtr 1	%	Qtr 2	%	Qtr 3	%	Qtr 4	%	Year	%
Tbody	0.0040	0.05	0.0050	0.07	0.0110	0.15	0.0023	0.03	0.0223	0.15
Bone	0.0000	0.00	0.0000	0.00	0.0004	0.01	0.0000	0.00	0.0004	0.00
Liver	0.0040	0.05	0.0050	0.07	0.0112	0.15	0.0023	0.03	0.0225	0.15
Thyroid	0.0059	0.08	0.0053	0.07	0.1471	1.96	0.0065	0.09	0.1649	1.10
Kidney	0.0040	0.05	0.0050	0.07	0.0115	0.15	0.0024	0.03	0.0228	0.15
Lung	0.0040	0.05	0.0050	0.07	0.0108	0.14	0.0023	0.03	0.0221	0.15
GI-LLI	0.0040	0.05	0.0050	0.07	0.0108	0.14	0.0023	0.03	0.0221	0.15

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

Type	Qtr 1	%	Qtr 2	%	Qtr 3	%	Qtr 4	%	Year	%
Gamma	0.0007	0.01	0.0005	0.01	0.0166	0.33	0.0000	0.00	0.0179	0.18
Beta	0.0025	0.02	0.0010	0.01	0.0304	0.30	0.0000	0.00	0.0340	0.17

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

Gaseous Effluent	BONE	LIVER	TBODY	THYROID	KIDNEY	GI-LLI	LUNG	SKIN
Iodine/Tritium Particulate	1.51E-06	5.18E-03	5.18E-03	5.67E-3	5.18E-03	5.18E-03	5.18E-03	
Noble Gas			4.15E-07					3.49E-05
Liquid Effluent								
Fish	1.89E-03	3.36E-03	2.48E-03	4.72E-04	1.42E-03	7.84E-04	8.18E-04	
Sediment			4.73E-05					5.55E-05
Unit 1 Total	1.89E-03	8.54E-03	7.66E-03	6.14E-03	6.60E-03	5.96E-03	5.99E-03	9.03E-05

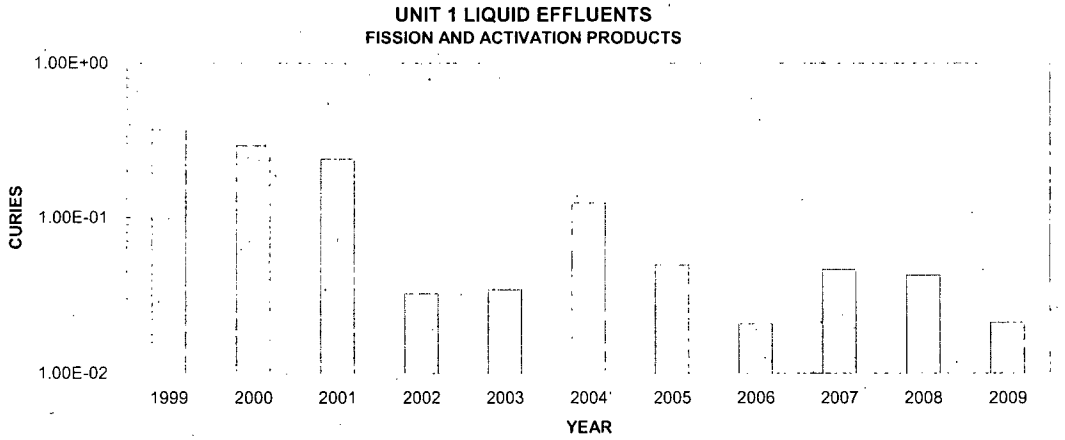
UNIT 2

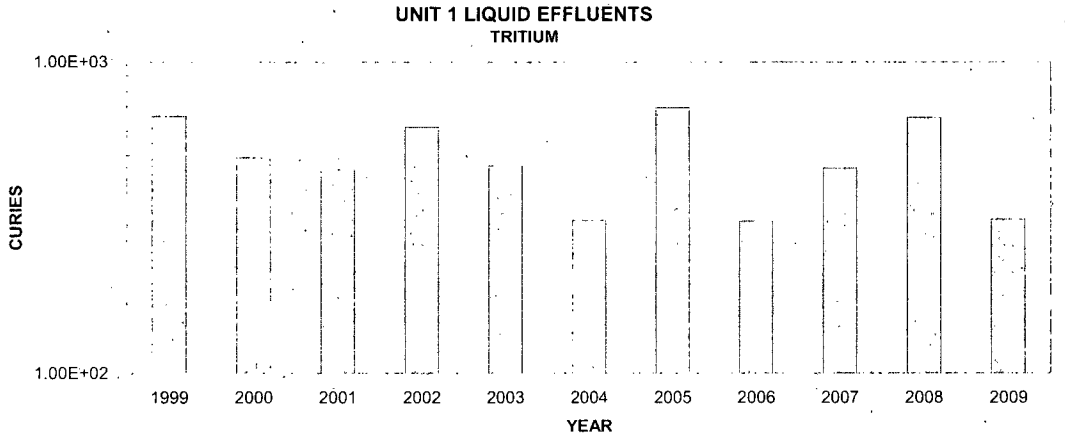
Gaseous Effluent								
Iodine/Tritium Particulate	1.91E-04	9.83E-03	9.75E-03	7.21E-02	9.96E-03	9.65E-03	9.66E-03	
Noble Gas			4.88E-03					1.01E-02
Liquid Effluent								
Fish	9.91E-04	2.76E-03	2.30E-03	1.26E-03	1.64E-03	1.32E-03	1.52E-03	
Sediment			2.47E-05					2.89E-05
Unit 2 Total	1.18E-03	1.26E-02	1.69E-02	7.33E-02	1.16E-02	1.10E-02	1.12E-02	1.01E-02

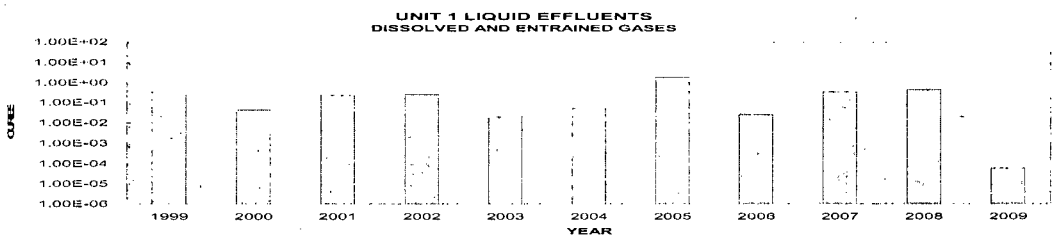
Site Total	3.07E-03	2.11E-02	2.46E-02	7.94E-02	1.82E-02	1.69E-02	1.72E-02	1.02E-02
Limit (40CFR190)	25	25	75	25	25	25	25	25
% Limit	1.23E-02	8.45E-02	3.28E-02	3.18E-01	7.28E-02	6.77E-02	6.87E-02	4.08E-02

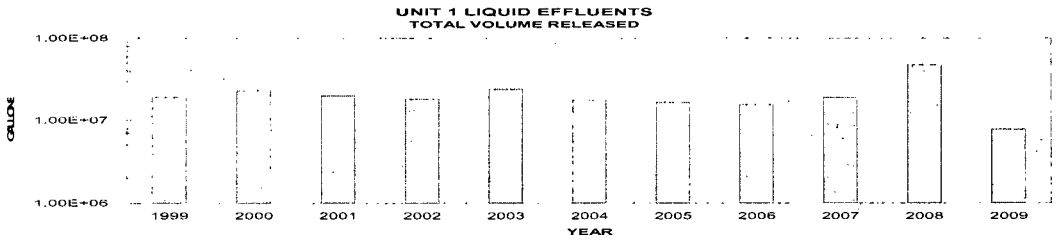
7. HISTORICAL EFFLUENT DATA

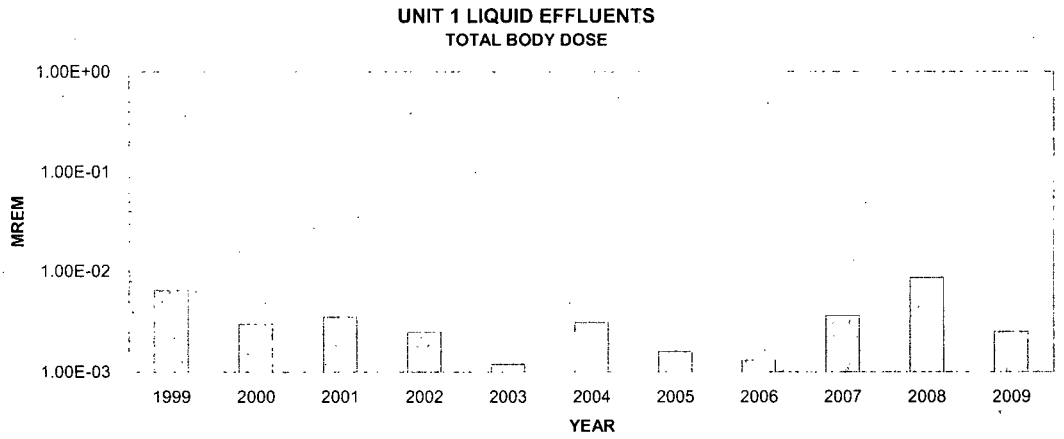
The following graphs show the historical release data for both units on a yearly basis. These graphs compare data from 1999 through 2009.

