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U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
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Gentlemen:

ULNRC-4647



**DOCKET NUMBER 50-483
UNION ELECTRIC COMPANY
CALLAWAY PLANT
FACILITY OPERATING LICENSE NPF-30
2001 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT**

Please find enclosed the 2001 Annual Radioactive Effluent Release Report for the Callaway Plant. This report is submitted in accordance with section 5.6.3 of the Technical Specification.

Very truly yours,

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BFH/jdg

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IE48

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2001 Callaway Plant Radioactive Effluent Release Report

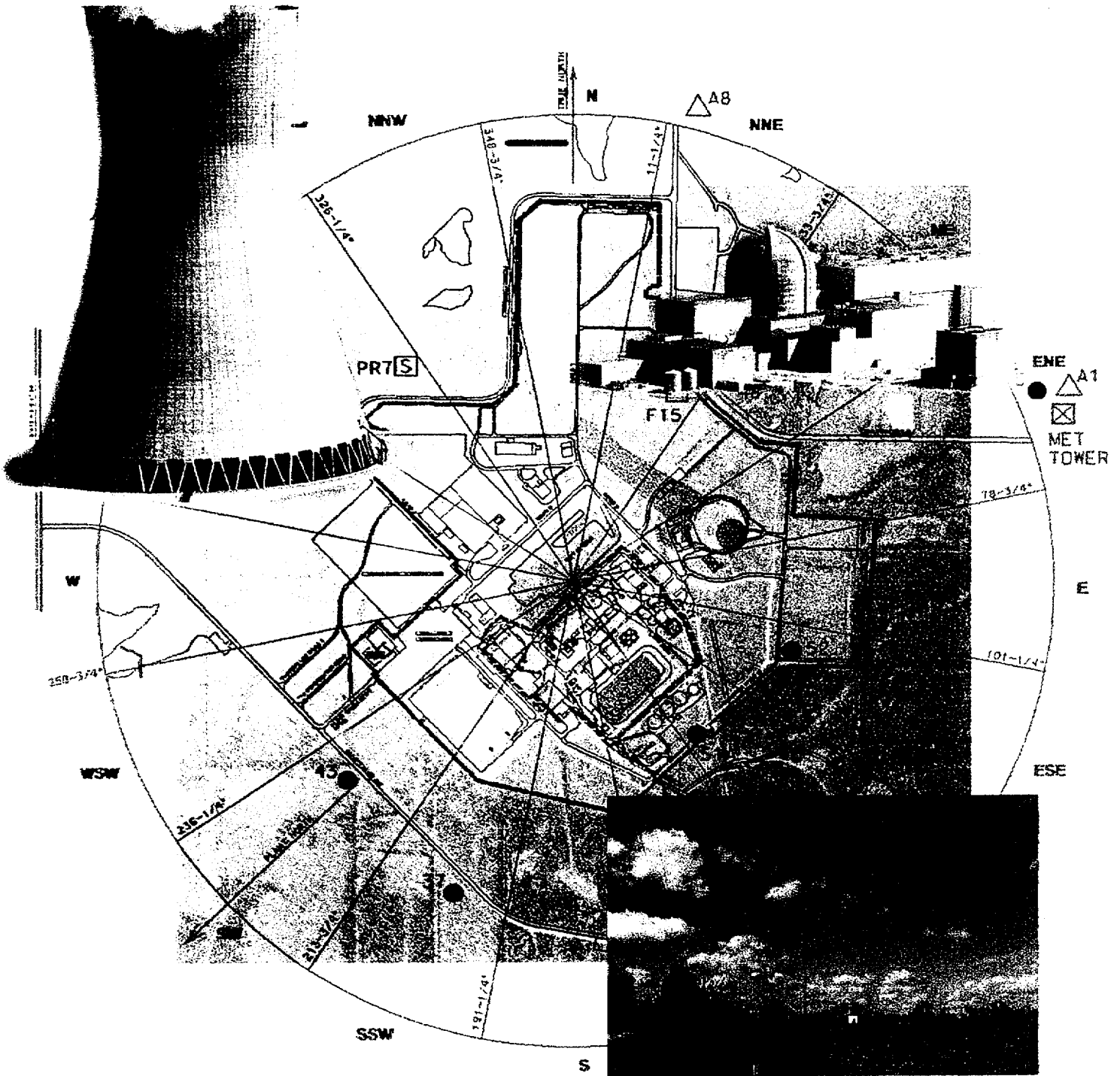


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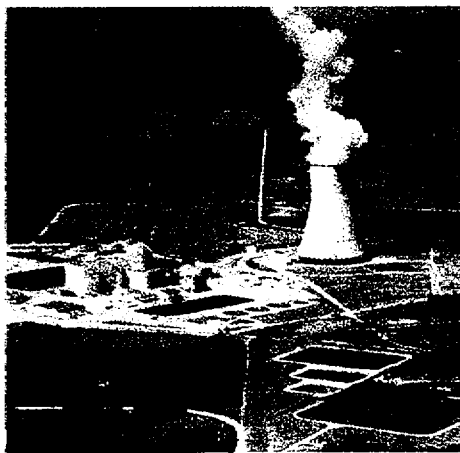
1A	Annual Summation of Gaseous Releases
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7	Total Dose Due to the Uranium Fuel Cycle
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Introduction

This report describes the Union Electric Co. Callaway Plant radioactive effluent releases for 2001. It is submitted in accordance with Section 5.6.3 of the Callaway Plant Technical Specifications.

A summary of radioactivity released in liquid and gaseous effluents and solid waste shipped from the Callaway Plant during the period from January 1, 2001 to December 31, 2001 is presented.

All liquid and gaseous effluents discharged during this reporting period complied with federal regulations and the limits in the Offsite Dose Calculation Manual (ODCM). Any exceptions are noted in this report.



2.1 Regulatory Limits

The Radiological Effluent Control (REC) limits applicable to the release of radioactive material in liquid and gaseous effluents are provided below.

Fission and Activation Gases (Noble Gases)

The dose rate due to radioactive noble gases released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to less than or equal to 500 mrem/yr to the total body and less than or equal to 3000 mrem/yr to the skin.

The air dose due to noble gases released in gaseous effluents, from each unit, to areas at and beyond the site boundary shall be limited to the following:

- a. During any calendar quarter: Less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation and,
- b. During any calendar year: Less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad for beta radiation.

Radioiodine, Tritium, And Particulates

The dose rate due to Iodine-131 and 133, tritium and all radionuclides in particulate form with half-lives greater than eight (8) days released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to less than or equal to 1500 mrem/yr to any organ.

The dose to a Member of the Public from Iodine-131 and 133, tritium, and all radionuclides in particulate form with half-lives greater than eight (8) days in gaseous effluents released to areas at and beyond the site boundary shall be limited to the following:

- a. During any calendar quarter: Less than or equal to 7.5 mrem to any organ and,
- b. During any calendar year: Less than or equal to 15 mrem to any organ.

Liquid Effluent

The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to ten times the concentrations specified in Appendix B, Table 2, Column 2 to 10CFR20 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2.0E-04 microcuries/ml total activity.

The dose or dose commitment to an Individual from radioactive materials in liquid effluents released to unrestricted areas shall be limited:

- a. During any calendar quarter to less than or equal to 1.5 mrem to the total body and less than or equal to 5 mrem to any organ, and
- b. During any calendar year to less than or equal to 3 mrem to the whole body and to less than or equal to 10 mrem to any organ.

