

Callaway Plant

Semiannual Radioactive Effluent Release Report

July - December 1991



SEMIANNUAL RADIOACTIVE EFFLUENT

RELEASE REPORT

CALLAWAY NUCLEAR PLANT

UNION ELECTRIC COMPANY

LICENSE NPF - 30

JULY - DECEMBER 1991

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INTRODUCTION

This Semiannual Radioactive Effluent Release Report is submitted in accordance with Section 6.9.1.7 of the Callaway Plant Technical Specifications.

The report presents a summary of radioactivity released in liquid and gaseous effluents, and solid waste shipped from the Callaway Plant during the period from July 1, 1991 to December 31, 1991. The information is presented in the format outlined in Appendix B of Regulatory Guide 1.21, Revision 1, June 1974.

All liquid and gaseous effluents discharged during this reporting period were in compliance with federal regulations and the limits of Union Electric Administrative Procedure APA-ZZ-01003.

SUPPLEMENTAL INFORMATIONRegulatory Limits

Specified as follows are the APA-ZZ-01003, Section 9 limits applicable to the release of radioactive material in liquid and gaseous effluents.

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 10 days in gaseous effluents released to areas at and beyond the area 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.

2.1.3 Liquid Effluents

The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to $2.0\text{E-}04$ 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.

2.1.4 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 Maximum Permissible Concentrations

- 2.2.1 The maximum permissible concentration values specified in 10CFR20, Appendix B, Table II, Column 2 are used to calculate release rates and permissible concentrations of liquid radioactive effluents at the unrestricted area boundary. A value of $2.0\text{E-}4$ microcuries/ml is used as the MPC for dissolved and entrained noble gases in liquid effluents.

- 2.2.2 For gaseous effluents, maximum permissible concentrations are not utilized in release rate calculations since the applicable limits are based on dose rate at the unrestricted area boundary. The "Percent of Tech Spec Limit" for Table 1A is therefore not applicable to the Callaway Plant.

2.3 Average Energy

This is not applicable to the Callaway Plant radiological effluent monitoring program.

2.4 Measurements and Approximations of Total Radioactivity

The quantification of radioactivity in liquid and gaseous effluents was accomplished by performing sampling and radiological analysis of effluents in accordance with the requirements of Table 9.3-A and Table 9.6-A of APA-EZ-01003, Offsite Dose Calculation Manual.

Gamma spectroscopy was the primary analysis technique used to determine radionuclide composition and concentration of liquid and gaseous effluents. Composite samples were analyzed for Sr-89, Sr-90, and Fe-55 by an independent laboratory. Tritium and 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. Gross beta or gamma radioactivity measurement techniques were not utilized to approximate the total radioactivity in effluents.

2.5 Batch Releases

2.5.1 Liquid

Number of batch releases: 112

Total time period for batch releases: 47,558 minutes

Maximum time period for a batch release: 1300 minutes

Average time period for batch releases: 425 minutes

Minimum time period for a batch release: 191 minutes

Average stream flow during periods of release of effluent into a flowing stream: 42,703 cfs*

*Ref: Letter, United States Department of the Interior - Geological Survey - Missouri, dated January 3, 1992.

2.5.2 Gaseous

Total for the
Reporting Period

Number of batch releases:	54
Total time period for batch releases:	7,886 minutes
Maximum time period for a batch release:	1,362 minutes
Average time period for batch releases:	145 minutes
Minimum time period for a batch release:	45 minutes

2.6 Unplanned Releases

2.6.1 Liquid

Number of releases: 0
Total Activity released: 0

2.6.2 Gaseous

Number of releases: 0
Total Activity released: 0

3.0 SUMMARY OF GASEOUS RADIOACTIVE EFFLUENTS

3.1 The quantities of radioactive material released in gaseous effluents are summarized in Tables 1A and 1B. Note that for this reporting period no gaseous effluents were considered as elevated releases.

4.0 SUMMARY OF LIQUID RADIOACTIVE EFFLUENTS

4.1 The quantities of radioactive material released in liquid effluents are summarized in Tables 2A and 2B.

5.0 SOLID WASTES

5.1 The quantities of radioactive material released in shipments of solid waste and irradiated fuel transported from the site during the reporting period are summarized in Table 3. The activity and fractional abundance of each nuclide was determined for each waste type by an independent laboratory based upon radiochemical analysis of samples of that waste type. The curie amount 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.

- 5.2 All dry compressible waste, contaminated equipment, etc. was shipped to reprocessing facilities for supercompaction, decontamination, or incineration. "Other" wastes shipped off-site consisted of contaminated oil which will be incinerated by a vendor to achieve volume reduction. Final burial volumes after reprocessing will be reported at a later date.

6.0 RELATED INFORMATION

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; and 3) Releases which are conducted in such a manner as to result in significant deviation from the requirements of the release permit.

There were no unplanned releases during this reporting period.

6.2 Changes to the Process Control Program

Revision 1 of APA-EZ-01011, Process Control Program Manual (PCP) was approved October 31, 1991. This revision incorporated a new section detailing Administrative Controls regarding reporting of "Major Changes to Solid Radwaste Treatment Systems" and "Changes to the Process Control Program Manual." This revision also included a removal from the PCP text applicable to the initially installed solid radwaste solidification system (which was being retired under Callaway modification 89-1045).

Lastly, two new attachments were added to the PCP. The first of these lists the vendor topical reports/systems which are approved for use at Callaway. The other of these lists the High Integrity Containers (HICs) authorized for use at Callaway.

This revision did not change the conformance of any solidified or packaged product generated at Callaway to meet the applicable requirements governing their packaging and disposal.

A complete copy of revision 1 of APA-EZ-01011 is included as Attachment 1.

6.3 Changes to the Offsite Dose Calculation Manual

There were no changes to the Offsite Dose Calculation Manual during the reporting period.

6.4 Major Changes to Radwaste Treatment Systems

During this reporting period two changes were approved by the Onsite Review Committee (ORC). These were retirement of the STOCK Cement Solidification System (ORC meeting 1064) and addition of the Pacific Nuclear System RVR-800 Radioactive Liquid Volume Reduction System (ORC meeting 1077).

The Solid Radwaste System was originally designed to collect, solidify and package radioactive wastes including evaporator concentrates, chemical wastes, spent resins and spent activated charcoal.

Packaging and solidification portions of the STOCK Cement Solidification system have been retired due to excessive maintenance, high operating costs, and difficulty with achieving acceptable solidification of processed wastes. Vendor solidification services have been used off and on since 1986 because of these problems. The associated piping systems, Reactor Makeup Water, Bulk Waste Disposal and Instrument Air were modified to allow use of alternate radwaste processing equipment. The piping systems affected by this modification have no safety design bases nor do they interface directly with safety related equipment. The STOCK solidification equipment has been isolated and retired in place. The waste streams have been rerouted to support operation of alternate processing equipment.

The components retired were the Solid Radwaste Drumming Station and the Cement Filling Station.

The Solid Radwaste Drumming Station received 55-gallon drums containing a predetermined quantity of cement and a mixing weight and injected into the drum a predetermined quantity of slurry from the solid radwaste decant station, or a predetermined quantity of concentrated wastes from the evaporator bottoms tank (primary), evaporator bottoms tank (secondary), or the chemical drain tank. The drum was tumbled for proper mixing of the contents to complete the solidification process.

The Cement Filling Station provided dry cement storage and accurately filled the empty drums with a known quantity of cement.

The Pacific Nuclear Systems RVR-800 Radioactive Liquid Volume Reduction System will replace the STOCK Solidification System. The RVR-800 will be used to process and package concentrated waste streams from primary and secondary evaporator bottoms tanks. This

radioactive waste is generated as a result of normal plant operation, including anticipated operational occurrences.