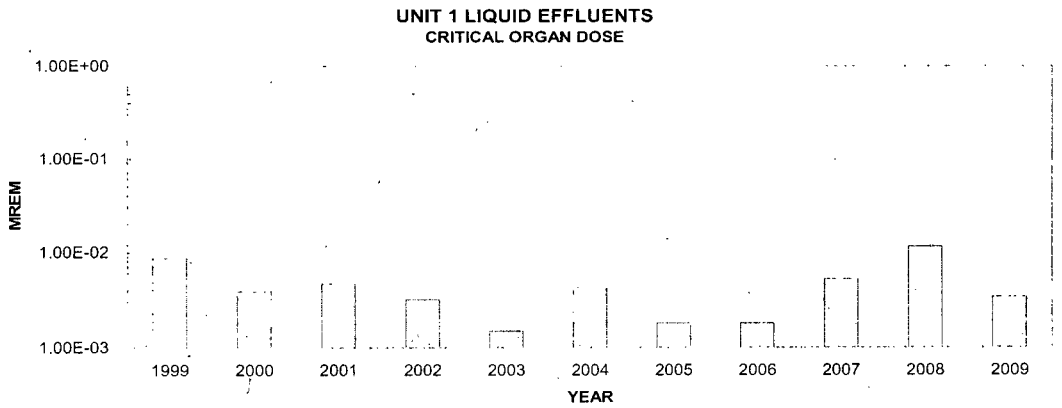


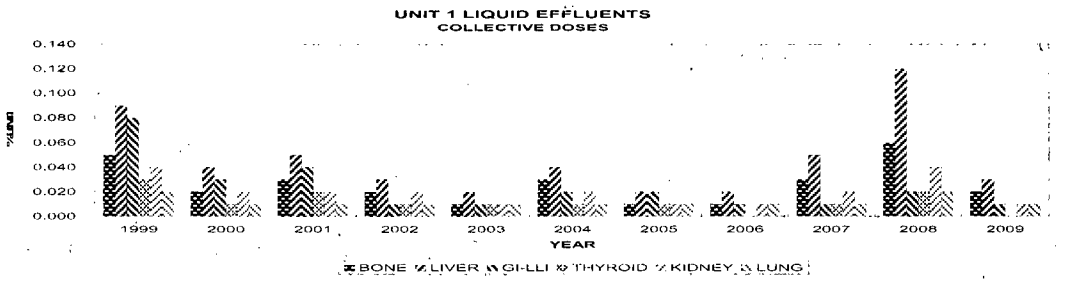


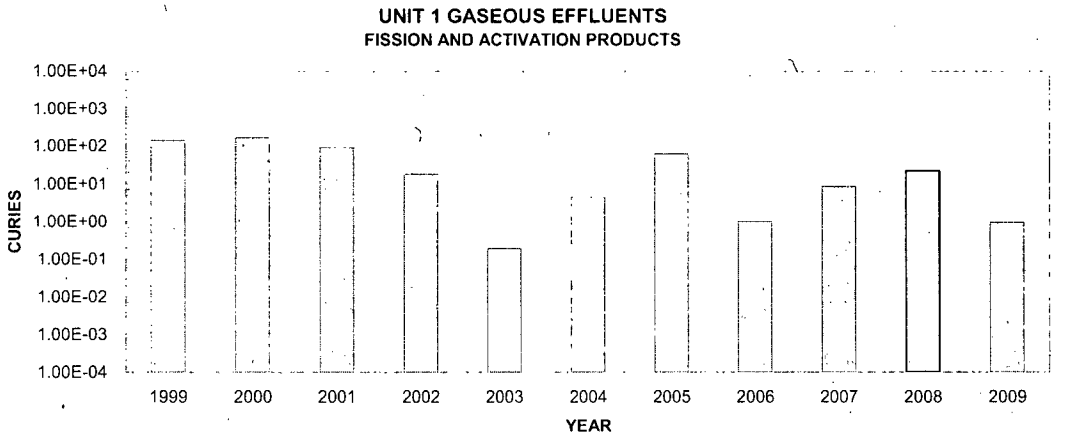

UNIT 1 LIQUID EFFLUENTS
DISSOLVED AND ENTRAINED GASES
CURIE
1.00E+02
1.00E+01
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1.00E-04
1.00E-05
1.00E-06
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

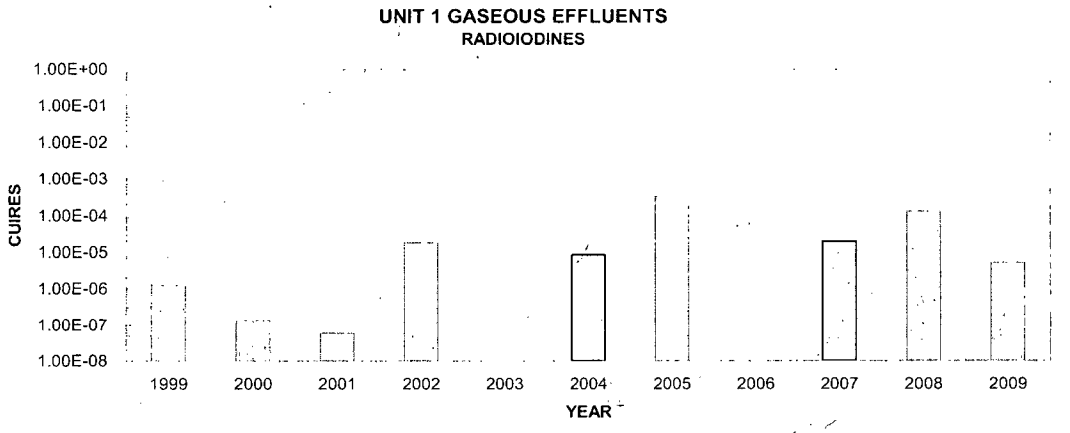

UNIT 1 LIQUID EFFLUENTS
TOTAL VOLUME RELEASED
GALLONS
1.00E+08
1.00E+07
1.00E+06
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

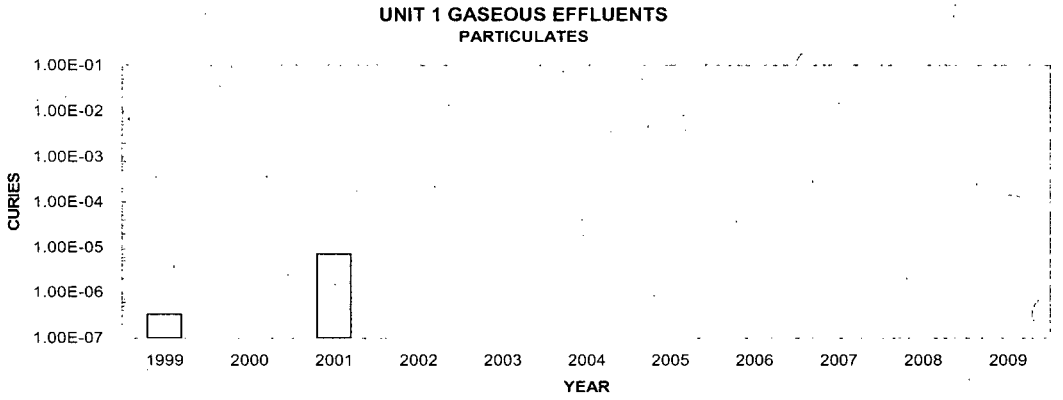

UNIT 1 LIQUID EFFLUENTS
TOTAL BODY DOSE
MREM
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

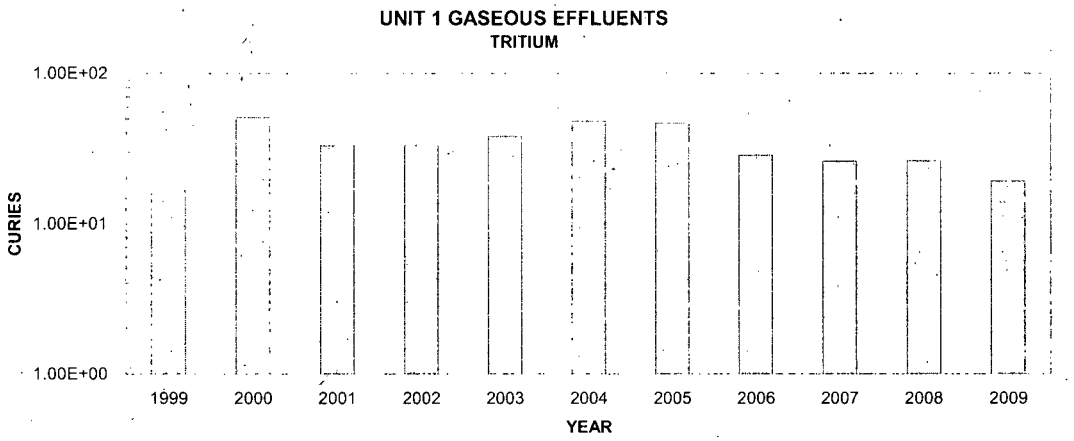

UNIT 1 LIQUID EFFLUENTS
CRITICAL ORGAN DOSE
MREM
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

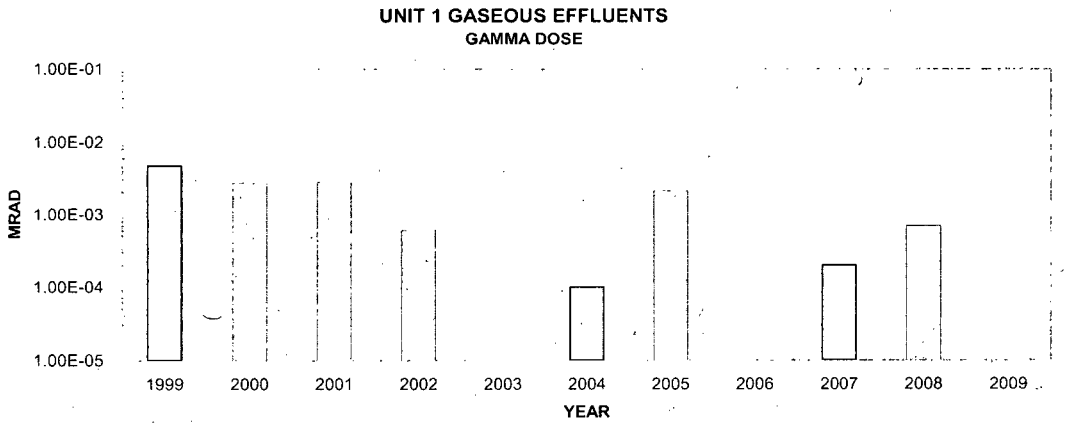

UNIT 1 LIQUID EFFLUENTS
COLLECTIVE DOSES
0.140
0.120
0.100
0.080
0.060
0.040
0.020
0.000
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR
BONE
LIVER
GI-LLI
THYROID
KIDNEY
LUNG

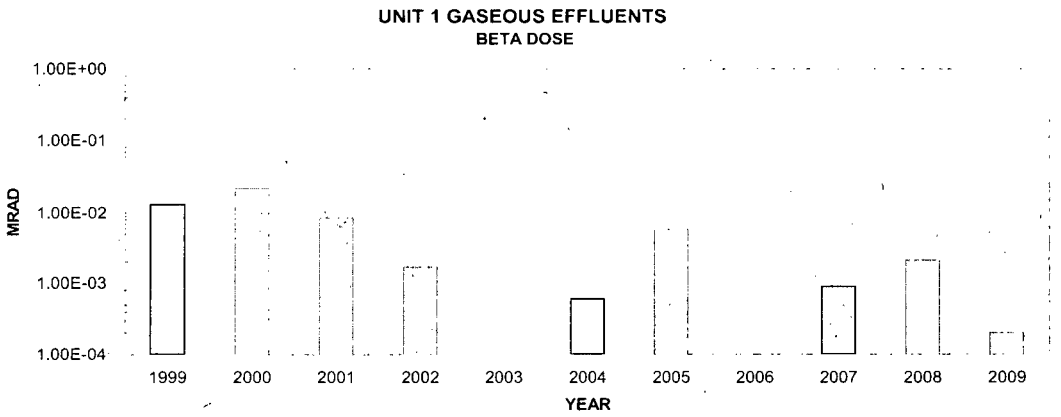

UNIT 1 GASEOUS EFFLUENTS
FISSION AND ACTIVATION PRODUCTS
CURIES
1.00E+04
1.00E+03
1.00E+02
1.00E+01
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1.00E-04
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