Uranium Fuel Cycle Sources

The annual (calendar year) dose or dose commitment to any Member of the Public due to releases of radioactivity and to radiation from uranium fuel cycle sources shall be limited to less than or equal to 25 mrem to the total body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrem.

2.2 Average Energy

This requirement is not applicable to the Callaway Plant radiological effluent monitoring program since the release rate limits for fission and activation gases in gaseous effluent are not based on the average energy of the radionuclide mixture.

2.3 Measurements and Approximations of Total Radioactivity

Radionuclide concentrations in liquid and gaseous effluents were obtained by effluent sampling and radiological analysis in accordance with the requirements of Final Safety Analysis Report Table 16.11-1 and Table 16.11-4.

Gamma spectroscopy was the primary analysis technique used to determine the radionuclide composition and concentration of liquid and gaseous effluents. Composite samples were analyzed for Sr-89, Sr-90, Fe-55, and transuranic nuclides by an independent laboratory. Tritium and gross alpha were measured for both liquid and gaseous effluents using liquid scintillation counting and gas flow proportional counting techniques, respectively.

The total radioactivity in effluent releases was determined from the measured concentrations of each radionuclide present and the total volume of effluents discharged.

2.4 Batch Releases

Summary information relating to batch releases of gaseous and liquid effluents to the environment from the Callaway Plant during this year is presented below.

LIQUID

	<u>UNITS</u>	<u>JAN-JUN</u>	<u>JUL-DEC</u>
Number of batch releases:	—	121	105
Total time period for batch releases:	Minutes	51,064	45,696
Maximum time period for batch releases:	Minutes	738	650
Average time period for batch releases:	Minutes	422	435
Minimum time period for batch releases:	Minutes	166	228
Average Missouri River flow during periods of effluent release to the river ¹ :	ft ³ /sec	113,895	60,934

GASEOUS

	<u>UNITS</u>	<u>JAN - JUN</u>	<u>JUL - DEC</u>
Number of batch releases:	—	28	34
Total time period for batch releases:	Minutes	23,136	4,318
Maximum time period for batch releases:	Minutes	11,908	1,379
Average time period for batch releases:	Minutes	826	127
Minimum time period for batch releases:	Minutes	11	15

¹ E-mail, S. Ternes, United States Department of the Interior - Geological Survey - Water Resources Division dated January 3, 2002

2.5 Abnormal Releases**LIQUID**

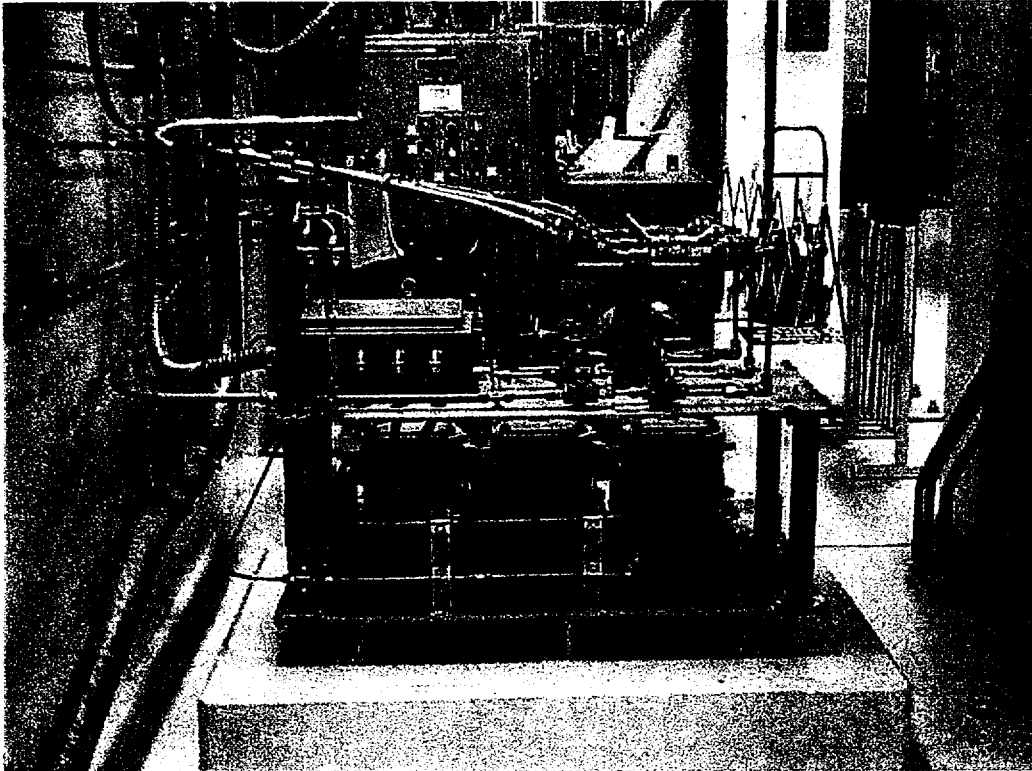
Number of releases: 0
Total Activity released: 0

GASEOUS

Number of releases: 1
Total Activity released: 4.91 E-2 curies

Summary of Gaseous Radioactive Effluents

The quantity of radioactive material released in gaseous effluents during the year is summarized in Tables 1A and 1B. During 2001, all gaseous effluents were considered as ground level releases.



Gaseous effluents from the plant are continuously monitored. Instrumentation provides on-line and grab sampling for iodine, particulates and noble gas.

Summary of Liquid Radioactive Effluents

The quantity of radioactive material released in liquid effluents during the year is summarized in Tables 2A and 2B. During 2001, there was no continuous release of liquid effluent from the plant.



Liquid effluents from the plant are continuously monitored. Shown is a liquid monitor shielded by lead to increase its sensitivity for sampling discharged water.

The quantities of radioactive material released in shipments of solid waste for burial and irradiated fuel transported from the site during the year are summarized in Table 3. The total quantity and radioactivity reported in Table 3 for each waste type was for waste buried and includes wastes buried by waste reprocesses after volume reduction. The activity and fractional abundance of each nuclide was determined

for each waste type based upon radiochemical analysis by an independent laboratory. The curie concentration of each nuclide listed in Table 3 was determined as the product of the fractional abundance and the total curies shipped. Those nuclides which comprise at least 1% of the total activity for a particular waste type are presented in Table 3.

6.1 Unplanned Releases

Unplanned releases are:

- 1) Inadvertent or accidental releases of radioactive material.
- 2) Releases of radioactive material via normal pathways without a release permit, proper authorization, or proper sampling and analysis.
- 3) Releases which are conducted in such a manner as to result in significant deviation from the requirements of the release permit.

Auxiliary Boiler Contamination

On April 10, 1998, radioactivity was detected in the Auxiliary Boiler feed water system. The plant was performing a refueling outage during this time. The boiler was flushed and cleaned several times in an attempt to decontaminate the unit. Small amounts of contamination remained in the sludge. During subsequent operation of the boiler small amounts of contamination leached from the sludge and were detected in the boiler water.

An investigation was performed to locate the source of the contamination. No miss-positioned valves or leaks were identified. The results of sampling different system components were inconclusive, but may indicate a small leak in the SLWE heat exchanger. During refueling operations, the concentration of radioactive nuclides in the SLWE system can be a factor of 1000 higher than normal operations. The size of the leak may be small enough to only be recognized when these high concentrations are present. Increased monitoring was initiated in an attempt to identify the source of the contamination. No additional contamination was identified.