Plant wastes are introduced through a vendor supplied waste supply valve via a plant waste supply line. When the liquid level in the dryer reaches a predetermined level, an ultrasonic level switch will automatically shut the waste supply valve. The liquid is then heated by passing steam through the external dryer jacket while being mixed by the rotating agitator. At the same time a vacuum is pulled on the dryer by a pump/educator system. The steam vapor is pulled from the dryer through a condenser heat exchanger. The condenser is cooled by a chilled water system. The condensate is routed to a condensate reservoir from which it can be delivered to plant drain systems. After boiling down to a predetermined low level, the waste supply valve will be opened and additional waste will enter the dryer until the high level is reached again. Three such cycles will generate a batch cycle.

The dry out phase begins with the end of the third transfer. The dryness of the material is verified by monitoring several system parameters, as well as visual indication of the dryer's contents using the video display. Upon verification of the dryness, a binding material is introduced into the dryer. The binder is a high temperature paraffin and is melted in a steam jacketed container positioned above the dryer. After proper mixing is achieved, the agitator helix moves the waste solution to a pneumatically operated discharge valve located at the bottom center of the dryer shell. Upon discharge the waste is deposited in a 55-gallon drum via a drum shroud. Upon cooling, the waste forms a free standing billet. The packaged waste will then be stored until it can be shipped offsite to a licensed burial site. This waste form has been found acceptable by US Ecology, Hanford, WA burial site, and the state of Washington as Class A unstable waste.

This equipment will require interface with various plant auxiliary systems. The necessary system interfaces are listed below:

- Instrument Air
- Demineralized Water
- Primary and Secondary Bottoms Tank Discharge
- Floor Drain Tank via Radwaste Sump
- PG Load Center

The RVR-800 System performs no functions related to the safe shutdown of the plant, and its failure does not adversely effect any safety related system or component. The installation of this equipment is being performed in accordance with the same codes, standards and quality control as was used on the existing solid radwaste system. The system will be operated in accordance with approved plant procedures and the Process Control Program.

Predicted releases of radioactive materials will not change due to installation of this system and retirement of the STOCK system. The volume of waste will decrease, not the activity of the waste. Therefore, the expected maximum exposure to a member of the public in the restricted area will not change. Because of the increased activity concentration, increased exposure rates from individual drums and the RVR unit itself, have the potential to increase plant worker exposures. Appropriate precautions will be taken should this potential materialize.

6.5 Land Use Census Changes

There were no changes in critical receptor locations for dose calculations during the reporting period.

6.6 Inoperability of Effluent Monitoring Instrumentation

While discharging DMT A per release permit on May 30, 1991, liquid effluent monitor HB-RE-0018 was left in purge (Out of Service) after flushing the monitor following a monitor trip on high radiation level. The discharge was reinitiated with monitor HB-RE-0018 in purge. After two hours it was noted that HB-RE-0018 was in purge. The monitor was placed back in service and tripped on high radiation level. During the time the monitor was in purge, 19,890 gallons of water were discharged.

When HB-RE-0018 is Out of Service, the action statement requires duplicate samples be taken and analyzed. Duplicate samples were taken and duplicate analyses were performed for all parameters except gross alpha analysis.

Corrective actions taken to prevent recurrence of this problem were: 1) the event was discussed with the people involved emphasizing better communications between the departments involved with these releases and closer attention to detail and 2) plant procedures were revised to incorporate the recommendations from the event review team.

Because the action statement was violated this event should have been reported in the Semiannual Effluent Release Report for the first half of 1991. The identified root causes of the omission were: 1) the initial review indicated the occurrence was not reportable in the Semiannual Effluent Release Report and 2) the subsequent search of the data base by keyword did not identify this release.

The corrective actions taken to prevent recurrence of this problem were: 1) The ODCM and Technical Specifications reportability requirements were discussed with the people involved and 2) a standard set of keywords will be used to flag all future releases.

This event had no adverse radiological consequences. The tank was sampled and the dose fully evaluated prior to release. The dose contribution from this discharge is included in Table 8.

7.0 METEOROLOGICAL DATA

Meteorological data for the reporting period is presented in Table 4 as Cumulative Joint Frequency Distributions for both 10 and 60 meter elevations.

8.0 ASSESSMENT OF DOSES

The assessment of doses to the maximum exposed individual from Gaseous and Liquid effluents was performed for locations representing the maximum dose. In all cases, doses were well below Technical Specification limits.

8.1 Dose at the SITE BOUNDARY From Gaseous Effluents

An assessment of doses from gaseous effluents was performed in accordance with the Callaway Plant ODCM for the maximum exposed individual at the SITE BOUNDARY location with the highest ground level concentration of radioactive material, based upon actual meteorological conditions existing during the year. Doses were assessed at each location considering noble gas submersion, inhalation and ground plane pathways. This assessment was performed for each age group, with the Child age group receiving the highest dose.

The calculations for the SITE BOUNDARY location conservatively assumed a hypothetical maximum exposed individual. The results of the assessment for the Child age group are presented in Table 5.

8.2 Dose at the Nearest Residence From Gaseous Effluents

An assessment of doses from gaseous effluents was performed in accordance with the Callaway Plant ODCM for the maximum exposed individual at the Nearest Residence location with the highest ground level concentration of radioactive material, based upon actual meteorological conditions existing during the year. Doses were assessed at each location considering noble gas submersion, inhalation, ground plane, and ingestion pathways. The ingestion pathways considered were produce, vegetable, goat's milk, cow's milk, and meat pathways. This assessment was performed for the Child age group.

The results of the assessment for the Child age group are presented in Table 5. The calculations for the Nearest Residence are for a "real" individual. It is conservatively assumed that each ingestion pathway exists at the Nearest Residence location, and that the Child age group exists at each location.

8.3 Dose to the MEMBER OF THE PUBLIC from Activities Within the SITE BOUNDARY

The assessment of dose to the MEMBER OF THE PUBLIC from activities within the SITE BOUNDARY was performed in accordance with Chapter 4 of the Callaway Plant ODCM. The dose to the MEMBER OF THE PUBLIC from activities within the SITE BOUNDARY is presented in Table 6.

8.4 Total Dose Due to the Uranium Fuel Cycle

Since there are no other Uranium Fuel Cycle facilities within 8 km of the Callaway plant, the total dose to the most likely exposed MEMBER OF THE PUBLIC results from direct radiation and radioactive effluents from the Callaway Plant. The methodology for assessing this dose is described in Chapter 4 of the Callaway Plant ODCM.

The Total Dose from the Uranium Fuel Cycle was evaluated for the MEMBER OF THE PUBLIC who may use portions of the area within the SITE BOUNDARY for purposes not associated with plant operations.

The Total Dose to the MEMBER OF THE PUBLIC (Table 7) is the sum of the dose due to activities within the SITE BOUNDARY (Table 6) and the dose due to gaseous effluents at his residence (Table 7). The food ingestion pathways do not exist at the residence location.

The Total Dose at the Nearest Residence is due to the dose from gaseous effluents, assuming that each food ingestion pathway exists at this location (Table 5).

In each case, the whole body gamma dose from Noble Gases and ground plane exposure is added to the organ dose from the inhalation and ingestion pathways.

The Total Dose from the Uranium Fuel Cycle is presented in Table 7.

8.5 Dose Due to Liquid Effluents

The total dose to the maximum exposed individual from liquid effluents released from the Callaway Plant during the year is presented in Table 8.