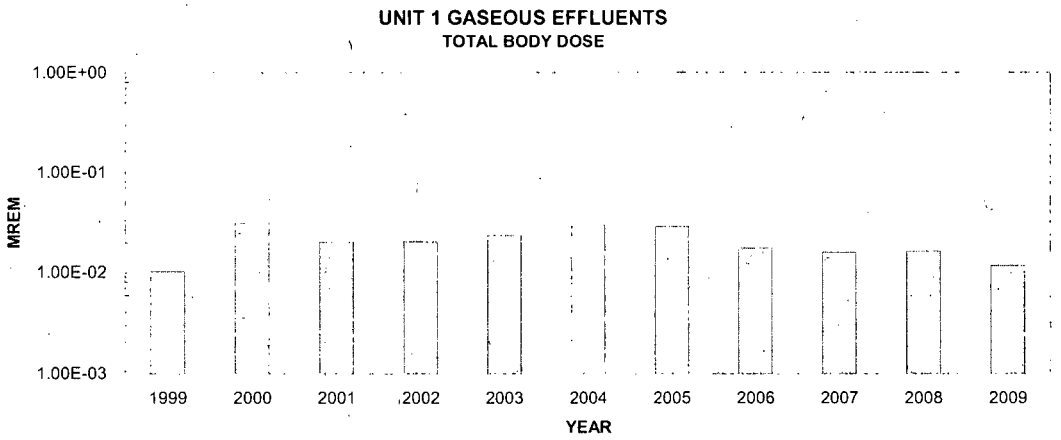

UNIT 1 GASEOUS EFFLUENTS
RADIOIODINES
CUIRES
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1.00E-04
1.00E-05
1.00E-06
1.00E-07
1.00E-08
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

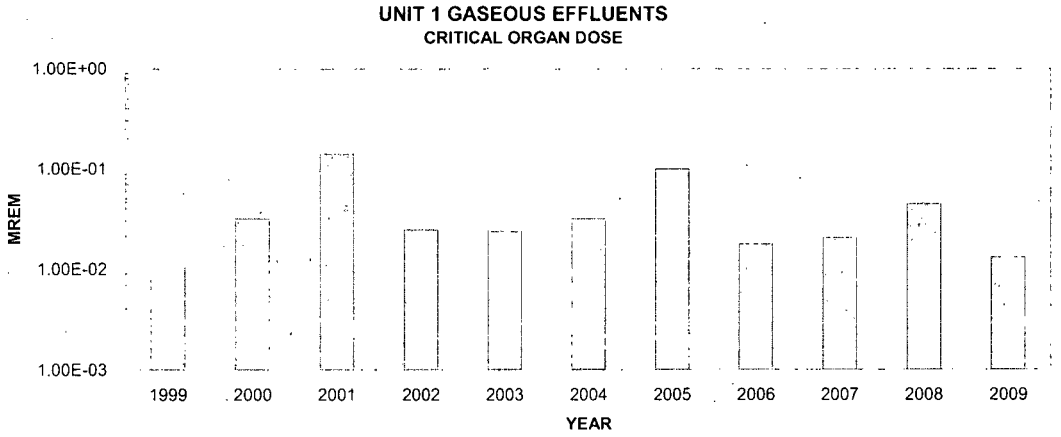

UNIT 1 GASEOUS EFFLUENTS
PARTICULATES
CURIES
1.00E-01
1.00E-02
1.00E-03
1.00E-04
1.00E-05
1.00E-06
1.00E-07
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

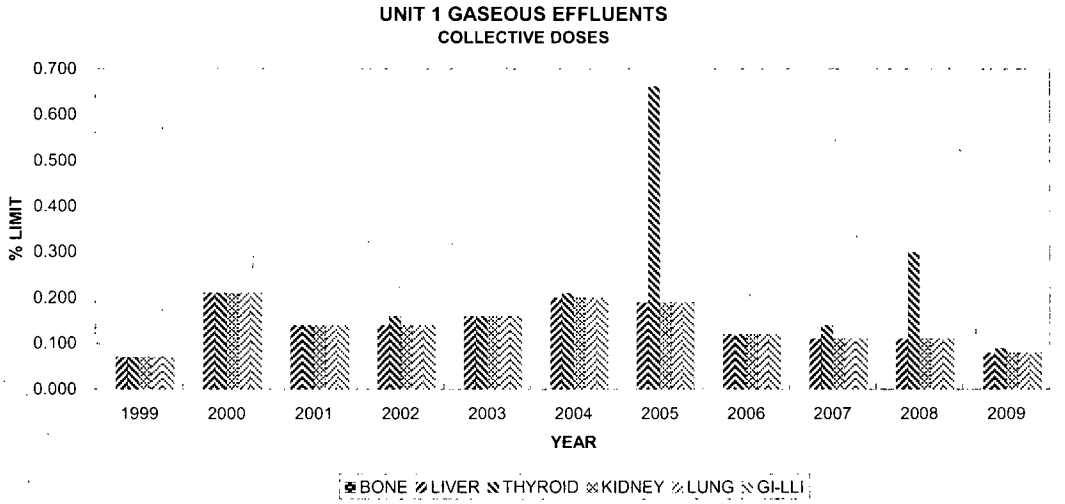

UNIT 1 GASEOUS EFFLUENTS
TRITIUM
CURIES
1.00E+02
1.00E+01
1.00E+00
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

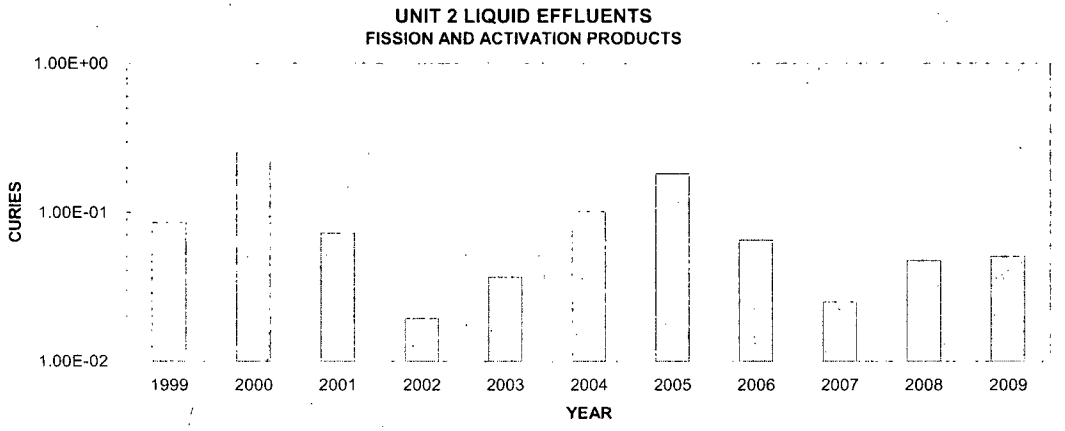

UNIT 1 GASEOUS EFFLUENTS
GAMMA DOSE
MRAD
1.00E-01
1.00E-02
1.00E-03
1.00E-04
1.00E-05
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

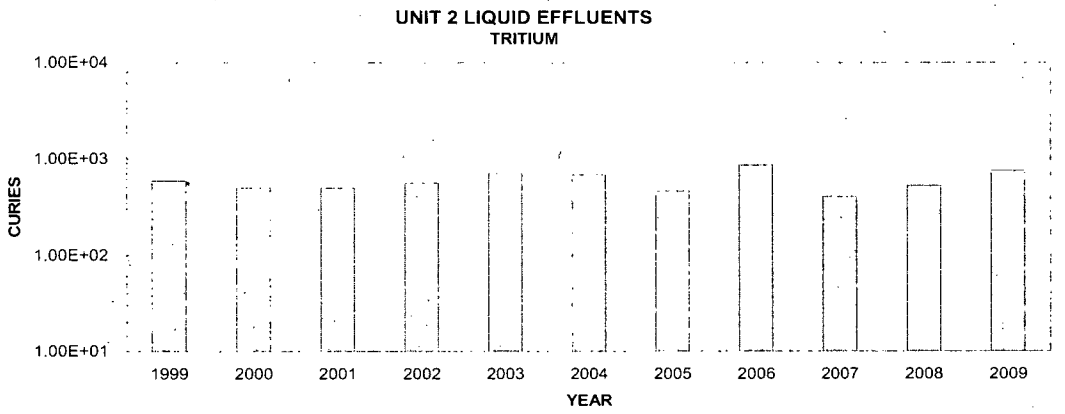

UNIT 1 GASEOUS EFFLUENTS
BETA DOSE
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1.00E-04
MRAD
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

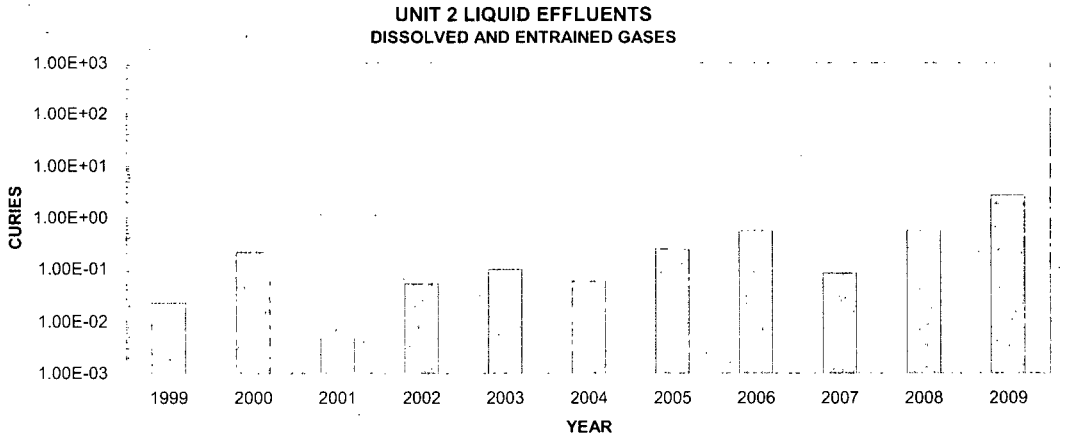

UNIT 1 GASEOUS EFFLUENTS
TOTAL BODY DOSE
1.00E+00
1.00E-01
1.00E-02
1.00E-03
MREM
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

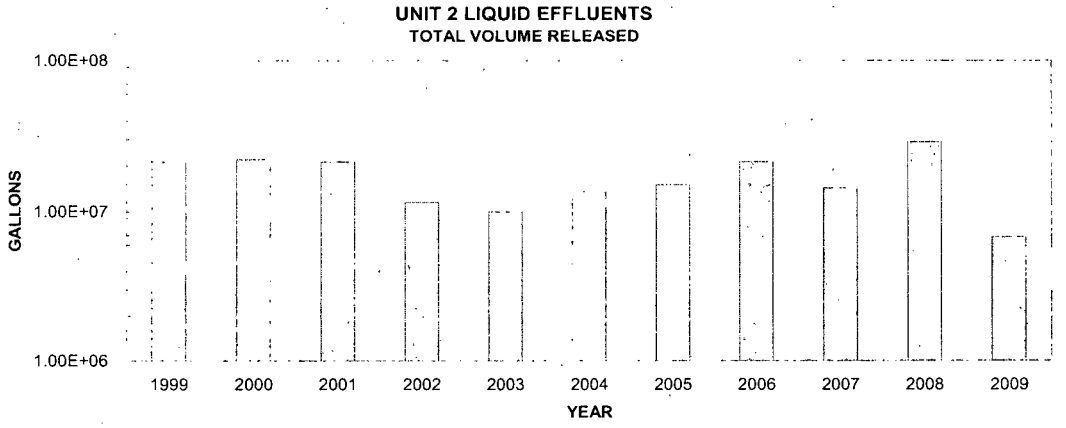

UNIT 1 GASEOUS EFFLUENTS
CRITICAL ORGAN DOSE
1.00E+00
1.00E-01
1.00E-02
1.00E-03
MREM
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