A 10CFR50.59 evaluation concluded that the resulting dose to a Member of the Public from the release of radioactive material to the environment would be a small fraction of the regulatory dose limits. Therefore, continued operation of the Auxiliary Boiler would not pose any significant safety or environmental concern.

The Auxiliary Boiler was operated intermittently during 2001. The maximum total body dose to a Member of the Public from these releases was 2.6 E-04 mrem during 2001. This is negligible compared to the quarterly and annual effluent control limits. The activity released from the Auxiliary Boiler during 2001 is included in Tables 1A, 1B, 5, 6 and 7.

6.2 Changes to the Offsite Dose Calculation Manual

No changes were made to the Callaway Offsite Dose Calculation Manual (plant procedure APA-ZZ-01003) during 2001.

6.3 Major Changes to Radwaste Treatment Systems

During 2001, there were no major plant modifications to the gaseous, solid or liquid radwaste treatment systems.

The following minor modification was made to the liquid radwaste system during 2001.

Temporary Modification 01-0009 was installed to provide a NUKEM ultrafiltration and demineralization skid to process liquid wastewater. This skid allows processing of plant wastewater, while removing solids using filtration and demineralization.

The NUKEM skid interfaces with Liquid Radwaste, Service Air and Reactor Makeup Water systems. Existing plant piping connections allow wastewater from the Boron Recycle System to be processed.

Because the wastewater continues to be collected in the Discharge Monitor Tanks and sampled prior to discharge, this change was not considered a major change. This modification was approved by ORC on 9/13/01 via meeting number 1823.

6.4 Land Use Census Changes

No changes were identified that required a change to the location of the nearest resident yielding the highest calculated dose commitment.

6.5 Inoperability of Effluent Monitoring Instrumentation

During 2001 all effluent monitoring instrumentation was OPERABLE within the limits specified in Radioactive Effluent Controls 16.11.1.3 and 16.11.2.4.

6.6 Instances of Liquid Holdup Tanks or Waste Gas Decay Tanks Exceeding Technical Specification Limits

All liquid tanks and waste gas decay tanks were within limits specified in Radioactive Effluent Controls 16.11.1 and 16.11.2 during the reporting period.

The on-site meteorological data for this reporting period is presented in Table 4. The data is presented as Cumulative Joint Frequency Distributions of wind speed and wind direction by atmospheric stability class for the 10 and 60 meter tower elevations. Valid data recovery for 2001 was greater than 90% for all required parameters.

A variation was discovered in the Primary Tower 10 meter wind speed data. The evening Primary Tower wind speed indicated consistently higher than the Secondary Tower 10 meter data. The cause for the variation was determined to be an electrical interference from the tower strobe light.

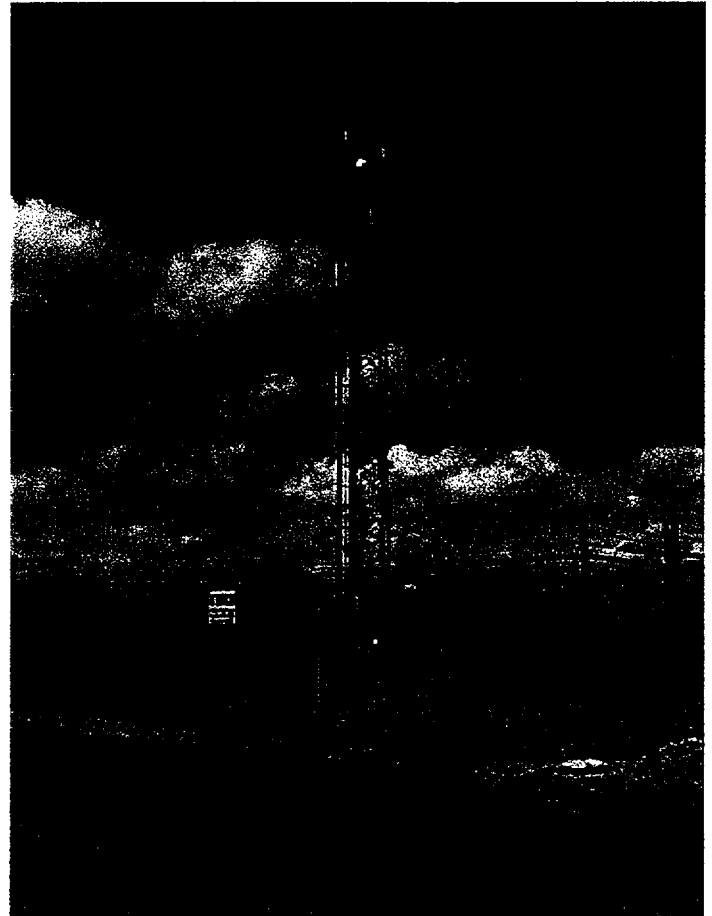
The affected data points were invalidated and substituted with secondary tower data. Primary Tower 60 and 90 meter wind speed data was also affected to a smaller extent. No affected values were not used to substitute for any 10 meter wind speed data used to calculate dose.

The percent of good data for the 10 meter wind speed for 2001 approached 100% after corrections. Plant Corrective Action Document 200202583 provides the details on this event.

On 9/2/01 the Primary Met Tower 60 meter wind speed instrument anemometer was discovered to be damaged. Special Report 2001-004 was submitted to the NRC after it was determined the instrument was inoperable for greater than seven days. Plant Corrective Action Document 200105528 provides the details of this event.

Plant Corrective Action Document 200206313 evaluated damage that was discovered on the Primary Met Tower 10 and 90 meter wind speed instruments. The 90 meter instrument had heat tracing wire rubbing on the anemometer. The 10 meter instrument was missing a cup.

Based on the type of damage to these instruments it was determined a large predatory bird was causing the problems.



Pictured is the Secondary Meteorological Tower. This station obtains measurements at a height of 10 meters, and provides backup data for the Primary Meteorological Tower readings at 10, 60 and 90 meters.

A meteorologist was consulted to determine possible solutions to this problem.

Assessment of doses to the maximum exposed individual from gaseous and liquid effluents released was performed in accordance with the ODCM as described in the following sections. For all effluents released from the Callaway Plant during this year, the annual dose to the maximum exposed individual was less than 1% of the Radiological Effluent Control Limits presented in Section 2.1 of this report.

8.1 Dose at the Site Boundary from Gaseous Effluents

The dose at the Site Boundary was due to plume exposure from noble gases, ground plane exposure, and inhalation. It was conservatively assumed that a hypothetical maximum exposed individual was present at the Site Boundary location with the most limiting atmospheric dispersion (based on actual meteorological conditions for the year). Dose was conservatively calculated using a child as the critical age group.

The dose from gaseous effluents at the Site Boundary for 2001 is presented in Table 5.

8.2 Dose to the Member of the Public

The Member of the Public is considered to be a real individual, not occupationally associated with the plant, who uses portions of the plant site for recreational or other purposes not associated with plant operation. This individual's utilization of areas both inside and outside the Site Boundary was characterized for this calculation and is described in the ODCM.

To evaluate total dose from the Uranium Fuel Cycle to any Member of the Public, the critical Member of the Public within the Site Boundary, and the Nearest Resident were each evaluated.

Dose At The Nearest Resident From Gaseous Effluent

The dose to the Nearest Resident was due to plume exposure from noble gases, ground plane exposure, and inhalation and ingestion. Dose was calculated at the nearest actual residence with the most limiting atmospheric dispersion (based on actual meteorological conditions for the year). It was conservatively assumed that each ingestion pathway (meat, milk, and vegetation) existed at this location. Dose was conservatively calculated assuming the child as the critical age group. Dose from activities within the Site Boundary was negligible and not included in this calculation.