TABLE 1A
SEMIANNUAL SUMMATION OF GASEOUS RELEASES
ALL AIRBORNE EFFLUENTS
QUARTERS 3 AND 4, 1991

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

1. TOTAL RELEASE	CURIES	3.55E+01	9.55E+01	20
2. AVERAGE RELEASE RATE FOR PERIOD	$\mu\text{Ci/SEC}$	4.46E+00	1.20E+01	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	

B. RADIOIODINES

1. TOTAL IODINE-131	CURIES	2.39E-06	1.26E-05	23
2. AVERAGE RELEASE RATE FOR PERIOD	$\mu\text{Ci/SEC}$	3.01E-07	1.61E-06	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	

C. PARTICULATES

1. PARTICULATE (HALF-LIVES > 8 DAYS)	CURIES	0.00E+00	0.00E+00	30
2. AVERAGE RELEASE RATE FOR PERIOD	$\mu\text{Ci/SEC}$	0.00E+00	0.00E+00	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	
4. GROSS ALPHA RADIOACTIVITY	CURIES	1.10E-06	1.18E-06	

D. TRITIUM

1. TOTAL RELEASE	CURIES	9.00E+00	9.34E+00	14
2. AVERAGE RELEASE RATE FOR PERIOD	$\mu\text{Ci/SEC}$	1.13E+00	1.18E+00	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	

TABLE 1B

SEMIANNUAL AIRBORNE CONTINUOUS AND BATCH RELEASES
GROUND LEVEL RELEASES
FISSION GASES, IODINES, AND PARTICULATES

QUARTERS 3 AND 4, 1991

NUCLIDE	UNIT	CONTINUOUS RELEASES			BATCH RELEASES	
		THIRD QUARTER	FOURTH QUARTER		THIRD QUARTER	FOURTH QUARTER
1. FISSION GASES						
KR-85M	CURIES	4.46E-02	1.05E+00		0.00E+00	0.00E+00
KR-85	CURIES	0.00E+00	0.00E+00		4.38E-01	7.61E-01
KR-87	CURIES	0.00E+00	2.94E-01		0.00E+00	0.00E+00
KR-88	CURIES	0.00E+00	2.05E+00		0.00E+00	0.00E+00
XE-131M	CURIES	0.00E+00	0.00E+00		9.04E-03	2.70E-02
XE-133	CURIES	2.98E+01	8.09E+01		8.88E-01	1.93E+00
XE-133M	CURIES	0.00E+00	0.00E+00		1.77E-03	5.45E-03
XE-135	CURIES	4.15E+00	8.36E+00		5.72E-03	1.29E-02
AR-41	CURIES	0.00E+00	0.00E+00		1.00E-01	1.49E-01
TOTAL FOR PERIOD	CURIES	3.40E+01	9.27E+01		1.44E+00	2.69E+00
2. IODINES						
I-131	CURIES	6.04E-07	6.75E-06		0.00E+00	2.96E-06
I-133	CURIES	1.79E-06	5.91E-06		0.00E+00	1.08E-07
TOTAL FOR PERIOD	CURIES	2.39E-06	1.27E-05		0.00E+00	1.38E-07
3. PARTICULATES						
G ALPH/	CURIES	1.04E-06	1.13E-06		6.37E-08	5.20E-08
TOTAL FOR PERIOD	CURIES	1.04E-06	1.13E-06		6.37E-08	5.20E-08
4. TRITIUM						
H-3	CURIES	8.67E+00	9.15E+00		3.26E-01	1.88E-01

TABLE 2A
SEMIANNUAL SUMMATION OF LIQUID RELEASES
ALL LIQUID EFFLUENTS

QUARTERS 3 AND 4, 1991

TYPE OF EFFLUENT	UNITS	THIRD QUARTER	FOURTH QUARTER	EST TOTAL ¹ ERROR %
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A. FISSION AND ACTIVATION PRODUCTS

1. TOTAL RELEASE (NOT INCLUDING TRITIUM, GASES, ALPHA)	CURIES	1.63E-03	7.49E-03	20
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	μCi/ML	3.30E-09	1.68E-08	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	

B. TRITIUM

1. TOTAL RELEASE	CURIES	3.06E+02	3.36E+02	14
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	μCi/ML	6.19E-04	7.53E-04	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	

C. DISSOLVED AND ENTRAINED GASES

1. TOTAL RELEASE	CURIES	5.36E-02	3.33E-01	27
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	μCi/ML	1.09E-07	7.46E-07	

D. GROSS ALPHA RADIOACTIVITY

1. TOTAL RELEASE	CURIES	2.45E-04	2.52E-04	29
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E. WASTE VOL RELEASED(PRE-DILUTION)	GAL	5.71E+06	4.64E+06	10
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F. VOLUME OF DILUTION WATER USED	GAL	1.25E+08	1.13E+08	10
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SEMIANNUAL LIQUID CONTINUOUS AND BATCH RELEASES
TOTALS FOR EACH NUCLIDE RELEASED

NUCLIDE	UNITS	CONTINUOUS RELEASES			BATCH RELEASES	
		THIRD QUARTER	FOURTH QUARTER		THIRD QUARTER	FOURTH QUARTER
1. ALL NUCLIDES						
H-3	CURIES	0.00E+00	0.00E+00		3.06E+02	3.36E+02
MN-54	CURIES	0.00E+00	0.00E+00		1.79E-04	6.43E-05
FE-55	CURIES	0.00E+00	0.00E+00		0.00E+00	6.77E-01
CO-58	CURIES	0.00E+00	0.00E+00		2.33E-04	3.99E-05
CO-60	CURIES	0.00E+00	0.00E+00		1.12E-03	4.88E-04
NB-95	CURIES	0.00E+00	0.00E+00		6.20E-06	0.00E+00
CS-134	CURIES	0.00E+00	0.00E+00		1.58E-05	3.20E-05
CS-137	CURIES	0.00E+00	0.00E+00		5.47E-05	3.69E-05
CE-144	CURIES	0.00E+00	0.00E+00		1.91E-05	0.00E+00
I-131	CURIES	0.00E+00	0.00E+00		0.00E+00	5.31E-05
KR-85	CURIES	0.00E+00	0.00E+00		0.00E+00	1.17E-03
XE-131M	CURIES	0.00E+00	0.00E+00		5.59E-04	3.35E-03
XE-133	CURIES	0.00E+00	0.00E+00		5.26E-02	3.21E-01
XE-133M	CURIES	0.00E+00	0.00E+00		4.16E-04	3.87E-03
XE-135	CURIES	0.00E+00	0.00E+00		1.12E-04	3.71E-03
G ALPHA	CURIES	0.00E+00	0.00E+00		2.45E-04	2.52E-04
TOTALS FOR PERIOD	CURIES	0.00E+00	0.00E+00		3.06E+02	3.36E+02

TABLE 3
SOLID WASTE & IRRADIATED FUEL SHIPMENTS
QUARTERS 3 & 4, 1991

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (DOES NOT INCLUDE IRRADIATED FUEL)

TYPE OF WASTE	6-MONTH PERIOD	EST. TOTAL ERROR (%)
a. Spent resins, filter sludges evaporator bottoms, etc.	33.5 m ³ 1.08E+02 Ci	±25%
	<u>Percent Abundance</u>	<u>Curies</u>
Fe-55	44.102%	4.78E+02
Co-60	30.517%	3.31E+02
Ni-61	15.023%	1.63E+02
Co-58	4.072%	4.41E+01
Mn-54	4.005%	4.34E+01
H-3	1.040%	1.13E+01
b. Dry compressible waste, contaminated equipment, etc.	32.6 m ³ 7.586 Ci	±25%
Fe-55	44.60%	3.38E+00
Co-58	22.20%	1.68E+00
Co-60	13.00%	9.90E-01
Nb-95	9.23%	7.00E-01
Mn-54	7.40%	5.61E-01
Zr-95	1.90%	1.44E-01
c. Irradiated components, control rods, etc.	0 m ³ 0 Ci	
d. Other	0 m ³ 0 Ci	

Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>	<u>Class of Solid Waste Shipped</u>	<u>Type of Container</u>
5	Cask	Richland, WA	A	LSA
1	Cask	Barnwell, SC	B	LSA
1	Truck	Oak Ridge, TN (QUADREX)	A	LSA
2	Truck	Oak Ridge, TN (SEG)	A	LSA
1	Truck	Richland, WA	A	LSA