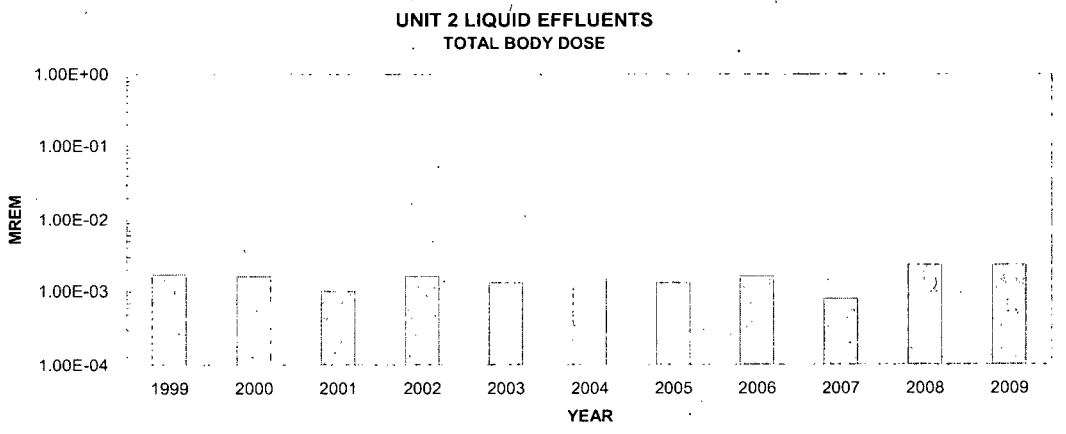

UNIT 1 GASEOUS EFFLUENTS
COLLECTIVE DOSES
% LIMIT
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR
BONE
LIVER
THYROID
KIDNEY
LUNG
GI-LLI

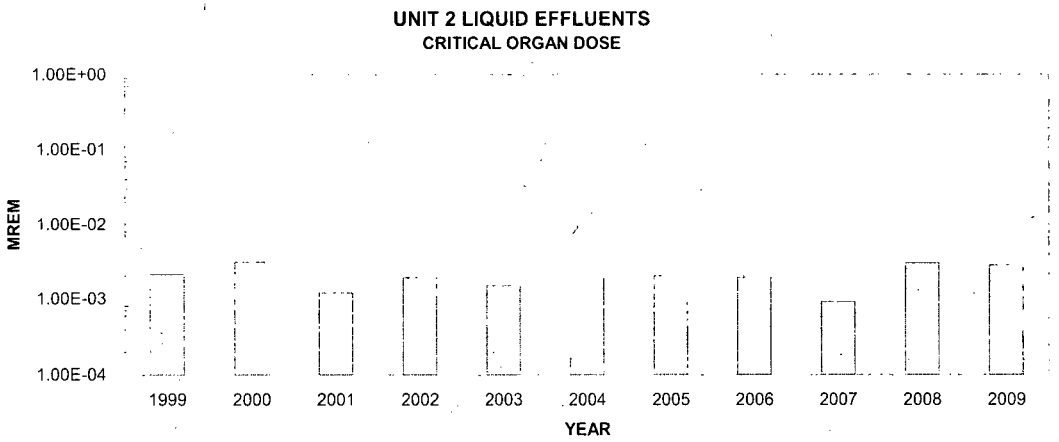

UNIT 2 LIQUID EFFLUENTS
FISSION AND ACTIVATION PRODUCTS
CURIES
1.00E+00
1.00E-01
1.00E-02
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

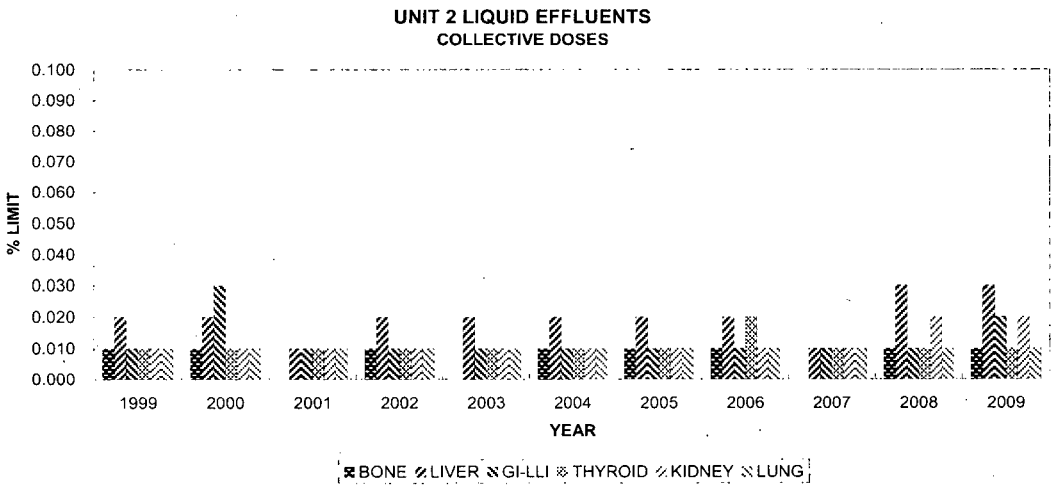

UNIT 2 LIQUID EFFLUENTS
TRITIUM
CURIES
1.00E+04
1.00E+03
1.00E+02
1.00E+01
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

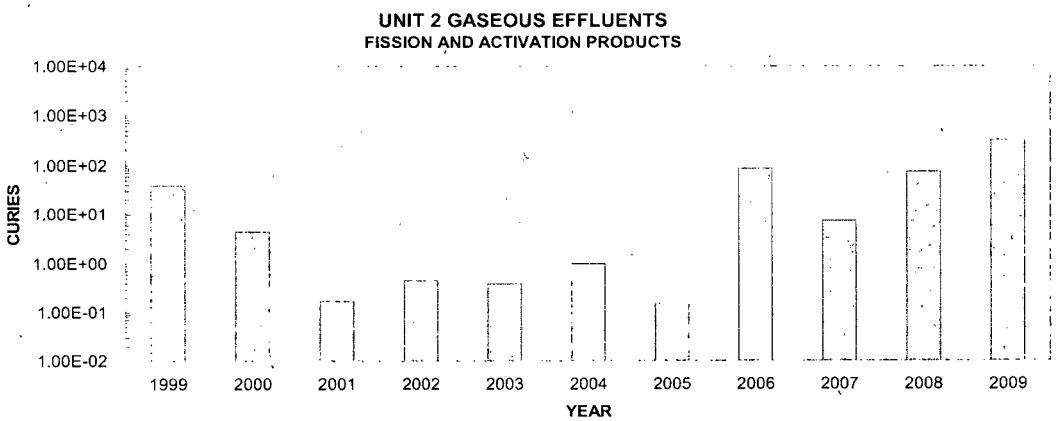

UNIT 2 LIQUID EFFLUENTS
DISSOLVED AND ENTRAINED GASES
CURIES
1.00E+03
1.00E+02
1.00E+01
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

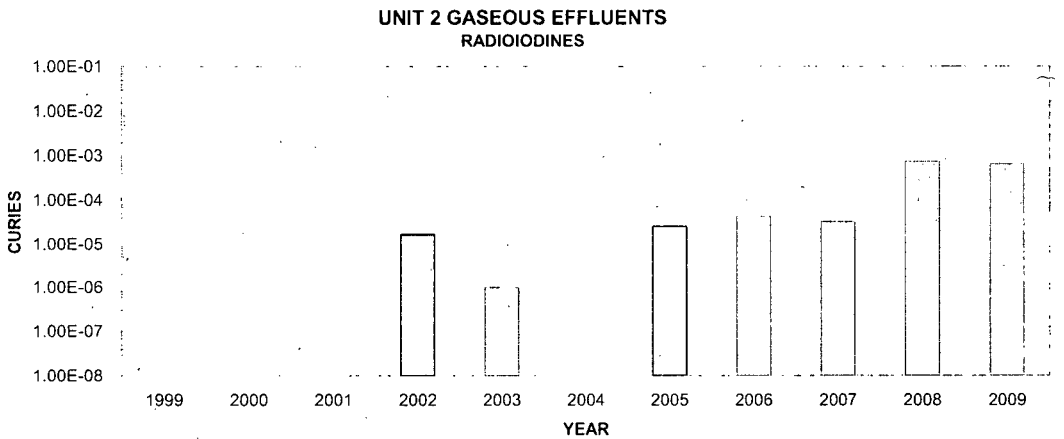

UNIT 2 LIQUID EFFLUENTS
TOTAL VOLUME RELEASED
GALLONS
1.00E+08
1.00E+07
1.00E+06
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

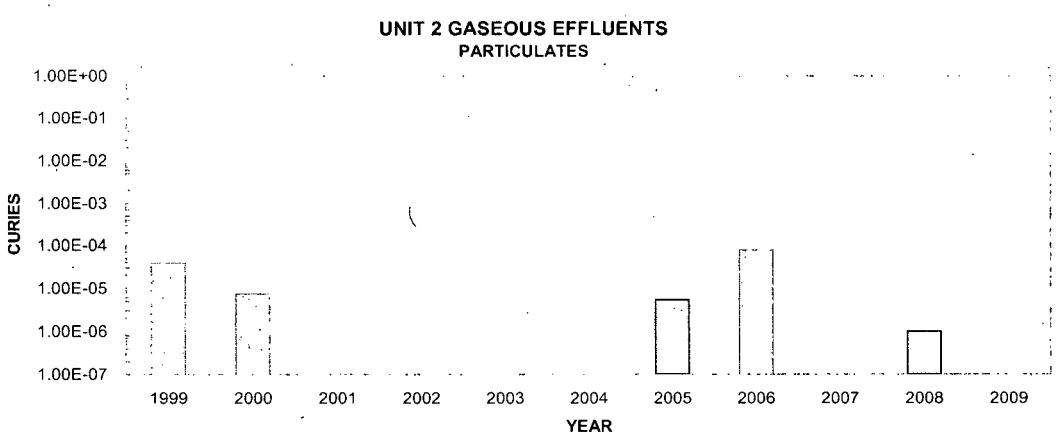

UNIT 2 LIQUID EFFLUENTS
TOTAL BODY DOSE
MREM
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1.00E-04
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

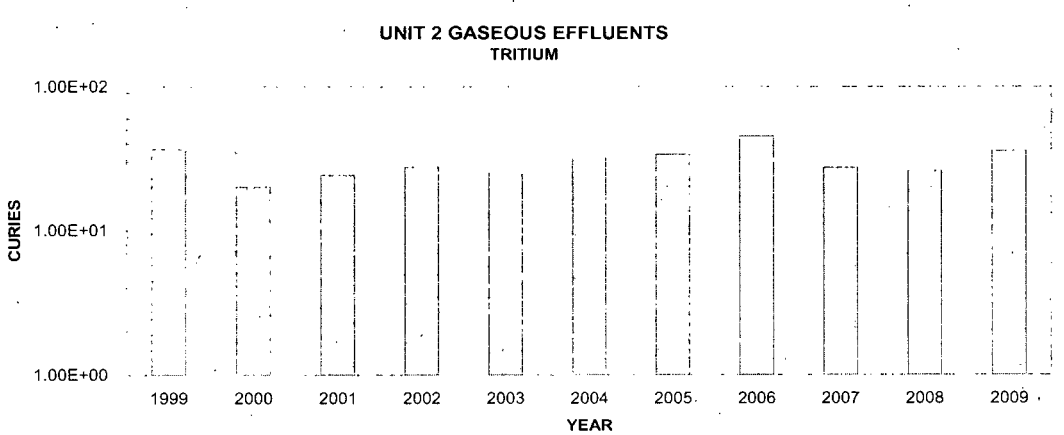

UNIT 2 LIQUID EFFLUENTS
CRITICAL ORGAN DOSE
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1.00E-04
MREM
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