The doses to the Nearest Resident for 2001 are presented in Table 5.

Dose To The Member Of The Public From Activities Within The Site Boundary

Based on the land use within the Site Boundary, the Member of the Public with the highest dose was a farmer. Dose from farming activities within the Site Boundary was due to direct radiation exposure, plume exposure from noble gases, ground plane exposure, and inhalation. The current tenant farmer estimates spending 1100 hours per year working within the Site Boundary area. Dose was calculated using the adult as the critical age group.

Dose to the Member of the Public from activities within the Site Boundary is presented in Table 6.

8.3 Total Dose Due to the Uranium Fuel Cycle

Since there are no other Uranium Fuel Cycle facilities within 8 kilometers of the Callaway Plant, the total dose to the most likely exposed Member of the Public resulted from direct radiation exposure and radioactive effluents from the Callaway Plant itself.

The total dose to the Member of the Public (Table 7) was the sum of the dose due to activities within the Site Boundary (Table 6) and the dose due to gaseous effluents at his residence. It was conservatively assumed that each food ingestion pathway exists at his residence and that the adult is the critical age group.

The total dose from the Uranium Fuel Cycle is presented in Table 7.

8.4 Dose Due to Liquid Effluents

Dose due to liquid effluents includes contributions from the maximum exposed individual's consumption of fish and recreational activities. An adult was considered the maximum exposed individual in this assessment.

It is conservatively assumed that the hypothetical maximum exposed individual obtained his entire annual fish intake from near the plant discharge.

*Semiannual Summation of Gaseous Releases**All Airborne Effluents*

QUARTERS 1 AND 2, 2001

TYPE OF EFFLUENT	UNITS	FIRST QUARTER	SECOND QUARTER	EST TOTAL ERROR % (a)
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A. FISSION AND ACTIVATION GASES

1. TOTAL RELEASE	CURIES	2.07E+02	4.04E+01	20
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/SEC	2.66E+01	5.14E+00	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	

B. RADIOIODINES

1. TOTAL IODINE-131	CURIES	2.39E-06	4.71E-05	23
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/SEC	3.07E-07	5.99E-06	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	

C. PARTICULATES

1. PARTICULATE (HALF-LIVES > 8 DAYS)	CURIES	2.66E-07	1.06E-04	30
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/SEC	3.42E-08	1.35E-05	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	
4. GROSS ALPHA RADIOACTIVITY	CURIES	7.69E-08	3.65E-08	

D. TRITIUM

1. TOTAL RELEASE	CURIES	1.96E+01	1.82E+01	14
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/SEC	2.52E+00	2.32E+00	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	

(a) Safety Analysis Calculation 87-063-00, January 6, 1988

*Semiannual Summation of Gaseous Releases**All Airborne Effluents**Continued*

QUARTERS 3 AND 4, 2001

TYPE OF EFFLUENT	UNITS	THIRD QUARTER	FOURTH QUARTER	EST TOTAL ERROR % (a)
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A. FISSION AND ACTIVATION GASES

1. TOTAL RELEASE	CURIES	2.63E+00	9.11E-01	20
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/SEC	3.30E-01	1.15E-01	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	

B. RADIOIODINES

1. TOTAL IODINE-131	CURIES	5.48E-08	2.73E-07	23
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/SEC	6.89E-09	3.43E-08	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	

C. PARTICULATES

1. PARTICULATE (HALF-LIVES > 8 DAYS)	CURIES	9.73E-05	1.46E-04	30
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/SEC	1.22E-05	1.83E-05	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	
4. GROSS ALPHA RADIOACTIVITY	CURIES	0.00E+00	4.74E-08	

D. TRITIUM

1. TOTAL RELEASE	CURIES	1.47E+01	1.07E+01	14
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/SEC	1.85E+00	1.35E+00	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	

(a) Safety Analysis Calculation 87-063-00, January 6, 1988

Table 1B

*Semiannual Airborne Continuous and
Batch Releases, Ground Level Releases
Fission Gases, Iodines, and Particulates*

QUARTERS 1 AND 2, 2001

NUCLIDE	UNITS	CONTINUOUS RELEASES		BATCH RELEASES	
		FIRST QUARTER	SECOND QUARTER	FIRST QUARTER	SECOND QUARTER

1. FISSION GASES

XE-133	CURIES	1.89E+02	3.63E+01	2.63E-01	1.78E+00
AR-41	CURIES	2.29E-01	0.00E+00	3.91E-02	1.77E-01
XE-135	CURIES	8.92E+00	1.26E+00	4.59E-03	5.02E-02
KR-85	CURIES	0.00E+00	0.00E+00	4.88E-01	2.60E-01
XE-133M	CURIES	2.30E+00	6.18E-01	7.60E-04	1.41E-02
XE-131M	CURIES	8.05E-01	0.00E+00	1.89E-03	0.00E+00
KR-85M	CURIES	1.53E+00	0.00E+00	6.48E-05	4.44E-03
KR-87	CURIES	7.79E-01	0.00E+00	0.00E+00	0.00E+00
KR-88	CURIES	2.25E+00	0.00E+00	0.00E+00	0.00E+00
XE-135M	CURIES	3.35E-01	0.00E+00	2.75E-07	0.00E+00
XE-138	CURIES	4.04E-01	0.00E+00	0.00E+00	0.00E+00
TOTAL FOR PERIOD	CURIES	2.06E+02	3.82E+01	7.97E-01	2.28E+00

2. IODINES

I-131	CURIES	1.28E-06	4.71E-05	1.10E-06	0.00E+00
I-132	CURIES	0.00E+00	3.20E-05	2.56E-07	0.00E+00
I-133	CURIES	0.00E+00	2.27E-06	9.01E-07	0.00E+00
I-135	CURIES	0.00E+00	0.00E+00	5.21E-07	0.00E+00
TOTAL FOR PERIOD	CURIES	1.28E-06	8.13E-05	2.78E-06	0.00E+00

3. PARTICULATES

CS-134	CURIES	0.00E+00	8.53E-08	1.03E-07	4.08E-06
CS-137	CURIES	0.00E+00	4.75E-07	1.63E-07	2.93E-05
CO-60	CURIES	0.00E+00	0.00E+00	0.00E+00	7.00E-05
CO-58	CURIES	0.00E+00	2.15E-06	0.00E+00	0.00E+00
SB-125	CURIES	0.00E+00	0.00E+00	0.00E+00	4.70E-08
ALPHA	CURIES	7.69E-08	3.65E-08	0.00E+00	0.00E+00
TOTAL FOR PERIOD	CURIES	7.69E-08	2.75E-06	2.66E-07	1.03E-04

4. TRITIUM

H-3	CURIES	1.95E+01	1.78E+01	1.10E-01	4.65E-01
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Table 1B