Solidification Agent

Cement (applicable to waste type "a" only)

B. IRRADIATED FUEL SHIPMENTS (DISPOSITION)

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

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MIB

PAGE 1 OF 1

REPORT CATEGORY : METEOROLOGICAL. RAW DATA INPUTS.
 TYPE OF ACTIVITY : 1 - HOUR AVERAGES FILE
 REPORT START TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 REPORT END TIME : 8758:00 HRS = 10:00PM DECEMBER 31, 1991

	UNIT	INPUT	% GOOD DATA
STABILITY CLASS	A - G	E	83%
PRECIPITATION	CM.	3.78E 02	83%
SOLAR RADIATION	LANGLY/MIN	0.00E-01	0%
10 M LEVEL WIND SPEED	M/S	1.58E 00	83%
" " WIND DIRECTION	DEG	1.93E 02	83%
" " WIND DIRECTION VARIABILITY	DEG	1.18E 01	83%
" " REFERENCE TEMPERATURE	DEG C	1.28E 01	83%
" " DEWPOINT	DEG C	4.19E 00	83%
60 M LEVEL WIND SPEED	M/S	2.37E 00	83%
" " WIND DIRECTION	DEG	2.03E 02	83%
" " WIND DIRECTION VARIABILITY	DEG	7.73E 00	83%
" " DEWPOINT	DEG C	70E-01	0%
TEMPERATURE DIFFERENCE 10 M - 60 M	DEG C	15E-01	83%

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MIC

PAGE 1 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 REPORT END TIME : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 STABILITY CLASS : A
 ELEVATION : 10 METER

WIND SPEED(MPH) AT 10 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.00E-01	0.00E-01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	1.00E 00
NNE	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
NE	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
ENE	0.00E-01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	1.00E 00
E	0.00E-01	1.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 00
ESE	1.00E 00	1.00E 00	2.00E 00	0.00E-01	0.00E-01	0.00E-01	4.00E 00
SE	0.00E-01	6.00E 00	3.00E 00	0.00E-01	0.00E-01	0.00E-01	9.00E 00
SSE	0.00E-01	7.00E 00	5.00E 00	0.00E-01	0.00E-01	0.00E-01	1.20E 01
S	0.00E-01	8.00E 00	4.00E 00	0.00E-01	0.00E-01	0.00E-01	1.20E 01
SSW	0.00E-01	8.00E 00	1.00E 01	2.00E 00	0.00E-01	0.00E-01	2.00E 01
SW	1.00E 00	0.00E-01	4.00E 00	1.00E 00	0.00E-01	0.00E-01	6.00E 00
WSW	1.00E 00	0.00E-01	2.00E 00	0.00E-01	0.00E-01	0.00E-01	3.00E 00
W	0.00E-01	2.00E 00	4.00E 00	0.00E-01	0.00E-01	0.00E-01	6.00E 00
WNW	3.00E 00	1.00E 00	5.00E 00	4.00E 00	0.00E-01	0.00E-01	1.30E 01
NW	0.00E-01	3.00E 00	0.00E-01	3.00E 00	0.00E-01	0.00E-01	6.00E 00
NNW	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
TOT	6.00E 00	3.80E 01	4.10E 01	1.00E 01	0.00E-01	0.00E-01	9.50E 01

PERIODS OF CALM(HOURS): 1.000E 00
 HOURS OF INVALID DATA : 0.000E-01

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MIC

PAGE 2 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 REPORT END TIME : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 STABILITY CLASS : B
 ELEVATION : 10 METERS

WIND SPEED(MPH) AT 10 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.00E-01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	1.00E 00
NNE	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
NE	0.00E-01	0.00E-01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	1.00E 00
ENE	0.00E-01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	1.00E 00
E	2.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	3.00E 00
ESE	1.00E 00	3.00E 00	2.00E 00	0.00E-01	0.00E-01	0.00E-01	6.00E 00
SE	2.00E 00	1.30E 01	1.10E 01	0.00E-01	0.00E-01	0.00E-01	2.60E 01
SSE	1.00E 00	1.70E 01	6.00E 00	0.00E-01	0.00E-01	0.00E-01	2.40E 01
S	5.00E 00	6.00E 00	1.50E 01	1.00E 00	1.00E 00	0.00E-01	2.80E 01
SSW	0.00E-01	1.50E 01	1.20E 01	2.00E 00	0.00E-01	0.00E-01	2.90E 01
SW	0.00E-01	1.50E 01	1.60E 01	1.00E 00	0.00E-01	0.00E-01	3.20E 01
WSW	1.00E 00	0.00E-01	2.00E 00	0.00E-01	0.00E-01	0.00E-01	3.00E 00
W	0.00E-01	1.00E 00	5.00E 00	2.00E 00	0.00E-01	0.00E-01	8.00E 00
WNW	2.00E 00	1.00E 00	8.00E 00	1.00E 00	0.00E-01	0.00E-01	1.20E 01
NW	0.00E-01	1.00E 00	6.00E 00	2.00E 00	0.00E-01	0.00E-01	9.00E 00
NNW	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
TOT	1.40E 01	7.50E 01	8.40E 01	9.00E 00	1.00E 00	0.00E-01	1.83E 02

PERIODS OF CALM(HOURS): 0.000E-01
 HOURS OF INVALID DATA : 0.000E-01

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MIC

PAGE 3 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 PERIOD OF RECORD : EACH WIND SPEED AND DIRECTION
 REPORT START TIME : QUARTER # ***
 REPORT END TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 STABILITY CLASS : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 ELEVATION : C
 : 10 METERS

WIND SPEED(MPH) AT 10 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.00E-01	4.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	5.00E 00
NNE	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
NE	0.00E-01	7.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	8.00E 00
ENE	0.00E-01	2.00E 00	4.00E 00	0.00E-01	0.00E-01	0.00E-01	6.00E 00
E	1.00E 00	8.00E 00	3.00E 00	1.00E 00	0.00E-01	0.00E-01	1.30E 01
ESE	1.00E 00	1.20E 01	7.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 01
SE	0.00E-01	1.80E 01	4.00E 00	2.00E 00	0.00E-01	0.00E-01	2.40E 01
SSE	2.00E 00	8.00E 00	5.00E 00	0.00E-01	0.00E-01	0.00E-01	1.50E 01
S	2.00E 00	1.20E 01	1.60E 01	1.20E 01	1.00E 00	0.00E-01	4.30E 01
SSW	6.00E 00	1.90E 01	2.30E 01	3.00E 00	0.00E-01	0.00E-01	5.10E 01
SW	1.00E 00	8.00E 00	1.00E 01	5.00E 00	0.00E-01	0.00E-01	2.40E 01
WSW	2.00E 00	3.00E 00	3.00E 00	0.00E-01	0.00E-01	0.00E-01	3.00E 00
W	4.00E 00	5.00E 00	5.00E 00	6.00E 00	0.00E-01	0.00E-01	2.00E 01
WNW	1.00E 00	6.00E 00	1.20E 01	4.00E 00	0.00E-01	0.00E-01	2.30E 01
NW	1.00E 00	3.00E 00	6.00E 00	4.00E 00	0.00E-01	0.00E-01	1.40E 01
NNW	0.00E-01	7.00E 00	2.00E 00	0.00E-01	0.00E-01	0.00E-01	9.00E 00
TOT	2.10E 01	1.22E 02	1.02E 02	3.70E 01	1.00E 00	0.00E-01	2.83E 02

PERIODS OF CALM(HOURS): 0.000E-01
 HOURS OF INVALID DATA : 0.000E-01

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS 1991

MIC

PAGE 4 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 REPORT END TIME : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 STABILITY CLASS : D
 ELEVATION : 10 METERS