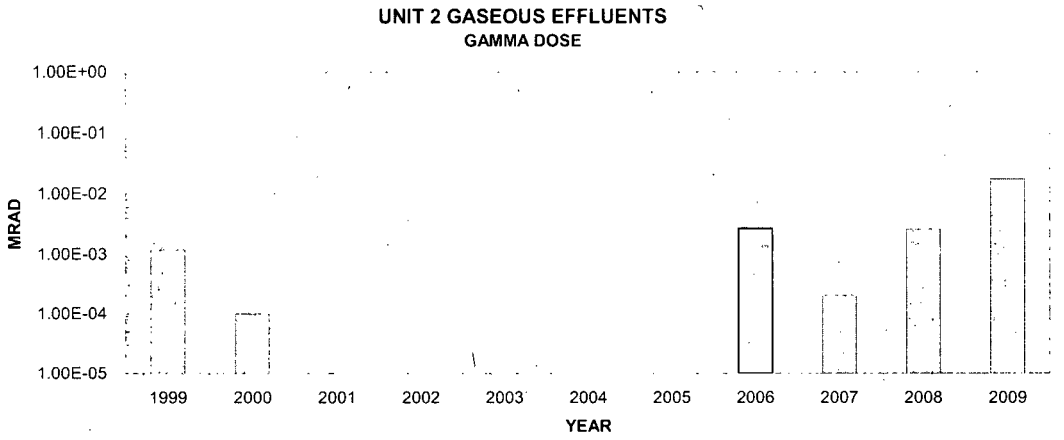

UNIT 2 LIQUID EFFLUENTS
COLLECTIVE DOSES
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
% LIMIT
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR
BONE
LIVER
GI-LLI
THYROID
KIDNEY
LUNG

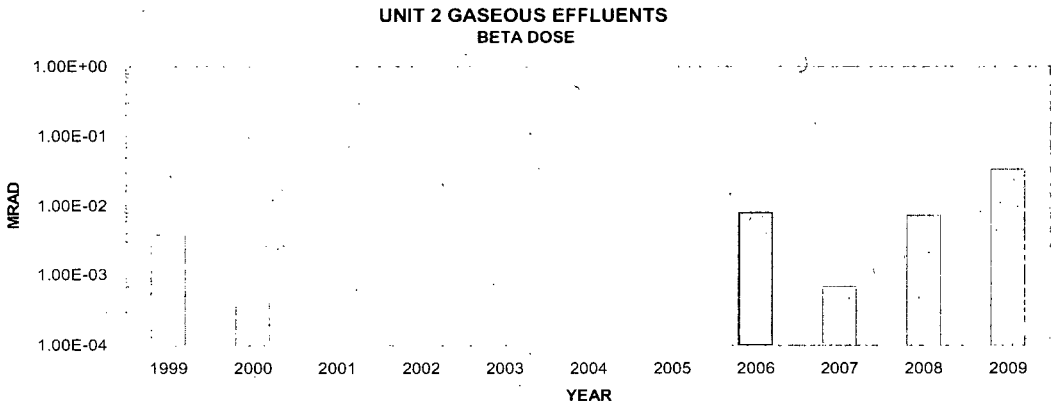

UNIT 2 GASEOUS EFFLUENTS
FISSION AND ACTIVATION PRODUCTS
1.00E+04
1.00E+03
1.00E+02
1.00E+01
1.00E+00
1.00E-01
1.00E-02
CURIES
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

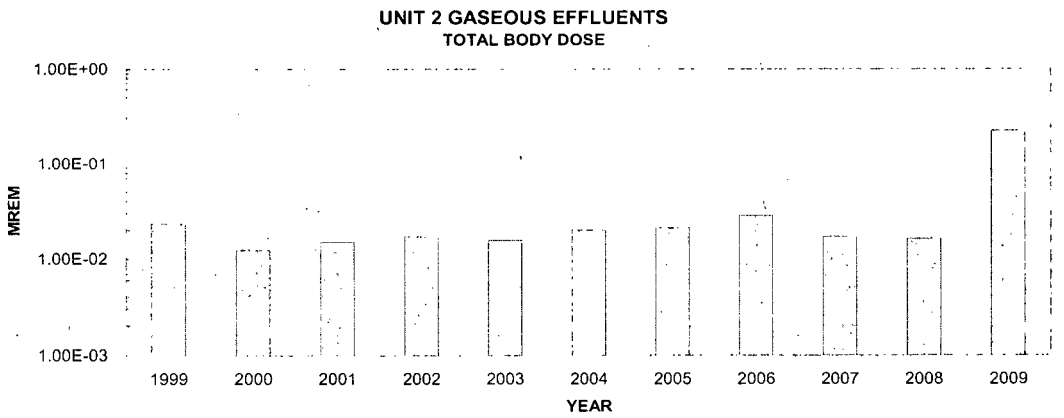

UNIT 2 GASEOUS EFFLUENTS
RADIOIODINES
CURIES
1.00E-01
1.00E-02
1.00E-03
1.00E-04
1.00E-05
1.00E-06
1.00E-07
1.00E-08
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

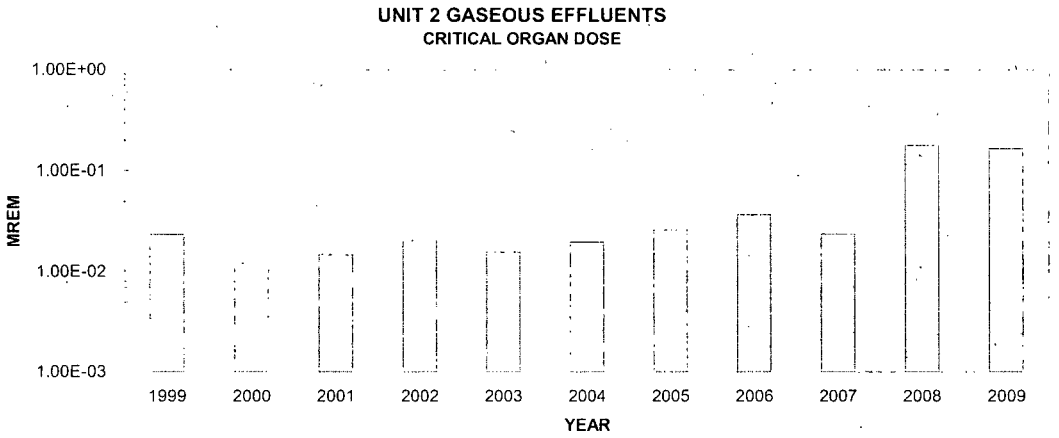

UNIT 2 GASEOUS EFFLUENTS
PARTICULATES
CURIES
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1.00E-04
1.00E-05
1.00E-06
1.00E-07
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR

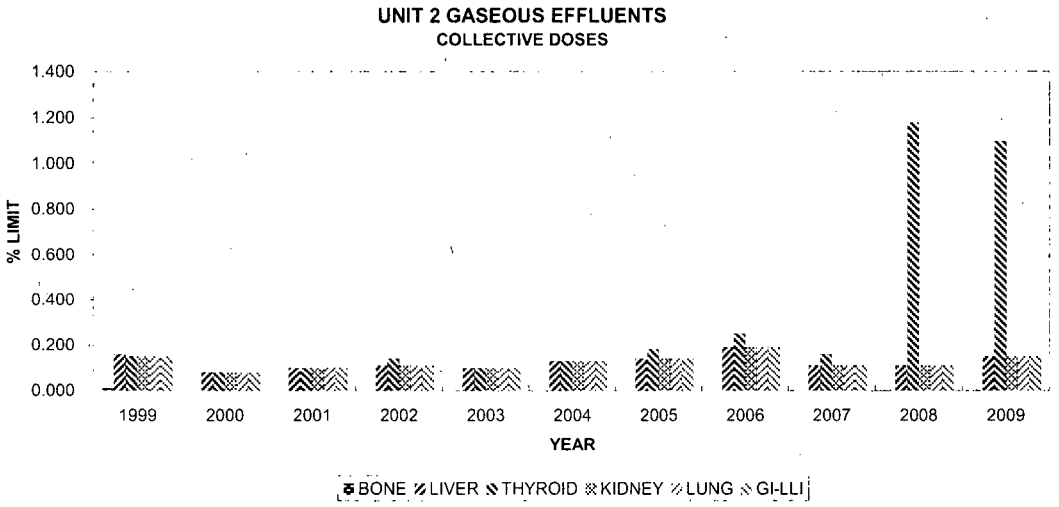

UNIT 2 GASEOUS EFFLUENTS
TRITIUM
CURIES
1.00E+02
1.00E+01
1.00E+00
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR


UNIT 2 GASEOUS EFFLUENTS
GAMMA DOSE
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1.00E-04
1.00E-05
MRAD
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR


UNIT 2 GASEOUS EFFLUENTS
BETA DOSE
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1.00E-04
MRAD
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR


UNIT 2 GASEOUS EFFLUENTS
TOTAL BODY DOSE
1.00E+00
1.00E-01
1.00E-02
1.00E-03
MREM
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR


UNIT 2 GASEOUS EFFLUENTS
CRITICAL ORGAN DOSE
1.00E+00
1.00E-01
1.00E-02
1.00E-03
MREM
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR


UNIT 2 GASEOUS EFFLUENTS
COLLECTIVE DOSES
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
% LIMIT
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
YEAR
BONE
LIVER
THYROID
KIDNEY
LUNG
GI-LLI

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 ARERR.