Semiannual Airborne Continuous and Batch Releases, Ground Level Releases

Fission Gases, Iodines, and Particulates

QUARTERS 3 AND 4, 2001

NUCLIDE	UNITS	CONTINUOUS RELEASES		BATCH RELEASES	
		THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER

1. FISSION GASES

XE-133	CURIES	0.00E+00	7.76E-02	8.54E-02	1.85E-01
AR-41	CURIES	0.00E+00	0.00E+00	3.59E-02	5.23E-02
XE-135	CURIES	0.00E+00	0.00E+00	1.01E-03	1.27E-03
KR-85	CURIES	0.00E+00	0.00E+00	1.73E+00	0.00E+00
XE-133M	CURIES	0.00E+00	0.00E+00	0.00E+00	1.73E-04
XE-131M	CURIES	0.00E+00	6.70E-02	3.33E-04	0.00E+00
KR-85M	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
KR-87	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
KR-88	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
XE-135M	CURIES	0.00E+00	0.00E+00	0.00E+00	6.28E-06
XE-138	CURIES	7.79E-01	5.28E-01	0.00E+00	0.00E+00
TOTAL FOR PERIOD	CURIES	7.79E-01	6.72E-01	1.85E+00	2.39E-01

2. IODINES

I-131	CURIES	5.48E-08	2.73E-07	0.00E+00	0.00E+00
I-132	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
I-133	CURIES	0.00E+00	2.52E-07	0.00E+00	0.00E+00
I-135	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL FOR PERIOD	CURIES	5.48E-08	5.25E-07	0.00E+00	0.00E+00

3. PARTICULATES

CS-134	CURIES	0.00E+00	4.53E-07	0.00E+00	2.41E-06
CS-137	CURIES	2.28E-07	5.07E-06	0.00E+00	4.82E-06
CO-60	CURIES	0.00E+00	0.00E+00	1.62E-06	1.29E-05
CO-58	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SB-125	CURIES	9.21E-05	1.17E-04	3.07E-07	0.00E+00
CR-51	CURIES	2.68E-06	2.05E-06	0.00E+00	0.00E+00
SB-124	CURIES	3.54E-07	3.65E-07	0.00E+00	0.00E+00
ALPHA	CURIES	0.00E+00	4.74E-08	0.00E+00	0.00E+00
TOTAL FOR PERIOD	CURIES	9.53E-05	1.25E-04	1.93E-06	2.02E-05

4. TRITIUM

H-3	CURIES	1.38E+01	1.00E+01	9.31E-01	6.97E-01
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Table 2A

Semiannual Summation of Liquid Releases

All Liquid Effluents

QUARTERS 1 AND 2, 2001

TYPE OF EFFLUENT	UNITS	FIRST QUARTER	SECOND QUARTER	EST TOTAL ERROR % (a)
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A. FISSION AND ACTIVATION PRODUCTS

1. TOTAL RELEASE [NOT INCLUDING TRITIUM, GASES, ALPHA]	CURIES	1.92E-03	6.44E-03	20
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	4.13E-09	1.42E-08	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	

B. TRITIUM

1. TOTAL RELEASE	CURIES	7.54E+02	8.97E+01	14
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	1.62E-03	1.98E-04	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	

C. DISSOLVED AND ENTRAINED GASES

1. TOTAL RELEASE	CURIES	2.46E+00	1.29E-01	27
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	5.30E-06	2.85E-07	

D. GROSS ALPHA RADIOACTIVITY

1. TOTAL RELEASE	CURIES	0.00E+00	0.00E+00	29
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E. WASTE VOLUME RELEASED (PRE-DILUTION)	GAL	5.82E+06	4.89E+06	10
---	-----	----------	----------	----

F. VOLUME OF DILUTION WATER USED	GAL	1.17E+08	1.15E+08	10
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(a) Safety Analysis Calculation 87-063-00, January 6, 1988

*Semiannual Summation of Liquid Releases**All Liquid Effluents*

QUARTERS 3 AND 4, 2001

TYPE OF EFFLUENT	UNITS	THIRD QUARTER	FOURTH QUARTER	EST TOTAL ERROR % (a)
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A. FISSION AND ACTIVATION PRODUCTS

1. TOTAL RELEASE [NOT INCLUDING TRITIUM, GASES, ALPHA]	CURIES	1.32E-03	3.12E-03	20
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	2.94E-09	6.57E-09	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	

B. TRITIUM

1. TOTAL RELEASE	CURIES	4.05E+01	1.02E+02	14
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	9.01E-05	2.15E-04	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	

C. DISSOLVED AND ENTRAINED GASES

1. TOTAL RELEASE	CURIES	2.05E-06	4.88E-04	27
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	4.57E-12	1.03E-09	

D. GROSS ALPHA RADIOACTIVITY

1. TOTAL RELEASE	CURIES	0.00E+00	0.00E+00	29
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E. WASTE VOLUME RELEASED (PRE-DILUTION)	GAL	4.91E+06	4.77E+06	10
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F. VOLUME OF DILUTION WATER USED	GAL	1.14E+08	1.21E+08	10
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(a) Safety Analysis Calculation 87-063-00, January 6, 1988

Table 2B

Semiannual Liquid Continuous & Batch Releases

Totals for Each Nuclide Released

QUARTERS 1 AND 2, 2001

NUCLIDE	UNITS	CONTINUOUS RELEASES		BATCH RELEASES	
		FIRST QUARTER	SECOND QUARTER	FIRST QUARTER	SECOND QUARTER
1. ALL NUCLIDES					
CS-134	CURIES	0.00E+00	0.00E+00	4.29E-04	4.91E-04
CS-137	CURIES	0.00E+00	0.00E+00	1.11E-03	1.31E-03
H-3	CURIES	0.00E+00	0.00E+00	7.54E+02	8.97E+01
CO-60	CURIES	0.00E+00	0.00E+00	2.96E-04	9.59E-04
XE-133	CURIES	0.00E+00	0.00E+00	2.39E+00	1.24E-01
XE-131M	CURIES	0.00E+00	0.00E+00	4.31E-02	5.01E-03
I-131	CURIES	0.00E+00	0.00E+00	2.28E-05	1.03E-04
MN-54	CURIES	0.00E+00	0.00E+00	1.34E-05	1.42E-04
XE-133M	CURIES	0.00E+00	0.00E+00	1.11E-02	3.32E-04
XE-135	CURIES	0.00E+00	0.00E+00	1.59E-04	1.99E-05
I-133	CURIES	0.00E+00	0.00E+00	2.65E-06	0.00E+00
KR-85	CURIES	0.00E+00	0.00E+00	1.35E-02	0.00E+00
CS-136	CURIES	0.00E+00	0.00E+00	8.60E-06	0.00E+00
CO-58	CURIES	0.00E+00	0.00E+00	2.43E-05	2.67E-03
CO-57	CURIES	0.00E+00	0.00E+00	8.09E-06	0.00E+00
BA-140	CURIES	0.00E+00	0.00E+00	7.20E-06	0.00E+00
NB-95	CURIES	0.00E+00	0.00E+00	0.00E+00	3.22E-04
ZR-95	CURIES	0.00E+00	0.00E+00	0.00E+00	1.90E-04
CR-51	CURIES	0.00E+00	0.00E+00	0.00E+00	1.78E-04
FE-59	CURIES	0.00E+00	0.00E+00	0.00E+00	1.73E-05
BA-139	CURIES	0.00E+00	0.00E+00	0.00E+00	2.25E-05
SN-113	CURIES	0.00E+00	0.00E+00	0.00E+00	2.84E-06
BE-7	CURIES	0.00E+00	0.00E+00	0.00E+00	3.25E-05
KR-85M	CURIES	0.00E+00	0.00E+00	0.00E+00	2.66E-06
TOTALS FOR PERIOD	CURIES	0.00E+00	0.00E+00	7.56E+02	8.98E+01