WIND SPEED(MPH) AT 10 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.00E-01	2.00E 01	2.80E 01	6.00E 00	0.00E-01	0.00E-01	5.40E 01
NNE	8.00E 00	4.10E 01	1.50E 01	3.00E 00	0.00E-01	0.00E-01	6.70E 01
NE	1.20E 01	5.20E 01	2.00E 00	0.00E-01	0.00E-01	0.00E-01	6.60E 01
ENE	1.10E 01	4.20E 01	2.50E 01	0.00E-01	0.00E-01	0.00E-01	7.80E 01
E	1.60E 01	6.60E 01	4.60E 01	3.00E 00	0.00E-01	0.00E-01	1.31E 02
ESE	1.90E 01	5.80E 01	3.00E 01	0.00E-01	0.00E-01	0.00E-01	1.07E 02
SE	1.90E 01	5.60E 01	2.70E 01	5.00E 00	2.00E 00	0.00E-01	1.39E 02
SSE	1.80E 01	4.70E 01	2.50E 01	6.00E 00	1.00E 00	0.00E-01	9.70E 01
S	2.40E 01	6.30E 01	6.90E 01	2.40E 01	3.00E 00	0.00E-01	1.83E 02
SSW	1.60E 01	6.10E 01	6.50E 01	2.70E 01	2.00E 00	0.00E-01	1.71E 02
SW	1.30E 01	3.70E 01	3.20E 01	1.40E 01	0.00E-01	0.00E-01	9.60E 01
WSW	1.10E 01	3.20E 01	1.10E 01	4.00E 00	0.00E-01	0.00E-01	5.80E 01
W	1.70E 01	5.60E 01	5.80E 01	3.00E 01	3.00E 00	0.00E-01	1.64E 02
WNW	2.50E 01	4.10E 01	7.70E 01	2.00E 01	6.00E 00	0.00E-01	1.69E 02
NW	6.00E 00	3.30E 01	4.90E 01	1.50E 01	0.00E-01	0.00E-01	1.03E 02
NNW	7.00E 00	2.60E 01	5.40E 01	0.00E-01	0.00E-01	0.00E-01	8.70E 01
TOT	2.22E 02	7.31E 02	6.13E 02	1.57E 02	1.70E 01	0.00E-01	1.74E 03

PERIODS OF CALM(HOURS): 2.000E 00
 HOURS OF INVALID DATA : 0.000E-01

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MIC

PAGE 5 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 PERIOD OF RECORD : EACH WIND SPEED AND DIRECTION
 REPORT START TIME : QUARTER 4 ***
 REPORT END TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 STABILITY CLASS : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 ELEVATION : E
 : 10 METERS

WIND SPEED(MPH) AT 10 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.00E 00	3.40E 01	3.20E 01	6.00E 00	0.00E-01	0.00E-01	7.40E 01
NNE	1.40E 01	6.70E 01	1.80E 01	0.00E-01	0.00E-01	0.00E-01	9.90E 01
NE	2.70E 01	6.10E 01	6.00E 00	0.00E-01	0.00E-01	0.00E-01	9.40E 01
ENE	2.40E 01	5.40E 01	2.00E 01	0.00E-01	0.00E-01	0.00E-01	9.80E 01
E	2.10E 01	8.80E 01	4.00E 01	5.00E 00	1.00E 00	0.00E-01	1.55E 02
ESE	3.40E 01	1.06E 02	5.30E 01	1.00E 01	0.00E-01	0.00E-01	2.03E 02
SE	2.00E 01	1.09E 02	3.80E 01	8.00E 00	0.00E-01	0.00E-01	1.75E 02
SSE	2.30E 01	8.90E 01	6.50E 01	1.20E 01	1.00E 00	0.00E-01	1.90E 02
S	2.00E 01	1.18E 02	1.24E 02	2.20E 01	0.00E-01	0.00E-01	2.84E 02
SSW	1.40E 01	5.30E 01	5.50E 01	1.20E 01	0.00E-01	0.00E-01	1.34E 02
SW	9.00E 00	4.00E 01	1.30E 01	5.00E 00	0.00E-01	0.00E-01	6.70E 01
WSW	2.90E 01	3.70E 01	2.80E 01	8.00E 00	0.00E-01	0.00E-01	1.02E 02
W	2.70E 01	5.80E 01	5.30E 01	2.20E 01	0.00E-01	0.00E-01	1.60E 02
WNW	6.10E 01	1.02E 02	9.60E 01	1.30E 01	1.00E 00	0.00E-01	2.73E 02
NW	3.00E 01	6.40E 01	2.50E 01	7.00E 00	3.00E 00	0.00E-01	1.29E 02
NNW	1.50E 01	8.40E 01	3.60E 01	3.00E 00	0.00E-01	0.00E-01	1.38E 02
TOT	3.70E 02	1.16E 03	7.02E 02	1.33E 02	6.00E 00	0.00E-01	2.38E 03

PERIODS OF CALM(HOURS): 3.200E 01
 HOURS OF INVALID DATA : 0.000E-01

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MIC

PAGE 6 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 REPORT END TIME : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 STABILITY CLASS : F
 ELEVATION : 10 METERS

WIND SPEED(MPH) AT 10 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.00E 00	1.60E 01	2.70E 01	2.00E 00	0.00E-01	0.00E-01	4.70E 01
NNE	1.90E 01	1.90E 01	6.00E 00	0.00E-01	0.00E-01	0.00E-01	4.40E 01
NE	3.20E 01	1.40E 01	1.00E 00	1.00E 00	0.00E-01	0.00E-01	4.80E 01
ENE	4.10E 01	2.90E 01	8.00E 00	0.00E-01	0.00E-01	0.00E-01	7.80E 01
E	5.30E 01	3.60E 01	1.50E 01	1.00E 00	0.00E-01	0.00E-01	1.05E 02
ESE	3.80E 01	4.00E 01	1.10E 01	1.00E 00	0.00E-01	0.00E-01	9.00E 01
SE	4.90E 01	1.33E 02	3.10E 01	3.00E 00	0.00E-01	0.00E-01	2.16E 02
SSE	4.10E 01	1.95E 02	2.50E 01	5.00E 00	0.00E-01	0.00E-01	2.66E 02
S	3.40E 01	1.73E 02	4.80E 01	6.00E 00	0.00E-01	0.00E-01	2.61E 02
SSW	2.20E 01	7.50E 01	3.40E 01	0.00E-01	0.00E-01	0.00E-01	1.31E 02
SW	2.90E 01	4.30E 01	1.20E 01	0.00E-01	0.00E-01	0.00E-01	8.40E 01
WSW	2.30E 01	2.70E 01	8.00E 00	0.00E-01	0.00E-01	0.00E-01	5.80E 01
W	2.90E 01	4.20E 01	8.00E 00	1.00E 00	0.00E-01	0.00E-01	8.00E 01
WNW	4.30E 01	4.30E 01	1.00E 01	0.00E-01	0.00E-01	0.00E-01	9.60E 01
NW	1.90E 01	4.30E 01	4.00E 00	2.00E 00	0.00E-01	0.00E-01	6.80E 01
NNW	1.50E 01	5.70E 01	1.80E 01	1.00E 00	0.00E-01	0.00E-01	9.10E 01
TOT	4.89E 02	9.85E 02	2.66E 02	2.30E 01	0.00E-01	0.00E-01	1.76E 03

PERIODS OF CALM(HOURS): 4.000E 01
 HOURS OF INVALID DATA : 0.000E-01

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MIC

PAGE 7 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 REPORT END TIME : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 STABILITY CLASS : G
 ELEVATION : 10 METERS