This summary covers shipments from January 1 through December 31, 2009. The summary for solid waste shipments is as follows:

NRC Regulatory Guide 1.21 Reports

Page 1

Report Date : 2/17/2010

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2009 to 06/30/2009 Percent Cutoff: 0

Waste Stream : Resins, Filters, and Evap Bottoms
Cartridge Filters U1 Primary Resin (RWE HU2 Primary Resin (RWE HU1 Secondary Resin
U1 Secondary Resin Secondary Resin in Sea-LSec. Resin in B-25

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	% Error (Ci)
A	2.51E+03	7.10E+01	1.61E+00	+/- 25%
B	1.10E+02	3.11E+00	2.10E+01	+/- 25%
C	0.00E+00	0.00E+00	0.00E+00	+/- 25%
All	2.62E+03	7.41E+01	2.26E+01	+/- 25%

Waste Stream : Dry Active Waste
Comp Trash in SV Metal Trash in SV Metal trash/Comp trash Metal/Comp Trash
Non Comp Trash

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	%Error (Ci)
A	6.43E+03	1.82E+02	1.20E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	6.43E+03	1.82E+02	1.20E+00	+/-25%

Waste Stream : Irradiated Components

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	% Error (Ci)
A	0.00E+00	0.00E+00	0.00E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	0.00E+00	0.00E+00	0.00E+00	+/-25%

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2009 to 06/30/2009 Percent Cutoff: 0

Waste Stream : Other Waste

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	% Error (Ci)
A	0.00E+00	0.00E+00	0.00E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	0.00E+00	0.00E+00	0.00E+00	+/-25%

Waste Stream : Sum of All 4 Categories

Cartridge Filters	U1 Primary Resin (RWE	U2 Primary Resin (RWE	Comp Trash in SV
Metal Trash in SV	U1 Secondary Resin	Metal trash/Comp trash	Metal/Comp Trash
U1 Secondary Resin	Secondary Resin in Sea-	Sec. Resin in B-25	Non Comp Trash

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	% Error (Ci)
A	8.94E+03	2.53E+02	2.81E+00	+/-25%
B	1.10E+02	3.11E+00	2.10E+01	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	9.05E+03	2.56E+02	2.38E+01	+/-25%

-Combined Waste Type Shipment, Major Volume Waste Type Shown

Report Date : 2/17/2010

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2009 to 06/30/2009

Number of Shipments	Mode of Transportation	Destination
12	Hittman Transport	Bear Creek Operations
5	Hittman Transport	Gallaher Road Operations
1	Hittman Transport	Studsvik Processsing Facility

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2009 to 06/30/2009 Percent Cutoff: 0

Resins, Filters, and Evap Bottoms		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
C-14	7.741%	1.25E-01
Mn-54	0.016%	2.64E-04
Co-60	0.193%	3.11E-03
Ni-63	6.738%	1.09E-01
Cs-134	0.686%	1.11E-02
Cs-137	84.624%	1.36E+00
Resins, Filters, and Evap Bottoms		
Waste Class B		
Nuclide Name	Percent Abundance	Curies
H-3	0.021%	4.36E-03
C-14	1.790%	3.76E-01
Sc-46	0.000%	1.09E-05
Cr-51	0.000%	2.87E-07
Mn-54	2.162%	4.54E-01
Fe-55	11.032%	2.32E+00
Fe-59	0.000%	3.73E-06
Co-57	0.286%	6.00E-02
Co-58	1.250%	2.62E-01
Co-60	12.837%	2.70E+00
Ni-59	0.047%	9.91E-03
Ni-63	32.363%	6.80E+00
Zn-65	0.066%	1.38E-02
Sr-89	0.000%	4.53E-05
Sr-90	0.044%	9.19E-03
Zr-95	0.004%	7.49E-04
Nb-95	0.000%	5.23E-06
Tc-99	0.023%	4.79E-03
Sn-113	0.003%	5.85E-04
Sb-125	0.995%	2.09E-01
Cs-134	15.124%	3.18E+00
Cs-137	21.888%	4.60E+00
Ce-144	0.066%	1.39E-02
Hf-181	0.000%	2.30E-07
Cm-242	0.000%	8.62E-06
Cm-243	0.000%	3.19E-05
Cm-244	0.000%	3.12E-05
Resins, Filters, and Evap Bottoms		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
H-3	0.019%	4.36E-03
C-14	2.213%	5.00E-01
Sc-46	0.000%	1.09E-05
Cr-51	0.000%	2.87E-07
Mn-54	2.009%	4.54E-01
Fe-55	10.246%	2.32E+00

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2009 to 06/30/2009 Percent Cutoff: 0

Fe-59	0.000%	3.73E-06
Co-57	0.265%	6.00E-02
Co-58	1.161%	2.62E-01
Co-60	11.937%	2.70E+00
Ni-59	0.044%	9.91E-03
Ni-63	30.538%	6.90E+00
Zn-65	0.061%	1.38E-02
Sr-89	0.000%	4.53E-05
Sr-90	0.041%	9.19E-03
Zr-95	0.003%	7.49E-04
Nb-95	0.000%	5.23E-06
Tc-99	0.021%	4.79E-03
Sn-113	0.003%	5.85E-04
Sb-125	0.924%	2.09E-01
Cs-134	14.095%	3.19E+00
Cs-137	26.357%	5.96E+00
Ce-144	0.062%	1.39E-02
Hf-181	0.000%	2.30E-07
Cm-242	0.000%	8.62E-06
Cm-243	0.000%	3.19E-05
Cm-244	0.000%	3.12E-05
Dry Active Waste		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
C-14	1.047%	1.25E-02
Cr-51	2.110%	2.53E-02
Mn-54	1.838%	2.20E-02
Fe-55	19.763%	2.37E-01
Fe-59	0.416%	4.99E-03
Co-57	0.188%	2.26E-03
Co-58	18.840%	2.26E-01
Co-60	10.042%	1.20E-01
Ni-59	0.081%	9.69E-04
Ni-63	21.816%	2.61E-01
Zn-65	0.127%	1.52E-03
Sr-90	0.005%	6.24E-05
Zr-95	1.148%	1.38E-02
Nb-95	2.817%	3.38E-02
Sn-113	0.028%	3.39E-04
Sb-125	1.282%	1.54E-02
Cs-134	4.634%	5.55E-02
Cs-137	13.768%	1.65E-01
Ce-144	0.047%	5.63E-04
Pu-239	0.000%	3.59E-06
Am-241	0.000%	4.13E-06
Cm-243	0.001%	8.13E-06
Cm-244	0.001%	8.13E-06
Dry Active Waste		
Waste Class All		

NRC Regulatory Guide 1.21 Reports

Report Date : 2/17/2010

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2009 to 06/30/2009 Percent Cutoff: 0

Nuclide Name	Percent Abundance	Curies
C-14	1.047%	1.25E-02
Cr-51	2.110%	2.53E-02
Mn-54	1.838%	2.20E-02
Fe-55	19.763%	2.37E-01
Fe-59	0.416%	4.99E-03
Co-57	0.188%	2.26E-03
Co-58	18.840%	2.26E-01
Co-60	10.042%	1.20E-01
Ni-59	0.081%	9.69E-04
Ni-63	21.816%	2.61E-01
Zn-65	0.127%	1.52E-03
Sr-90	0.005%	6.24E-05
Zr-95	1.148%	1.38E-02
Nb-95	2.817%	3.38E-02
Sn-113	0.028%	3.39E-04
Sb-125	1.282%	1.54E-02
Cs-134	4.634%	5.55E-02
Cs-137	13.768%	1.65E-01
Ce-144	0.047%	5.63E-04
Pu-238	0.000%	3.59E-06
Am-241	0.000%	4.13E-06
Cm-243	0.001%	8.13E-06
Cm-244	0.001%	8.13E-06
Sum of All 4 Categories		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
C-14	4.885%	1.37E-01
Cr-51	0.900%	2.53E-02
Mn-54	0.794%	2.23E-02
Fe-55	8.432%	2.37E-01
Fe-59	0.178%	4.99E-03
Co-57	0.080%	2.26E-03
Co-58	8.038%	2.26E-01
Co-60	4.395%	1.23E-01
Ni-59	0.035%	9.69E-04
Ni-63	13.172%	3.70E-01
Zn-65	0.054%	1.52E-03
Sr-90	0.002%	6.24E-05
Zr-95	0.490%	1.38E-02
Nb-95	1.202%	3.38E-02
Sn-113	0.012%	3.39E-04
Sb-125	0.547%	1.54E-02
Cs-134	2.371%	6.66E-02
Cs-137	54.392%	1.53E+00
Ce-144	0.020%	5.63E-04
Pu-238	0.000%	3.59E-06
Am-241	0.000%	4.13E-06
Cm-243	0.000%	8.13E-06
Cm-244	0.000%	8.13E-06

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2009 to 06/30/2009 Percent Cutoff: 0

Sum of All 4 Categories		
Waste Class B		
Nuclide Name	Percent Abundance	Curies
H-3	0.021%	4.36E-03
C-14	1.790%	3.76E-01
Sc-46	0.000%	1.09E-05
Cr-51	0.000%	2.87E-07
Mn-54	2.162%	4.54E-01
Fe-55	11.032%	2.32E+00
Fe-59	0.000%	3.73E-06
Co-57	0.286%	6.00E-02
Co-58	1.250%	2.62E-01
Co-60	12.837%	2.70E+00
Ni-59	0.047%	9.91E-03
Ni-63	32.363%	6.80E+00
Zn-65	0.066%	1.38E-02
Sr-89	0.000%	4.53E-05
Sr-90	0.044%	9.19E-03
Zr-95	0.004%	7.49E-04
Nb-95	0.000%	5.23E-06
Tc-99	0.023%	4.79E-03
Sn-113	0.003%	5.85E-04
Sb-125	0.995%	2.09E-01
Cs-134	15.124%	3.18E+00
Cs-137	21.888%	4.60E+00
Ce-144	0.066%	1.39E-02
Hf-181	0.000%	2.30E-07
Cm-242	0.000%	8.62E-06
Cm-243	0.000%	3.19E-05
Cm-244	0.000%	3.12E-05
Sum of All 4 Categories		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
H-3	0.018%	4.36E-03
C-14	2.155%	5.13E-01
Sc-46	0.000%	1.09E-05
Cr-51	0.106%	2.53E-02
Mn-54	2.001%	4.76E-01
Fe-55	10.725%	2.55E+00
Fe-59	0.021%	4.99E-03
Co-57	0.262%	6.23E-02
Co-58	2.051%	4.88E-01
Co-60	11.841%	2.82E+00
Ni-59	0.046%	1.09E-02
Ni-63	30.099%	7.17E+00
Zn-65	0.064%	1.53E-02
Sr-89	0.000%	4.53E-05
Sr-90	0.039%	9.25E-03
Zr-95	0.061%	1.45E-02

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2009 to 06/30/2009 Percent Cutoff: 0

Nb-95	0.142%	3.38E-02
Tc-99	0.020%	4.79E-03
Sn-113	0.004%	9.24E-04
Sb-125	0.942%	2.24E-01
Cs-134	13.619%	3.24E+00
Cs-137	25.723%	6.12E+00
Ce-144	0.061%	1.45E-02
Hf-181	0.000%	2.30E-07
Pu-238	0.000%	3.59E-06
Am-241	0.000%	4.13E-06
Cm-242	0.000%	8.62E-06
Cm-243	0.000%	4.00E-05
Cm-244	0.000%	3.93E-05

Report Date: 2/17/2010

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2009 to 06/30/2009

Manifest Number	Date Shipped	Waste Volume Used	Burial volume Used
RSR 09-062	6/30/2009	Yes	
RSR 09-054	6/11/2009	Yes	
RSR 09-053	5/26/2009	Yes	
RSR 09-052	5/21/2009	Yes	
RSR 09-051	5/19/2009	Yes	
RSR 09-047	5/12/2009	Yes	
RSR 09-048	5/7/2009	Yes	
RSR 09-044	5/5/2009	Yes	
RSR 09-041	4/28/2009	Yes	
RSR 09-039	4/21/2009	Yes	
RSR 09-032	3/17/2009	Yes	
RSR 09-026	2/25/2009	Yes	
RSR 09-022	2/19/2009	Yes	
RSR 09-021	2/17/2009	Yes	
RSR 09-020	2/12/2009	Yes	
RSR 09-017	2/10/2009	Yes	
RSR 09-013	1/22/2009	Yes	
RSR 09-003	1/13/2009	Yes	

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 07/01/2009 to 12/31/2009 Percent Cutoff: 0

Waste Stream : Resins, Filters, and Evap Bottoms
U1 Primary Resin (RWE

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	% Error (Ci)
A	6.08E+02	1.72E+01	1.68E-02	+/- 25%
B	1.00E+02	2.83E+00	2.59E+01	+/- 25%
C	0.00E+00	0.00E+00	0.00E+00	+/- 25%
All	7.08E+02	2.01E+01	2.59E+01	+/- 25%