Table 2B

Semiannual Liquid Continuous & Batch Releases

Totals for Each Nuclide Released

QUARTERS 3 AND 4, 2001

NUCLIDE	UNITS	CONTINUOUS RELEASES		BATCH RELEASES	
		THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER

I. ALL NUCLIDES

CS-134	CURIES	0.00E+00	0.00E+00	2.71E-04	3.67E-04
CS-137	CURIES	0.00E+00	0.00E+00	6.75E-04	7.67E-04
H-3	CURIES	0.00E+00	0.00E+00	4.05E+01	1.02E+02
CO-60	CURIES	0.00E+00	0.00E+00	1.41E-04	2.73E-05
XE-133	CURIES	0.00E+00	0.00E+00	0.00E+00	4.84E-04
XE-131M	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
I-131	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MN-54	CURIES	0.00E+00	0.00E+00	3.56E-06	0.00E+00
XE-133M	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
XE-135	CURIES	0.00E+00	0.00E+00	2.05E-06	0.00E+00
I-133	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
KR-85	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CS-136	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CO-58	CURIES	0.00E+00	0.00E+00	1.80E-04	6.04E-06
CO-57	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BA-140	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NB-95	CURIES	0.00E+00	0.00E+00	0.00E+00	1.04E-05
ZR-95	CURIES	0.00E+00	0.00E+00	0.00E+00	3.60E-06
CR-51	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FE-59	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BA-139	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SN-113	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BE-7	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
KR-85M	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TC-99M	CURIES	0.00E+00	0.00E+00	2.40E-06	0.00E+00
CE-144	CURIES	0.00E+00	0.00E+00	1.35E-05	0.00E+00
PR-144	CURIES	0.00E+00	0.00E+00	1.35E-05	0.00E+00
RU-106	CURIES	0.00E+00	0.00E+00	1.98E-05	0.00E+00
SB-125	CURIES	0.00E+00	0.00E+00	0.00E+00	1.94E-03
XE-135M	CURIES	0.00E+00	0.00E+00	0.00E+00	4.25E-06
TOTALS FOR PERIOD	CURIES	0.00E+00	0.00E+00	4.05E+01	1.02E+02

Table 3

Solid Waste & Irradiated Fuel Shipments

2001

A. SOLID WASTE BURIED (Does not include irradiated fuel)

1. Type of waste

	UNITS	PERIOD JAN - JUN	PERIOD JUL - DEC	EST. TOTAL ERROR (%)
a. Spent resins, filter sludges evaporator bottoms, etc.	m ³	11.6	15.1	±25%
	Ci	167.38	8.75	
b. Dry compressible waste, contaminated equipment, etc.	m ³	3.5	9.1	±25%
	Ci	0.50	0.47	
c. Irradiated components, control rods, etc.	m ³	0	0	±25%
	Ci			
d. Other	m ³	0	0	±25%
	Ci			

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

PERIOD JAN - JUN			PERIOD JUL - DEC		
Nuclide	Percent Abundance	Curies	Nuclide	Percent Abundance	Curies
a. H-3	32.64	54.63	H-3	32.64	2.86
Ni-63	22.87	38.28	Ni-63	22.87	2.00
Cs-137	17.81	29.81	Cs-137	17.81	1.56
Co-58	9.94	16.64	Co-58	9.94	0.87
Cs-134	5.68	9.51	Cs-134	5.68	0.49
Co-60	5.09	8.52	Co-60	5.09	0.45
Fe-55	4.38	7.33	Fe-55	4.38	0.38

b. Fe-55	42.08	0.21	Fe-55	42.08	0.20
Co-58	23.65	0.12	Co-58	23.65	0.11
Ni-63	9.97	0.049	Ni-63	9.97	0.047
Co-60	7.79	0.039	Co-60	7.79	0.037
Nb-95	4.39	0.022	Nb-95	4.39	0.021
Mn-54	4.21	0.021	Mn-54	4.21	0.019
Zr-95	2.45	0.012	Zr-95	2.45	0.012
Cs-137	1.91	0.0096	Cs-137	1.91	0.0089
Cr-51	1.09	0.0055	Cr-51	1.09	0.0051

Table 3

Solid Waste & Irradiated Fuel Shipments

2001

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

Nuclide	PERIOD JAN - JUN		PERIOD JUL - DEC	
	Percent Abundance	Curies	Percent Abundance	Curies
c. None				

d. None				
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3. Solid waste disposition

Number of Shipments	Mode of Transportation	Destination	Class of Solid Waste Shipped	Type of Container
1*	Cask	Duratek, Inc	A	LSA
3*	Truck	ATG	A	LSA
5*	Cask	ATG	A	LSA
3*	Cask	ATG	B	LSA
1*	Cask	ATG	C	LSA
2	Cask	Barnwell, S. C.	A	LSA
2	Cask	Barnwell, S. C.	B	LSA
11*	Truck	Duratek, Inc	A	LSA
1*	Cask	Duratek, Inc	A	LSA
1*	Truck	Duratek, Inc	B	LSA
1**	Truck	DSSI	A	LSA

* Sent to waste processors for volume reduction before burial ** Mixed waste shipment for thermal destruction

4. Solidification agent

Not used

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
0		

Table 4

Meteorological Data

Averages Using Hourly Averaged Data

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

		UNITS	VALUES	% GOOD DATA
Stability Class		A - G	E	99%
Total Precipitation		CM.	1.19E+02	100%
10 Meter Level:	Wind Speed	Meter/Sec	3.16E+00	100%
	Wind Direction	Degrees	1.97E+02	99%
	Wind Direction Variability	Degrees	1.30E+01	99%
	Reference Temperature	Degrees C	1.35E+01	99%
	Dewpoint	Degrees C	7.14E+00	98%
60 Meter Level:	Wind Speed	Meter/Sec	5.76E+00	92%
	Wind Direction	Degrees	2.08E+02	91%
	Wind Direction Variability	Degrees	8.50E+00	99%
	Dewpoint	Degrees C	NONE	0%
	Temperature Difference 60 - 10	Degrees C	2.01E-01	99%

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: A

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	6	7	11	0	0	0	24
NNE	2	8	6	0	0	0	16
NE	3	9	1	0	0	0	13
ENE	1	14	10	0	0	0	25
E	5	17	10	0	0	0	32
ESE	8	35	16	0	0	0	59
SE	5	65	43	1	0	0	114
SSE	8	47	30	18	0	0	103
S	9	42	42	12	0	0	105
SSW	16	64	90	12	0	0	182
SW	5	35	50	0	4	1	95
WSW	3	21	25	7	0	0	56
W	1	27	22	9	3	0	62
WNW	3	24	33	7	0	0	67
NW	3	9	26	7	0	0	45
NNW	2	9	6	8	0	0	25
TOT	80	433	421	81	7	1	1023

Hours of Calm Data: 6
 Hours of Invalid Data: 28

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: B

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	4	9	15	0	0	0	28
NNE	3	5	0	0	0	0	8
NE	3	4	4	0	0	0	11
ENE	1	14	2	0	0	0	17
E	3	7	3	0	0	0	13
ESE	2	8	2	0	0	0	12
SE	2	14	12	0	0	0	28
SSE	2	12	9	1	0	0	24
S	4	11	14	3	0	0	32
SSW	2	21	20	4	0	0	47
SW	2	13	17	0	0	0	32
WSW	3	7	8	2	0	0	20
W	1	11	14	4	1	0	31
WNW	2	8	19	4	1	0	34
NW	1	6	9	3	0	0	19
NNW	1	8	15	5	0	0	29
TOT	36	158	163	26	2	0	385