WIND SPEED(MPH) AT 10 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	9.00E 00	8.00E 00	4.00E 00	0.00E-01	0.00E-01	0.00E-01	2.10E 01
NNE	3.60E 01	3.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	4.00E 01
NE	2.00E 01	6.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	2.60E 01
ENE	2.00E 00	4.00E 00	2.00E 00	0.00E-01	0.00E-01	0.00E-01	8.00E 00
E	2.90E 01	4.00E 00	1.70E 01	0.00E-01	0.00E-01	0.00E-01	5.00E 01
ESE	2.60E 01	5.00E 00	1.40E 01	0.00E-01	0.00E-01	0.00E-01	4.20E 01
SE	1.70E 01	4.30E 01	1.00E 01	3.00E 00	0.00E-01	0.00E-01	7.30E 01
SSE	2.30E 01	7.90E 01	1.10E 01	0.00E-01	0.00E-01	0.00E-01	1.13E 02
S	2.60E 01	4.20E 01	3.00E 00	0.00E-01	0.00E-01	0.00E-01	7.10E 01
SSW	2.30E 01	2.90E 01	2.00E 00	0.00E-01	0.00E-01	0.00E-01	5.40E 01
SW	2.30E 01	3.50E 01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	5.90E 01
WSW	2.00E 01	6.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	2.60E 01
W	2.40E 01	6.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	3.10E 01
WNW	1.00E 01	1.20E 01	7.00E 00	0.00E-01	0.00E-01	0.00E-01	2.90E 01
NW	1.20E 01	1.80E 01	4.00E 00	1.00E 00	0.00E-01	0.00E-01	3.50E 01
NNW	3.90E 01	2.00E 01	0.00E 00	0.00E-01	0.00E-01	0.00E-01	6.50E 01
TOT	3.39E 02	3.20E 02	8.00E 01	4.00E 00	0.00E-01	0.00E-01	7.43E 02

PERIODS OF CALM(HOURS): 3.000E 01
 HOURS OF INVALID DATA : 0.000E-01
 HOURS OF GOOD DATA : 7.287E 03 = 83.2% OF TOTAL HOURS

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MID

PAGE 1 OF 7

REPORT CATEGORY : METEROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 PERIOD OF RECORD : EACH WIND SPEED AND DIRECTION
 REPORT START TIME : QUARTER # ***
 REPORT END TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 STABILITY CLASS : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 ELEVATION : A
 : 60 METERS

WIND SPEED(MPH) AT 60 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.00E-01	0.00E-01	0.00E-01	0.00E-01	1.00E 00	0.00E-01	1.00E 00
NNE	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
NE	1.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	1.00E 00
ENE	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
E	0.00E-01	1.00E 00	2.00E 00	1.00E 00	0.00E-01	0.00E-01	4.00E 00
ESE	0.00E-01	0.00E-01	2.00E 00	1.00E 00	0.00E-01	0.00E-01	3.00E 00
SE	1.00E 00	3.00E 00	2.00E 00	1.00E 00	0.00E-01	0.00E-01	7.00E 00
SSE	0.00E-01	2.00E 00	6.00E 00	0.00E-01	0.00E-01	0.00E-01	8.00E 00
S	0.00E-01	5.00E 00	6.00E 00	1.00E 00	1.00E 00	0.00E-01	1.30E 01
SSW	1.00E 00	3.00E 00	9.00E 00	2.00E 00	0.00E-01	0.00E-01	1.50E 01
SW	2.00E 00	3.00E 00	5.00E 00	8.00E 00	0.00E-01	0.00E-01	1.80E 01
WSW	1.00E 00	1.00E 00	0.00E-01	1.00E 00	0.00E-01	0.00E-01	3.00E 00
W	1.00E 00	0.00E-01	0.00E-01	1.00E 00	0.00E-01	0.00E-01	2.00E 00
WNW	0.00E-01	1.00E 00	0.00E-01	3.00E 00	5.00E 00	0.00E-01	9.00E 00
NW	0.00E-01	1.00E 00	3.00E 00	1.00E 00	3.00E 00	0.00E-01	8.00E 00
NNW	0.00E-01	0.00E-01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	1.00E 00
TOT	7.00E 00	2.00E 01	3.60E 01	2.00E 01	1.00E 01	0.00E-01	9.30E 01

PERIODS OF CALM(HOURS): 3.000E 00
 HOURS OF INVALID DATA : 0.000E-01

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MID

PAGE 2 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 REPORT END TIME : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 STABILITY CLASS : B
 ELEVATION : 60 METERS

WIND SPEED(MPH) AT 60 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.00E-01	0.00E-01	1.00E 00	2.00E 00	0.00E-01	0.00E-01	3.00E 00
NNE	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
NE	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
ENE	0.00E-01	1.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 00
E	0.00E-01	0.00E-01	5.00E 00	1.00E 00	0.00E-01	0.00E-01	6.00E 00
ESE	1.00E 00	2.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	4.00E 00
SE	0.00E-01	8.00E 00	5.00E 00	1.00E 00	0.00E-01	0.00E-01	1.40E 01
SSE	1.00E 00	9.00E 00	1.60E 01	2.00E 00	0.00E-01	0.00E-01	2.80E 01
S	5.00E 00	9.00E 00	1.30E 01	5.00E 00	1.00E 00	1.00E 00	3.40E 01
SSW	0.00E-01	1.00E 01	5.00E 00	3.00E 00	0.00E-01	0.00E-01	1.80E 01
SW	1.00E 00	8.00E 00	1.70E 01	5.00E 00	1.00E 00	0.00E-01	3.20E 01
WSW	1.00E 00	3.00E 00	2.00E 00	0.00E-01	0.00E-01	0.00E-01	6.00E 00
W	0.00E-01	0.00E-01	2.00E 00	4.00E 00	0.00E-01	0.00E-01	6.00E 00
WNW	1.00E 00	0.00E-01	2.00E 00	6.00E 00	2.00E 00	0.00E-01	1.10E 01
NW	0.00E-01	1.00E 00	0.00E-01	3.00E 00	1.00E 00	0.00E-01	5.00E 00
NNW	0.00E-01	0.00E-01	2.00E 00	1.00E 00	0.00E-01	0.00E-01	3.00E 00
TOT	1.00E 01	5.10E 01	7.20E 01	3.30E 01	5.00E 00	1.00E 00	1.72E 02

PERIODS OF CALM(HOURS): 1.100E 01
 HOURS OF INVALID DATA : 0.000E-01

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MID

PAGE 3 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 REPORT END TIME : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 STABILITY CLASS : C
 ELEVATION : 60 METERS

WIND SPEED(MPH) AT 60 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.00E-01	0.00E-01	4.00E 00	3.00E 00	0.00E-01	0.00E-01	7.00E 00
NNE	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
NE	0.00E-01	2.00E 00	2.00E 00	0.00E-01	0.00E-01	0.00E-01	4.00E 00
ENE	0.00E-01	2.00E 00	4.00E 00	0.00E-01	0.00E-01	0.00E-01	6.00E 00
E	0.00E-01	2.00E 00	8.00E 00	1.00E 00	0.00E-01	0.00E-01	1.10E 01
ESE	0.00E-01	4.00E 00	1.30E 01	1.00E 00	0.00E-01	0.00E-01	1.80E 01
SE	1.00E 00	1.40E 01	6.00E 00	2.00E 00	0.00E-01	0.00E-01	2.30E 01
SSE	1.00E 00	9.00E 00	8.00E 00	1.00E 00	0.00E-01	0.00E-01	1.90E 01
S	3.00E 00	1.00E 01	1.20E 01	6.00E 00	4.00E 00	1.00E 00	3.60E 01
SSW	3.00E 00	1.40E 01	1.70E 01	7.00E 00	2.00E 00	0.00E-01	4.30E 01
SW	2.00E 00	8.00E 00	1.40E 01	1.10E 01	3.00E 00	2.00E 00	4.00E 01
WSW	2.00E 00	2.00E 00	6.00E 00	0.00E-01	0.00E-01	0.00E-01	1.00E 01
W	2.00E 00	4.00E 00	3.00E 00	3.00E 00	1.00E 00	0.00E-01	1.30E 01
WNW	0.00E-01	1.00E 00	5.00E 00	5.00E 00	7.00E 00	0.00E-01	1.80E 01
NW	0.00E-01	4.00E 00	5.00E 00	6.00E 00	3.00E 00	0.00E-01	1.80E 01
NNW	0.00E-01	7.00E 00	3.00E 00	1.00E 00	0.00E-01	0.00E-01	1.10E 01
TOT	1.40E 01	8.30E 01	1.10E 02	4.70E 01	2.00E 01	3.00E 00	2.77E 02