Waste Stream : Dry Active Waste
Comp Trash in SV

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	%Error (Ci)
A	1.96E+03	5.54E+01	6.95E-02	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	1.96E+03	5.54E+01	6.95E-02	+/-25%

Waste Stream : Irradiated Components

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	% Error (Ci)
A	0.00E+00	0.00E+00	0.00E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	0.00E+00	0.00E+00	0.00E+00	+/-25%

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Report Date : 2/17/2010

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 07/01/2009 to 12/31/2009 Percent Cutoff: 0

Waste Stream : Other Waste
Oil

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	% Error (Ci)
A	4.01E+02	1.14E+01	6.09E-03	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	4.01E+02	1.14E+01	6.09E-03	+/-25%

Waste Stream : Sum of All 4 Categories
U1 Primary Resin (RWE IComp Trash in SV Oil

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	% Error (Ci)
A	2.97E+03	8.40E+01	9.23E-02	+/-25%
B	1.00E+02	2.83E+00	2.59E+01	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	3.07E+03	8.68E+01	2.60E+01	+/-25%

-Combined Waste Type Shipment, Major Volume Waste Type Shown

Report Date : 2/17/2010

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 07/01/2009 to 12/31/2009

Number of Shipments	Mode of Transportation	Destination
2	Hittman Transport	Bear Creek Operations
1	Hittman Transport	STUDSVIK Processing Facility
1	Hittman Transport	Studsvik Processsing Facility

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Report Date : 2/17/2010

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 07/01/2009 to 12/31/2009 Percent Cutoff: 0

Resins, Filters, and Evap Bottoms		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
Co-60	0.398%	6.68E-05
Cs-134	0.687%	1.15E-04
Cs-137	98.915%	1.66E-02
Resins, Filters, and Evap Bottoms		
Waste Class B		
Nuclide Name	Percent Abundance	Curies
C-14	1.939%	5.02E-01
Mn-54	2.132%	5.51E-01
Fe-55	7.829%	2.03E+00
Co-57	0.288%	7.44E-02
Co-58	1.217%	3.15E-01
Co-60	13.207%	3.42E+00
Ni-63	32.166%	8.32E+00
Zn-65	0.067%	1.73E-02
Sr-89	0.000%	5.50E-05
Sr-90	0.047%	1.21E-02
Tc-99	0.009%	2.44E-03
Sb-125	0.865%	2.24E-01
Cs-134	16.359%	4.23E+00
Cs-137	23.808%	6.16E+00
Ce-144	0.068%	1.75E-02
Resins, Filters, and Evap Bottoms		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
C-14	1.938%	5.02E-01
Mn-54	2.130%	5.51E-01
Fe-55	7.824%	2.03E+00
Co-57	0.288%	7.44E-02
Co-58	1.216%	3.15E-01
Co-60	13.198%	3.42E+00
Ni-63	32.145%	8.32E+00
Zn-65	0.067%	1.73E-02
Sr-89	0.000%	5.50E-05
Sr-90	0.047%	1.21E-02
Tc-99	0.009%	2.44E-03
Sb-125	0.864%	2.24E-01
Cs-134	16.349%	4.23E+00
Cs-137	23.857%	6.18E+00
Ce-144	0.068%	1.75E-02
Dry Active Waste		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
C-14	1.297%	9.01E-04
Cr-51	4.104%	2.85E-03

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 07/01/2009 to 12/31/2009 Percent Cutoff: 0

Mn-54	0.933%	6.49E-04
Fe-55	12.439%	8.64E-03
Fe-59	0.680%	4.72E-04
Co-57	0.138%	9.56E-05
Co-58	18.649%	1.30E-02
Co-60	9.371%	6.51E-03
Ni-63	15.185%	1.06E-02
Zn-65	0.236%	1.64E-04
Zr-95	1.684%	1.17E-03
Nb-95	4.601%	3.20E-03
Sb-125	1.160%	8.06E-04
Cs-134	6.354%	4.41E-03
Cs-137	23.168%	1.61E-02
Dry Active Waste		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
C-14	1.297%	9.01E-04
Cr-51	4.104%	2.85E-03
Mn-54	0.933%	6.49E-04
Fe-55	12.439%	8.64E-03
Fe-59	0.680%	4.72E-04
Co-57	0.138%	9.56E-05
Co-58	18.649%	1.30E-02
Co-60	9.371%	6.51E-03
Ni-63	15.185%	1.06E-02
Zn-65	0.236%	1.64E-04
Zr-95	1.684%	1.17E-03
Nb-95	4.601%	3.20E-03
Sb-125	1.160%	8.06E-04
Cs-134	6.354%	4.41E-03
Cs-137	23.168%	1.61E-02
Other Waste		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
Co-60	17.081%	1.04E-03
Cs-137	43.035%	2.62E-03
Ce-144	39.884%	2.43E-03
Other Waste		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
Co-60	17.081%	1.04E-03
Cs-137	43.035%	2.62E-03
Ce-144	39.884%	2.43E-03
Sum of All 4 Categories		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
C-14	0.576%	9.01E-04

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Report Date : 2/17/2010

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 07/01/2009 to 12/31/2009 Percent Cutoff: 0

Cr-51	3.089%	2.85E-03
Mn-54	0.702%	6.49E-04
Fe-55	9.361%	8.64E-03
Fe-59	0.511%	4.72E-04
Co-57	0.104%	9.56E-05
Co-58	14.034%	1.30E-02
Co-60	8.251%	7.62E-03
Ni-63	11.427%	1.06E-02
Zn-65	0.177%	1.64E-04
Zr-95	1.267%	1.17E-03
Nb-95	3.463%	3.20E-03
Sb-125	0.873%	8.06E-04
Cs-134	4.906%	4.53E-03
Cs-137	38.226%	3.53E-02
Ce-144	2.631%	2.43E-03
Sum of All 4 Categories		
Waste Class B		
Nuclide Name	Percent Abundance	Curies
C-14	1.939%	5.02E-01
Mn-54	2.132%	5.51E-01
Fe-55	7.829%	2.03E+00
Co-57	0.288%	7.44E-02
Co-58	1.217%	3.15E-01
Co-60	13.207%	3.42E+00
Ni-63	32.166%	8.32E+00
Zn-65	0.067%	1.73E-02
Sr-89	0.000%	5.50E-05
Sr-90	0.047%	1.21E-02
Tc-99	0.009%	2.44E-03
Sb-125	0.865%	2.24E-01
Cs-134	16.359%	4.23E+00
Cs-137	23.808%	6.16E+00
Ce-144	0.068%	1.75E-02
Sum of All 4 Categories		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
C-14	1.936%	5.02E-01
Cr-51	0.011%	2.85E-03
Mn-54	2.127%	5.52E-01
Fe-55	7.835%	2.03E+00
Fe-59	0.002%	4.72E-04
Co-57	0.287%	7.45E-02
Co-58	1.263%	3.28E-01
Co-60	13.189%	3.42E+00
Ni-63	32.092%	8.33E+00
Zn-65	0.067%	1.74E-02
Sr-89	0.000%	5.50E-05
Sr-90	0.046%	1.21E-02
Zr-95	0.005%	1.17E-03

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Report Date : 2/17/2010

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 07/01/2009 to 12/31/2009 Percent Cutoff: 0

Nb-95	0.012%	3.20E-03
Tc-99	0.009%	2.44E-03
Sb-125	0.865%	2.24E-01
Cs-134	16.318%	4.24E+00
Cs-137	23.859%	6.19E+00
Ce-144	0.077%	2.00E-02

Report Date : 2/17/2010

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 07/01/2009 to 12/31/2009

Manifest Number	Date Shipped	Waste Volume Used	Burial volume Used
RSR 09-132	12/10/2009	Yes	
RSR 09-090	9/10/2009	Yes	
RSR 09-073	7/22/2009	Yes	
RSR 09-053	7/7/2009	Yes	

9. UNPLANNED RELEASES

An unplanned release is the unintended discharge of a volume of liquid or airborne radioactivity to unrestricted areas.

During 2009, there were four unplanned releases to an unrestricted area.

2GR2009-0016: Arkansas Nuclear One Unit #2 Main Turbine was taken off-line on February 7, 2009, due to a ruptured extraction steam drain line. The broken pipe was a Carbon Steel Schedule 80, 1 inch diameter pipe, designed as a moisture removal line from the high pressure Turbine Steam Chest, draining into Extraction Steam Line 2GBD-1. The leak was located immediately downstream of Flow Orifice 2FO-0860 in line 2GBD-92-1". The location of the break was un-isolable, requiring the unit to reduce power and take the turbine off line. The fundamental cause of the failure was erosion of the pipe wall below the orifice. The pipe wall thinned to the point of rupture due to Flow Accelerated Corrosion (FAC) with mechanical erosion an unlikely but possible contributor. The ANO FAC program has a gap identifying critical wear areas in small-bore piping (i.e. areas downstream of orifices similar to the subject failure). The failed line is listed in the FAC program documents as susceptible, but was not being monitored at the failed location.

The Unit 2 steam release permit 2GR2009-0016 containing the activity and dose released as a result of the extraction steam line break on February 7, 2009, was categorized as an "unplanned" release as defined by Procedure 1604.015, "Analysis of Unit Vents", Attachment 2, "Definition of Unplanned Releases". Sample data indicated that only a small amount of tritium was released (4.23E-4 curies) during this time. Correspondingly, the dose associated with the release (ITP = 2.601E-7 mRem) was insignificant compared to the ODCM ITP limits (Qrtly = 7.5 mRem, Annual = 15 mRem).

The following table lists the percent of the year-to-date ITP dose values, and the corresponding impact on the quarterly and yearly ODCM limits:

Dose	% of YTD Dose	% of ODCM Qtrly Limit	% of ODCM Yearly Limit
ITP	0.011	0.0000035	0.0000017

YTD = year to date

Corrective actions issued to prevent re-occurrence include the following:

1. Add the P000 exam locations to the 2GBD-92-1" and 2GBD-156-1" piping inspections (downstream of orifices) to the ANO FAC inspection program and the addition of inspections of all elbows on both lines.

2. Implement a re-occurring inspection interval on the lines as required by program procedures.

3. Incorporate the latest recommendations of NSAC-202L Rev. 3 concerning inspections of small bore piping, including sections downstream of orifices and other flow restrictions into the ANO FAC Program.

4. Incorporate recommendations of NSAC-202L, Rev. 3, which includes developing and implementing a susceptibility/consequences analyses ranking system.

2GR2009-0097: A radioactive effluent release occurred from the Unit 2 Containment Building via the equipment hatch on September 2, 2009, at 0340 hrs. This release was caused by Containment Purge Exhaust Fan (2VEF-15) tripping due to high radiation. The cause of the high radiation was a result of venting the Pressurizer to the Containment Sump as part of collapsing the Pressurizer bubble. Shortly after the tripping of 2VEF-15, the Unit 2 Equipment Hatch was closed as a result of radioactivity being detected by Radiation Protection stationed at the hatch. Effluent samples were collected during the release and an effluent release permit (2GR2009-0097) was generated to document the activity and dose discharged. According to the Unit 2 Operations Station Log for 9/2/2009, the initial trip of 2VEF-15 occurred at 0340 hrs. The initial trip time was used as the release start time for the equipment hatch release. The equipment hatch was closed at 0425 hrs; therefore, this time was used as the release end time. A total of 7.77E-5 curies of tritium, 6E-5 curies of particulate activity and 0.42 curies of noble gas activity were released. This corresponded to a gamma dose of 1.6E-5 mRad, a beta dose of 4.7E-5 mRad and ITP dose of 6.1E-5 mRem.