Hours of Calm Data: 1
Hours of Invalid Data: 8

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: C

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	8	15	9	0	0	0	32
NNE	2	7	5	0	0	0	14
NE	2	8	2	0	0	0	12
ENE	1	8	2	0	0	0	11
E	0	9	3	0	0	0	12
ESE	4	8	11	2	0	0	25
SE	1	19	13	0	0	0	33
SSE	5	13	11	3	0	0	32
S	3	4	18	3	0	0	28
SSW	3	15	11	1	0	0	30
SW	2	13	10	1	2	0	28
WSW	2	10	6	2	0	0	20
W	3	12	14	3	0	0	32
WNW	0	11	11	2	0	0	24
NW	1	10	7	6	0	0	24
NNW	2	12	9	3	0	0	26
TOT	39	174	142	26	2	0	383

Hours of Calm Data: 1
Hours of Invalid Data: 4

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: D

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	12	53	41	5	0	0	111
NNE	12	44	21	2	0	0	79
NE	10	29	14	0	0	0	53
ENE	6	33	25	0	0	0	64
E	5	34	19	0	0	0	58
ESE	9	32	21	0	0	0	62
SE	13	43	34	9	0	0	99
SSE	11	32	45	9	0	0	97
S	14	52	62	22	2	0	152
SSW	6	55	35	8	1	0	105
SW	14	34	28	2	0	0	78
WSW	5	34	25	12	3	2	81
W	3	41	65	31	1	0	141
WNW	5	47	53	16	1	0	122
NW	17	67	71	19	0	0	174
NNW	16	46	51	23	1	0	137
TOT	158	676	610	158	9	2	1613

Hours of Calm Data: 11
Hours of Invalid Data: 16

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: E

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	27	80	41	2	0	0	150
NNE	32	48	27	2	0	1	110
NE	30	87	37	0	1	0	155
ENE	13	61	32	1	0	0	107
E	8	59	41	3	0	0	111
ESE	23	87	80	9	0	0	199
SE	25	194	99	10	0	0	328
SSE	23	125	124	23	0	0	295
S	29	135	127	24	1	0	316
SSW	30	93	46	9	2	1	181
SW	21	71	21	5	1	5	124
WSW	22	89	39	7	3	4	164
W	19	107	77	5	0	0	208
WNW	19	98	51	4	0	0	172
NW	20	90	62	7	0	0	179
NNW	24	69	55	7	0	0	155
TOT	365	1493	959	118	8	11	2954

Hours of Calm Data: 25
Hours of Invalid Data: 10

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: F

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	19	35	12	0	0	0	66
NNE	21	42	10	0	0	0	73
NE	16	67	2	0	0	0	85
ENE	19	40	6	0	0	0	65
E	10	46	6	0	0	0	62
ESE	24	60	6	5	0	0	95
SE	31	209	22	2	0	0	264
SSE	34	167	17	1	0	0	219
S	33	133	5	1	0	0	172
SSW	17	86	8	0	0	0	111
SW	22	63	3	0	0	0	88
WSW	29	26	0	0	0	0	55
W	26	37	3	1	0	0	67
WNW	43	44	3	0	0	0	90
NW	18	33	5	0	0	0	56
NNW	24	41	8	2	0	0	75
TOT	386	1129	116	12	0	0	1643

Hours of Calm Data: 17
 Hours of Invalid Data: 12

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: G

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	22	30	3	0	0	0	55
NNE	22	24	0	0	0	0	46
NE	13	13	3	0	0	0	29
ENE	8	16	3	0	0	0	27
E	3	5	0	0	0	0	8
ESE	9	14	0	0	0	0	23
SE	17	54	4	0	0	0	75
SSE	14	59	1	0	0	0	74
S	20	16	0	0	0	0	36
SSW	23	25	0	0	0	0	48
SW	15	26	0	0	0	0	41
WSW	9	4	0	0	0	0	13
W	11	7	0	0	0	0	18
WNW	24	4	0	0	0	0	28
NW	10	4	2	0	0	0	16
NNW	17	27	6	0	0	0	50
TOT	237	328	22	0	0	0	587

Hours of Calm Data: 18
Hours of Invalid Data: 14

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: A

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	2	3	10	3	0	0	18
NNE	1	9	8	0	0	0	18
NE	1	7	4	0	0	0	12
ENE	1	16	12	1	0	0	30
E	1	14	10	3	0	0	28
ESE	3	18	16	3	0	0	40
SE	3	33	60	3	0	0	99
SSE	4	27	51	16	7	2	107
S	7	24	33	27	9	0	100
SSW	4	25	72	52	9	0	162
SW	4	29	60	38	4	7	142
WSW	0	12	20	17	3	2	54
W	1	13	19	13	3	8	57
WNW	0	17	27	22	8	2	76
NW	1	9	16	20	6	0	52
NNW	1	6	12	7	3	0	29
TOT	34	262	430	225	52	21	1024

Hours of Calm Data: 0
 Hours of Invalid Data: 33

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: B

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	3	22	3	0	0	28
NNE	2	6	2	0	0	0	10
NE	1	7	5	0	0	0	13
ENE	0	9	5	0	0	0	14
E	2	5	4	0	0	0	11
ESE	0	5	4	1	0	0	10
SE	2	10	17	0	0	0	29
SSE	1	3	15	6	1	0	26
S	1	7	13	10	2	0	33
SSW	0	8	17	11	3	1	40
SW	1	8	14	15	0	0	38
WSW	2	4	10	6	1	0	23
W	0	5	11	8	3	3	30
WNW	1	6	9	11	6	3	36
NW	1	8	8	6	2	0	25
NNW	0	5	10	8	2	0	25
TOT	14	99	166	85	20	7	391

Hours of Calm Data: 0
 Hours of Invalid Data: 3

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: C

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	8	11	2	0	0	22
NNE	1	11	8	0	0	0	20
NE	2	4	5	0	0	0	11
ENE	1	6	3	1	0	0	11
E	0	9	6	0	0	0	15
ESE	1	7	6	3	0	0	17
SE	0	7	24	4	0	0	35
SSE	2	7	11	5	2	0	27
S	2	4	9	12	4	0	31
SSW	2	4	13	9	2	0	30
SW	3	7	14	7	0	3	34
WSW	0	4	6	2	1	0	13
W	0	10	12	10	5	2	39
WNW	1	7	6	9	1	1	25
NW	1	6	9	5	8	0	29
NNW	1	8	8	3	3	0	23
TOT	18	109	151	72	26	6	382

Hours of Calm Data: 0
 Hours of Invalid Data: 6

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: D

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	3	23	37	24	5	0	92
NNE	2	33	32	6	2	0	75
NE	3	19	20	4	0	0	46
ENE	0	19	27	16	0	0	62
E	1	24	19	12	0	0	56
ESE	2	19	31	9	0	0	61
SE	2	17	33	22	5	0	79
SSE	4	17	40	29	7	0	97
S	6	13	39	49	20	4	131
SSW	3	27	45	28	13	2	118
SW	3	26	33	32	3	1	98
WSW	2	20	14	19	11	6	72
W	3	21	28	46	25	11	134
WNW	5	24	39	47	27	10	152
NW	4	22	55	54	20	1	156
NNW	5	27	31	48	14	4	129
TOT	48	351	523	445	152	39	1558