PERIODS OF CALM(HOURS): 6.000E 00
 HOURS OF INVALID DATA : 0.000E-01

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MID

PAGE 4 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 REPORT END TIME : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 STABILITY CLASS : D
 ELEVATION : 60 METERS

WIND SPEED(MPH) AT 60 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.00E 00	1.80E 01	3.70E 01	4.00E 00	2.00E 00	0.00E-01	6.30E 01
NNE	5.00E 00	3.70E 01	3.60E 01	1.90E 01	1.00E 00	0.00E-01	9.80E 01
NE	8.00E 00	4.00E 01	1.50E 01	1.00E 00	0.00E-01	0.00E-01	6.40E 01
ENE	8.00E 00	2.50E 01	2.90E 01	3.00E 00	0.00E-01	0.00E-01	6.50E 01
E	8.00E 00	5.10E 01	6.30E 01	5.00E 00	0.00E-01	0.00E-01	1.27E 02
ESE	7.00E 00	4.10E 01	4.30E 01	1.60E 01	0.00E-01	0.00E-01	1.07E 02
SE	1.00E 01	4.00E 01	3.40E 01	1.20E 01	1.00E 00	0.00E-01	9.70E 01
SSE	9.00E 00	3.80E 01	2.70E 01	1.50E 01	3.00E 00	3.00E 00	9.50E 01
S	1.00E 01	5.00E 01	5.80E 01	3.90E 01	1.00E 01	1.00E 00	1.68E 02
SSW	1.00E 01	4.90E 01	5.50E 01	3.30E 01	1.00E 01	5.00E 00	1.62E 02
SW	1.00E 01	2.00E 01	4.80E 01	3.20E 01	2.10E 01	4.00E 00	1.35E 02
WSW	1.10E 01	2.50E 01	2.40E 01	7.00E 00	1.00E 00	2.00E 00	7.00E 01
W	1.30E 01	3.90E 01	3.80E 01	2.60E 01	2.10E 01	1.20E 01	1.49E 02
WNW	9.00E 00	3.40E 01	3.20E 01	4.00E 01	1.50E 01	2.00E 00	1.32E 02
NW	2.00E 00	2.10E 01	3.70E 01	3.10E 01	1.50E 01	1.10E 01	1.17E 02
NNW	3.00E 00	1.60E 01	3.40E 01	1.90E 01	0.00E-01	1.00E 00	7.30E 01
TOT	1.25E 02	5.44E 02	6.10E 02	3.02E 02	1.00E 02	4.10E 01	1.72E 03

PERIODS OF CALM(HOURS): 2.000E 01
 HOURS OF INVALID DATA : 0.000E-01

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MID

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REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 REPORT END TIME : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 STABILITY CLASS : E
 ELEVATION : 60 METERS

WIND SPEED(MPH) AT 60 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.00E 00	8.00E 00	5.90E 01	3.20E 01	7.00E 00	0.00E-01	1.07E 02
NNE	1.00E 00	2.30E 01	7.60E 01	1.80E 01	2.00E 00	1.00E 00	1.21E 02
NE	2.00E 00	3.50E 01	5.70E 01	1.00E 00	0.00E-01	0.00E-01	9.50E 01
ENE	8.00E 00	3.30E 01	4.50E 01	3.00E 00	0.00E-01	1.00E 00	9.00E 01
E	2.00E 00	3.60E 01	8.30E 01	1.60E 01	0.00E-01	0.00E-01	1.37E 02
ESE	1.30E 01	5.10E 01	8.60E 01	3.60E 01	5.00E 00	0.00E-01	1.91E 02
SE	8.00E 00	4.20E 01	8.40E 01	4.40E 01	6.00E 00	0.00E-01	1.84E 02
SSE	2.10E 01	3.20E 01	5.20E 01	5.90E 01	6.00E 00	2.00E 00	1.72E 02
S	1.00E 01	3.70E 01	9.90E 01	9.90E 01	1.30E 01	0.00E-01	2.58E 02
SSW	6.00E 00	3.10E 01	4.80E 01	8.30E 01	1.40E 01	1.00E 00	1.83E 02
SW	8.00E 00	2.30E 01	3.90E 01	3.80E 01	1.00E 00	2.00E 00	1.11E 02
WSW	1.60E 01	2.10E 01	2.20E 01	2.40E 01	9.00E 00	4.00E 00	9.60E 01
W	1.70E 01	2.50E 01	5.80E 01	5.00E 01	1.40E 01	9.00E 00	1.73E 02
WNW	9.00E 00	3.70E 01	6.60E 01	6.20E 01	1.80E 01	2.00E 00	1.94E 02
NW	8.00E 00	3.30E 01	3.90E 01	5.40E 01	7.00E 00	8.00E 00	1.49E 02
NNW	1.00E 00	2.80E 01	6.40E 01	3.00E 01	5.00E 00	0.00E-01	1.28E 02
TOT	1.31E 02	4.95E 02	9.77E 02	6.49E 02	1.07E 02	3.00E 01	2.39E 03

PERIODS OF CALM(HOURS): 1.800E 01
 HOURS OF INVALID DATA : 0.000E-01

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MID

PAGE 6 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 REPORT END TIME : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 STABILITY CLASS : F
 ELEVATION : 60 METERS

WIND SPEED(MPH) AT 60 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.00E 00	8.00E 00	3.10E 01	1.90E 01	4.00E 00	0.00E-01	6.30E 01
NNE	2.00E 00	1.10E 01	4.10E 01	5.00E 00	1.00E 00	0.00E-01	6.00E 01
NE	3.00E 00	1.30E 01	3.10E 01	1.00E 00	0.00E-01	0.00E-01	4.80E 01
ENE	7.00E 00	1.80E 01	2.90E 01	4.00E 00	0.00E-01	0.00E-01	5.80E 01
E	3.00E 00	2.90E 01	7.00E 01	9.00E 00	0.00E-01	0.00E-01	1.10E 02
ESE	6.00E 00	3.50E 01	4.50E 01	6.00E 00	1.00E 00	0.00E-01	9.30E 01
SE	2.00E 00	2.80E 01	7.80E 01	3.40E 01	0.00E-01	0.00E-01	1.42E 02
SSE	6.00E 00	3.70E 01	8.60E 01	5.30E 01	5.00E 00	0.00E-01	1.87E 02
S	5.00E 00	4.80E 01	1.48E 02	7.00E 01	6.00E 00	1.00E 00	2.78E 02
SSW	7.00E 00	2.80E 01	9.80E 01	9.60E 01	2.00E 00	0.00E-01	2.31E 02
SW	3.00E 00	2.30E 01	3.90E 01	5.80E 01	6.00E 00	0.00E-01	1.29E 02
WSW	3.00E 00	2.20E 01	2.80E 01	1.30E 01	0.00E-01	0.00E-01	6.60E 01
W	4.00E 00	1.70E 01	4.30E 01	3.40E 01	1.00E 00	0.00E-01	9.90E 01
WNW	2.00E 00	2.30E 01	3.60E 01	2.10E 01	0.00E-01	0.00E-01	8.20E 01
NW	2.00E 00	1.80E 01	2.90E 01	8.00E 00	0.00E-01	0.00E-01	5.70E 01
NNW	1.00E 00	1.80E 01	4.00E 01	9.00E 00	1.00E 00	0.00E-01	6.90E 01
TOT	5.60E 01	3.76E 02	8.72E 02	4.40E 02	2.70E 01	1.00E 00	1.77E 03