The following table lists the percent of the year-to-date dose values, and the corresponding impact on the quarterly and yearly ODCM limits:

Dose	% of YTD Dose	% of ODCM Qtrly Limit	% of ODCM Yearly Limit
Gamma Air	0.25	0.0003	0.00016
Beta Air	0.30	0.0005	0.00023
ITP	0.40	0.0008	0.00041

The above unplanned releases resulted in minor amounts of curies and dose released from the equipment hatch. The releases had an insignificant impact on the ANO YTD doses as well as the ODCM Quarterly and Yearly dose limits. Additionally, the unplanned releases described above are well below the 30-day reporting criteria described in ODCM Limitation L3.4.1.

Corrective actions have been issued as a result of the unplanned release to prevent re-occurrence. The actions include:

1. Evaluate the current Containment Purge Radmonitor (2RITS-8233) setpoint requirements contained within OP-2104.033 and revise as necessary to prevent unnecessary tripping of 2VEF-15.

2. Evaluate adding requirements to procedure OP-1104.033 to help preclude hatch releases. Suggested requirements are:

    - If Unit 1 VEF-15 trips and the equipment hatch is open, then the personnel hatch doors will be immediately opened and remain open. A Radwaste Area Ventilation Fan (VEF-8A/B) will be verified to be in service until purge ventilation is restored. If securing purge fans due to maintenance with the equipment hatch open, then verify personnel hatch doors are open with Radwaste ventilation in service prior to securing purge exhaust fan. Request Radwaste personnel stationed at equipment hatch periodically monitor airflow at hatch to verify flow of air into containment building. If it is necessary to close the personnel hatch doors while the containment ventilation is out of service, then personnel hatch doors shall remain open until the equipment hatch is closed.

- If personnel hatch doors are not open and cannot be opened, the equipment hatch will be immediately closed and remain closed until containment ventilation is restored or personnel hatch doors are opened.

3. Evaluate adding requirements to procedure OP-2104.033 to help preclude hatch releases. Suggested requirements are:

   - If Unit 2 2VEF-15 trips and the equipment hatch is open, then the personnel hatch doors will be immediately opened and remain open and a Radwaste Area Ventilation Fan (2VEF-8A/B) will be verified to be in service until purge ventilation is restored. If securing purge fans due to maintenance with equipment hatch open, then verify personnel hatch doors are open with Radwaste ventilation in service prior to securing purge exhaust fan. Request Radwaste personnel stationed at equipment hatch periodically monitor airflow at hatch to verify flow of air into containment building. If it is necessary to close the personnel hatch doors while the containment ventilation is out of service, then personnel hatch doors shall remain open until the equipment hatch is closed.

   - If personnel hatch doors are not open and cannot be opened, the equipment hatch will be immediately closed and remain closed until containment ventilation is restored or personnel hatch doors are opened.

2GR2009-0098: There was a second release of a small amount of tritium through the Unit 2 Equipment Hatch. The release was due to the tripping of Containment Purge Radmonitor (2RITS-8233) during the lowering of the radmonitor setpoint by Operations from 1E6 counts per minute (cpm) to 1.8E4 cpm. This resulted in the Containment Purge Exhaust Fan (2VEF-15) tripping off line at 0943 hrs on September 4, 2009. 2VEF-15 was successfully restarted at 0950 hrs on September 4, 2009. Effluent samples collected at the equipment hatch indicated the release of radioactivity. Only a small amount of tritium was detected. Gaseous effluent release permit 2GR2009-0098 was issued to document the dose released. A total of 7.45E-7 curies of tritium were released which resulted in an ITP dose of 4.6E-10 mRem.

The following table lists the percent of the year-to-date dose values, and the corresponding impact on the quarterly and yearly ODCM limits:

Dose	% of YTD Dose	% of ODCM Qtrly Limit	% of ODCM Yearly Limit
ITP	3.0E-6	6.1E-9	3.1E-9

The above unplanned releases resulted in only minor amounts of curies and dose released from the equipment hatch. The releases had an insignificant impact on the ANO YTD doses as well as the ODCM Quarterly and Yearly dose limits. Additionally, the unplanned releases described above are well below the 30-day reporting criteria described in ODCM Limitation L3.4.1.

2GR2009-0099: There was a release of a small amount of radioactivity through the Unit 2 Equipment Hatch on 9/7/09. The release was due to the tripping of Containment Purge Radmonitor (2RITS-8233) which in turn, secured the Containment Purge Exhaust Fan (2VEF-15). The setpoint of 2RITS-8233 had previously been adjusted to ≤ 2X the background per OP-2104.033, Attachment B, "Adjustment of Containment Purge Rad Monitor Setpoint." At 1138 hrs, 2VEF-15 was secured due to the setpoint on 2RITS-8233 being exceeded. ANO-2 Operations successfully re-started 2VEF-15 at 1220 hrs. Effluent samples collected at the equipment hatch indicated the presence of radioactivity. Therefore, gaseous release permit 2GR2009-0099 was issued to document activity and dose released. A total of 1.05E-5 curies of tritium, 6.09E-7 curies of particulate activity, and 8.95E-4 curies of noble gas activity were released. This corresponded to a gamma dose of 2.8E-8 mRad, a beta dose of 8.3E-8 mRad, and ITP dose of 7.2E-5 mRem.

The following table lists the percent of the year-to-date dose values, and the corresponding impact on the quarterly and yearly ODCM limits:

Dose	% of YTD Dose	% of ODCM Qtrly Limit	% of ODCM Yearly Limit
Gamma Air	0.0004	0.0000006	0.0000003
Beta Air	0.0005	0.0000008	0.0000004
ITP	0.5	0.00096	0.00048

The above unplanned releases resulted in only minor amounts of curies and dose released from the equipment hatch. The releases had an insignificant impact on the ANO YTD doses as well as the ODCM Quarterly and Yearly dose limits. Additionally, the unplanned releases described above are well below the 30-day reporting criteria described in ODCM Limitation L3.4.1.

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 ARERR.

During 2009, there was one instance of radioactive effluent instrumentation inoperable for longer than 30 days. On October 1, 2009, at 21:07, an ODCM 30-day action statement was entered by Unit 2 Operations due to the high range noble gas channel (Channel 9) of 2RX-9830 (SPING 7 - Unit 2 Fuel Handling Area) being declared inoperable due to the channel displaying false intermittent alarms. On October 31, 2009, Unit 2 Operations documented that the ODCM 30-day action statement would be exceeded since Channel 9 had not been returned to service within the required 30 days. Attempts were made to repair Channel 9 during the 30-day window. However, the channel remained inoperable greater than 30 days due to parts issues, manpower availability due to resource sharing, and scope growth of work for repairs. The channel was returned to service on November 3, 2009, at 13:51.

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 (EN-RW-105) shall be included in the ARERR for the period in which the change was made effective.

There were no changes made to the Process Control Program (EN-RW-105) during 2009.

12. CHANGES TO THE ODCM

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

There was one change made to the ODCM during 2009. Revision 17 of the ODCM was implemented on June 3, 2009. The revision included the following changes:

- The location description for Sample Stations Number 13 and 109 were clarified to more accurately reflect the location of the sample station. The previous descriptions included references to ANO Gate 4 which no longer exists. Sample Station 152 location was previously listed to be on a road sign post. However, the road sign post has been removed and the TLD relocated to a nearby utility pole.

- Clarification was added to the liquid effluent radiation monitor setpoint calculation listed in Section 2.1, "Radioactive Liquid Effluent Monitor Setpoint," of the ODCM. Specifically, the current ODCM count rate equation states, "K = Slope * 10^S(A) + Offset," where S(A) is the Cs-137 equivalent value of the activity in the liquid release. The revised setpoint calculation states, "K = Offset * S(A)^Slope." This equation is consistent with the calculation methodology included in the Open EMS software.

13. LOWER LIMITS OF DETECTION LEVELS

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

During 2009, 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 ARERR.

A. Changes in Sample Locations

During 2009, there were no changes to milk or fresh leafy vegetable sample locations or instances where milk or fresh leafy vegetable samples were unavailable.

B. Increase in Calculated Dose Commitment

There were no environmental sampling locations identified during 2009 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 2009 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 or Unit 2 liquid and gaseous radwaste systems or the solid radwaste system during 2009.

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

No effluent releases occurred from the ISFSI during 2009.

18. RADIOACTIVE GROUND WATER MONITORING PROGRAM DATA

Nuclear Energy Institute (NEI) 07-07 Objective 2.4, "Annual Reporting," requires documentation of all on-site ground water sample results and a description of any significant on-site leaks/spills into ground water for each calendar year in the ARERR for the Radiological Effluent Technical Specifications as contained in the appropriate reporting procedure.

A. NEI 07-07 Objective 2.4, "Annual Reporting", Acceptance Criteria "b.i" requires that ground water sample results that are taken in support of the Ground Water Protection Initiative (GPI) but are not part of the Radiological Environmental Monitoring Program (REMP) (e.g. samples obtained during the investigatory phase of the action plan) are reported in the ARERR. Additionally, EN-CY-111, "Radiological Ground Water Monitoring Program" (RGWMP), Step 5.9.3 requires that a listing of non-REMP wells and a summary of pertinent sample results from the RGWMP are reported in the ARERR and an estimate of the doses to a member of the public associated with off-site releases of licensed radioactive material via ground water is included in the ARERR.

   In 2009, there were no non-REMP designated ground water wells installed at ANO. There were no new REMP designated ground water wells installed in 2009. There were four previously installed (prior to 2009) REMP designated ground water wells. The results of the samples collected from the REMP designated ground water wells are included in the 2009 Annual Radiological Environmental Operating Report as required by NEI 07-07.

B. NEI 07-07 Objective 2.4, "Annual Reporting," Acceptance Criteria "c.ii" requires that a description of all spills or leaks that were communicated per NEI 07-07 Objective 2.2, "Voluntary Communication" be included in the ARERR. Additionally, EN-RP-113, "Response to Contaminated Spills/Leaks," Step 5.4 requires that the following be included in the ARERR:

1. Spills/leaks documented on Attachment 9.1 that were released to the environment or outside the spent fuel pool enclosure, shall be documented in the next ARERR.

2. The documentation in the ARERR report will contain:

   (a) Description of event
   (b) Impact of event
   (c) Remediation of event
   (d) Radioactive contamination content and levels of event
   (e) Discussion of impact on groundwater, if any

   In 2009, there were no spills/leaks that occurred that required communication per NEI 07-07 Objective 2.2 or inclusion into the ARERR per Procedure EN-RP-113, "Response to Contaminated Spills/Leaks."

C. EN-CY-108, "Monitoring of Non-Radioactive Systems," Step 5.1.[3] requires that verified positive results associated with the sampling of designated nonradioactive or cross-contaminated systems are to be included in the site's ARERR, unless already reported under an existing monitored ODCM release point.

   In 2009, there were no verified positive results associated with the sampling of designated nonradioactive or cross-contaminated systems.