Hours of Calm Data: 1
 Hours of Invalid Data: 81

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: E

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	2	7	49	49	4	1	112
NNE	1	8	36	32	3	0	80
NE	3	25	63	14	1	1	107
ENE	2	12	67	54	0	0	135
E	2	6	54	31	2	0	95
ESE	1	10	70	78	10	0	169
SE	2	10	91	154	18	0	275
SSE	2	14	50	112	41	14	233
S	4	15	58	169	83	14	343
SSW	3	17	56	99	21	4	200
SW	1	7	42	66	12	10	138
WSW	2	13	42	48	13	11	129
W	2	10	42	129	26	3	212
WNW	3	11	43	102	26	1	186
NW	1	15	38	99	14	2	169
NNW	1	8	40	82	11	2	144
TOT	32	188	841	1318	285	63	2727

Hours of Calm Data: 2
 Hours of Invalid Data: 260

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: F

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	2	4	26	23	0	0	55
NNE	0	4	26	7	1	0	38
NE	2	4	31	12	0	0	49
ENE	0	2	52	22	0	0	76
E	1	4	54	10	0	0	69
ESE	1	2	46	35	3	0	87
SE	0	3	52	83	5	0	143
SSE	1	8	62	100	16	1	188
S	0	3	50	97	8	0	158
SSW	0	2	45	117	20	0	184
SW	1	2	32	51	16	0	102
WSW	0	4	26	23	5	0	58
W	0	4	18	21	1	0	44
WNW	0	4	15	43	0	0	62
NW	0	2	21	48	5	0	76
NNW	1	5	15	24	5	0	50
TOT	9	57	571	716	85	1	1439

Hours of Calm Data:
Hours of Invalid Data:

1
232

Totals of Hours at Each Wind Speed & Direction

1-JAN-2001 00:00:00.00 to 31-DEC-2001 23:00:00.00

Stability Class: G

	Wind Speed at 60.00 Meter Level (MPH)						
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	3	18	7	1	0	30
NNE	0	1	16	20	0	0	37
NE	0	2	20	9	0	0	31
ENE	0	2	24	6	0	0	32
E	0	0	16	10	0	0	26
ESE	0	0	16	8	0	0	24
SE	1	2	8	7	1	0	19
SSE	0	3	27	19	1	0	50
S	0	3	20	39	0	0	62
SSW	0	2	15	21	2	0	40
SW	0	2	3	18	12	0	35
WSW	0	3	15	14	1	0	33
W	0	0	7	5	0	0	12
WNW	0	2	9	6	0	0	17
NW	0	0	5	3	0	0	8
NNW	0	3	13	8	1	0	25
TOT	2	28	232	200	19	0	481

Hours of Calm Data: 1
 Hours of Invalid Data: 137

Table 5

*Dose at the Site Boundry and to the
Nearest Resident From Gaseous Effluents*

		SITE BOUNDARY		NEAREST RESIDENT	
		LOCATION: 1.40 km SSW		LOCATION: 2.90 km NNW	
		AGE GROUP: CHILD		AGE GROUP: CHILD	
ORGAN	UNITS	DOSE	% LIMIT(a)	DOSE	% LIMIT(b)
1. GAMMA AIR DOSE *	MRAD	4.27E-03	0.04	2.49E-03	N/A
2. BETA AIR DOSE *	MRAD	7.86E-03	0.04	4.58E-03	N/A
3. WHOLE BODY ***	MREM	4.11E-03	N/A	2.45E-03	N/A
4. SKIN ***	MREM	8.09E-03	N/A	4.77E-03	N/A
5. BONE **	MREM	2.94E-04	N/A	7.65E-04	0.01
6. LIVER **	MREM	1.92E-03	N/A	8.88E-03	0.06
7. TOTAL BODY **	MREM	1.92E-03	N/A	8.43E-03	0.06
8. THYROID **	MREM	1.94E-03	N/A	1.21E-02	0.08
9. KIDNEY **	MREM	1.92E-03	N/A	8.52E-03	0.06
10. LUNG **	MREM	1.94E-03	N/A	8.41E-03	0.06
11. GI-LLI **	MREM	1.92E-03	N/A	8.37E-03	0.06

* Dose from Noble Gases only

** Dose from Tritium, Radioiodines, and Particulates only

*** Dose from Noble Gases plus Ground Plane dose

(a) Annual dose limits of Offsite Dose Calculation Manual (APA-ZZ-01003) of 10 mrad gamma air dose and 20 mrad beta air dose.

(b) Annual dose limits of Offsite Dose Calculation Manual (APA-ZZ-01003) of 15 mrem to any organ from I-131, I-133, H-3 and particulate radionuclides with halflives greater than 8 days.

Table 6

Dose to the Member of the Public

From Activities within the Site Boundary

ORGAN	UNITS	EFFLUENT DOSE WITHIN THE SITE BOUNDARY	DIRECT RADIATION FROM THE UNIT	DIRECT RADIATION FROM OUTSIDE TANKS	TOTAL DOSE FOR THE YEAR
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1. SKIN	MREM	2.47E-03	N/A	N/A	2.47E-03
2. BONE	MREM	1.25E-04	8.79E-03	1.09E-02	1.98E-02
3. LIVER	MREM	7.31E-04	8.79E-03	1.09E-02	2.04E-02
4. TOTAL BODY	MREM	1.94E-03	8.79E-03	1.09E-02	2.16E-02
5. THYROID	MREM	7.35E-04	8.79E-03	1.09E-02	2.04E-02
6. KIDNEY	MREM	7.31E-04	8.79E-03	1.09E-02	2.04E-02
7. LUNG	MREM	7.37E-04	8.79E-03	1.09E-02	2.04E-02
8. GI-LLI	MREM	7.31E-04	8.79E-03	1.09E-02	2.04E-02

Table 7

Total Dose Due to the Uranium Fuel Cycle

(Member of the Public)

ORGAN	UNITS	DOSE AT THE RESIDENCE LOCATION	DOSE FROM ACTIVITIES WITHIN SITE BOUNDARY	TOTAL DOSE TO THE MEMBER OF THE PUBLIC	% LIMITS *
1. SKIN	MREM	1.71E-03	2.47E-03	4.17E-03	0.02
2. BONE	MREM	1.56E-04	1.98E-02	2.00E-02	0.08
3. LIVER	MREM	1.99E-03	2.04E-02	2.24E-02	0.09
4. TOTAL BODY	MREM	2.80E-03	2.16E-02	2.44E-02	0.10
5. THYROID	MREM	2.47E-03	2.04E-02	2.29E-02	0.03
6. KIDNEY	MREM	1.93E-03	2.04E-02	2.24E-02	0.09
7. LUNG	MREM	1.92E-03	2.04E-02	2.23E-02	0.09
8. GI-LLI	MREM	1.93E-03	2.04E-02	2.24E-02	0.09

* Annual dose limits from 40CFR190.10(a) of 25 mrem whole body, 75 mrem to the thyroid, and 25 mrem to any other organ.

Table 8

Dose Due to Liquid Effluents

(Member of the Public)

ORGAN	UNITS	DOSE	LIMIT *	% LIMIT
1. BONE	MREM	1.89E-02	10.00	1.89E-01
2. LIVER	MREM	3.26E-02	10.00	3.26E-01
3. TOTAL BODY	MREM	2.39E-02	3.00	7.96E-01
4. THYROID	MREM	2.26E-03	10.00	2.26E-02
5. KIDNEY	MREM	1.23E-02	10.00	1.23E-01
6. LUNG	MREM	5.55E-03	10.00	5.55E-02
7. GI-LLI	MREM	7.78E-03	10.00	7.78E-02

* Annual dose limits of APA-ZZ-01003, Section 9.4.1.1.