PERIODS OF CALM(HOURS): 3.100E 01
 HOURS OF INVALID DATA : 0.000E-01

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS
1991

MID

PAGE 7 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 1:00 HRS = 01:00AM JANUARY 1, 1991
 REPORT END TIME : 8758:00 HRS = 10:00PM DECEMBER 31, 1991
 STABILITY CLASS : G
 ELEVATION : 60 METERS

WIND SPEED(MPH) AT 60 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.00E-01	3.00E 00	1.60E 01	2.00E 01	1.00E 00	0.00E-01	4.00E 01
NNE	1.00E 00	1.00E 01	2.70E 01	6.00E 00	0.00E-01	0.00E-01	4.40E 01
NE	2.00E 00	1.80E 01	2.10E 01	1.00E 00	0.00E-01	0.00E-01	4.20E 01
ENE	1.00E 00	5.00E 00	2.90E 01	8.00E 00	0.00E-01	0.00E-01	4.30E 01
E	1.00E 00	6.00E 00	3.10E 01	1.10E 01	0.00E-01	1.00E 00	5.00E 01
ESE	1.00E 00	1.50E 01	3.20E 01	1.20E 01	0.00E-01	0.00E-01	6.00E 01
SE	1.00E 00	1.20E 01	2.30E 01	7.00E 00	3.00E 00	0.00E-01	4.60E 01
SSE	0.00E-01	1.20E 01	2.70E 01	1.80E 01	0.00E-01	0.00E-01	5.70E 01
S	1.00E 00	1.70E 01	3.90E 01	2.50E 01	0.00E-01	0.00E-01	8.20E 01
SSW	2.00E 00	1.20E 01	4.00E 01	3.10E 01	1.00E 00	0.00E-01	8.60E 01
SW	1.00E 00	5.00E 00	2.50E 01	1.70E 01	1.00E 00	0.00E-01	4.90E 01
WSW	3.00E 00	8.00E 00	2.60E 01	1.00E 01	0.00E-01	0.00E-01	4.70E 01
W	2.00E 00	8.00E 00	2.20E 01	1.10E 01	0.00E-01	0.00E-01	4.30E 01
WNW	0.00E-01	4.00E 00	1.50E 01	3.00E 00	0.00E-01	0.00E-01	2.20E 01
NW	1.00E 00	3.00E 00	3.00E 00	7.00E 00	1.00E 00	0.00E-01	1.50E 01
NNW	1.00E 00	4.00E 00	1.60E 01	5.00E 00	0.00E-01	0.00E-01	2.60E 01
TOT	1.80E 01	1.42E 02	3.92E 02	1.92E 02	7.00E 00	1.00E 00	7.52E 02

PERIODS OF CALM(HOURS): 2.100E 01
 HOURS OF INVALID DATA : 0.000E-01
 HOURS OF GOOD DATA : 7.287E 03 = 83.2% OF TOTAL HOURS

TABLE 5

DOSE AT THE SITE BOUNDARY AND TO THE NEAREST RESIDENT
FROM GASEOUS EFFLUENTS

<u>ORGAN</u>	<u>SITE BOUNDARY</u>		<u>NEAREST RESIDENT</u>	
	<u>LOCATION:</u> 1.6km W <u>AGE GROUP:</u> CHILD		<u>LOCATION:</u> 2.87km NNW <u>AGE GROUP:</u> CHILD	
	<u>DOSE</u>	<u>% LIMIT(a)</u>	<u>DOSE</u>	<u>% LIMIT(b)</u>
Gamma Air Dose (mRad)*	4.21E-03	0.04	2.33E-03	N/A
Beta Air Dose (mRad)*	6.36E-03	0.03	3.52E-03	N/A
Whole Body (mRem)*	3.85E-03	N/A	2.13E-03	N/A
Skin (mRem)*	7.45E-03	N/A	4.13E-03	N/A
Bone (mRem)**	2.36E-08	N/A	4.70E-06	0.00
Liver (mRem)**	1.24E-03	N/A	5.93E-03	0.04
Total Body (mRem)**	1.24E-03	N/A	5.92E-03	0.04
Thyroid (mRem)**	1.24E-03	N/A	6.51E-03	0.04
Kidney (mRem)**	1.24E-03	N/A	5.93E-03	0.04
Lung (mRem)**	1.24E-03	N/A	5.92E-03	0.04
GI-LLI (mRem)**	1.24E-03	N/A	5.92E-03	0.04

* Dose from Noble Gases only

** Dose from Tritium, Radiiodines and Particulates only

(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 radio-
nuclides with half-lives greater than 8 days.

TABLE 6

DOSE TO THE MEMBER OF THE PUBLIC FROM ACTIVITIES
WITHIN THE SITE BOUNDARY

ORGAN	EFFLUENT DOSE WITHIN THE SITE BOUNDARY <u>(mRem)</u>	DIRECT RADIATION FROM THE UNIT <u>(mRem)</u>	DIRECT RADIATION FROM OUTSIDE TANKS <u>(mRem/1100hr)</u>	TOTAL DOSE FOR THE YEAR <u>(mRem)</u>
Skin	1.44E-03	N/A	N/A	1.44E-03
Bone	2.49E-09	9.00E-03	3.95E-04	9.39E-03
Liver	2.78E-04	9.00E-03	3.95E-04	9.67E-03
Total Body	1.02E-03	9.00E-03	3.95E-04	1.04E-02
Thyroid	2.78E-04	9.00E-03	3.95E-04	9.67E-03
Kidney	2.78E-04	9.00E-03	3.95E-04	9.67E-03
Lung	2.78E-04	9.00E-03	3.95E-04	9.67E-03
GI-LLI	2.78E-04	9.00E-03	3.95E-04	9.67E-03

TABLE 7

TOTAL DOSE DUE TO THE URANIUM FUEL CYCLE
(MEMBER OF THE PUBLIC)

<u>ORGAN</u>	<u>DOSE AT THE RESIDENCE LOCATION (mRem)</u>	<u>DOSE FROM ACTIVITIES WITHIN THE SITE BOUNDARY (mRem)</u>	<u>TOTAL DOSE TO THE MEMBER OF THE PUBLIC (mRem)</u>	<u>% LIMIT 40CFR190*</u>
Skin	1.09E-03	1.44E-03	2.53E-03	0.01
Bone	7.88E-09	9.39E-03	9.39E-03	0.04
Liver	2.39E-04	9.67E-03	9.91E-03	0.04
Total Body	8.04E-04	1.04E-02	1.12E-02	0.04
Thyroid	2.40E-04	9.67E-03	9.91E-03	0.01
Kidney	2.39E-04	9.67E-03	9.91E-03	0.04
Lung	2.39E-04	9.67E-03	9.91E-03	0.04
GI-LLI	2.39E-04	9.67E-03	9.91E-03	0.04

* 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)

1991

<u>ORGAN</u>	<u>DOSE</u> <u>(mRem)</u>	<u>LIMIT*</u> <u>(mRem)</u>	<u>% LIMIT</u>
BONE	1.59E-03	10	2E-02
LIVER	5.04E-03	10	5E-02
TOTAL BODY	4.35E-03	3	1E-01
THYROID	2.54E-03	10	3E-02
KIDNEY	3.33E-03	10	3E-02
LUNG	2.79E-03	10	3E-02
GI-LLI	7.83E-03	10	8E-02

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

ATTACHMENT 1

APA-ZZ-01011, PROCESS CONTROL PROGRAM MANUAL