

SEMIANNUAL RADIOACTIVE EFFLUENT

RELEASE REPORT

CALLAWAY NUCLEAR PLANT

UNION ELECTRIC COMPANY

LICENSE NPF - 30

JULY - DECEMBER 1985

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INTRODUCTION

This Semiannual Radioactive Effluent Release Report is for Union Electric Company's Callaway Plant and is submitted in accordance with the requirements of Technical Specification 6.9.1.7. The report covers the period from July 1, 1985 through December 31, 1985.

This report includes a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the plant. The information is presented in accordance with 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 the limits of the Callaway Plant Technical Specifications.

2.0 SUPPLEMENTAL INFORMATION

2.1 Regulatory Limits

Specified as follows are the technical specification limits applicable to the release of radioactive material in liquid and gaseous effluents.

2.1.1 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.

2.1.2 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.

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 $2.0E-04$ 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.

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 $2.0E-4$ microcuries/ml is used as the MPC for dissolved and entrained noble gases in liquid effluents. The concentration limit used to calculate the percent of limit for mixed fission and activation products in Table 2A is $3.0E-7$ microcuries/cc. A limit of $3.0E-3$ microcuries/ml (i.e., H-3 MPC value) is utilized in the calculation of the percent of limit for tritium in Table 2A.

2.2.2 For gaseous effluents, maximum permissible concentrations are not directly used in release rate calculations since the applicable limits are stated in terms of dose rate at the unrestricted area boundary.

2.3 Average Energy

This is not applicable to the Callaway Plant's radiological effluent technical specifications.

2.4 Measurements and Approximations of Total Radioactivity

The quantification of radioactivity in liquid and gaseous effluents was accomplished by performing the sampling and radiological analysis of effluents in accordance with the requirements of Table 4.11-1 and Table 4.11-2 of the Callaway Plant Technical Specifications (See attachments 1 and 2).

Gamma spectroscopy was the primary analysis technique used to determine the radionuclide composition and concentration of liquid and gaseous effluents. For Sr-89, Sr-90, and Fe-55 composite samples were collected and analyses performed by a contract 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

- 2.5.1.1 Number of batch releases: 144
- 2.5.1.2 Total time period for batch releases: 40596.0 minutes
- 2.5.1.3 Maximum time period for a batch release: 485.0 minutes
- 2.5.1.4 Average time period for batch releases: 281.9 minutes
- 2.5.1.5 Minimum time period for a batch release: 165.0 minutes
- 2.5.1.6 Average stream flow during periods of release of effluent into a flowing stream: 69,000 cfs

2.5.2 Gaseous

- 2.5.2.1 Number of batch releases: 30
- 2.5.2.2 Total time period for batch releases: 12608.0 minutes
- 2.5.2.3 Maximum time period for a batch release: 3263.0 minutes
- 2.5.2.4 Average time period for batch releases: 420.3 minutes
- 2.5.2.5 Minimum time period for a batch release: 15.0 minutes

2.6 Abnormal Releases

2.6.1 Liquid

2.6.1.1 Number of releases: 0

2.6.1.2 Total Activity released: 0

2.6.2 Gaseous

2.6.2.1 Number of releases: 0

2.6.2.2 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 Table 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 Table 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.

6.0 RELATED INFORMATION

6.1 Unplanned Releases

6.1.1 There was no unplanned release during the reporting period.

6.2 Changes to the Process Control Program

Revision 4, to the Callaway Process Control Program (PCP) was issued August 2, 1985. This revision incorporated a revised formulation for the solidification of spent resin having a resulting waste classification of Class "A" to be shipped as "UNSTABLE" waste. Formulation was developed by in-plant testing, both lab scale and full scale, to achieve a high waste loading while still meeting all applicable requirements for disposal. Attachment 3 provides documentation that the changes have been reviewed and found acceptable by the On-site Review Committee (ORC).

6.3 Changes to the Offsite Dose Calculation Manual

There were no changes to the ODCM during the reporting period.

6.4 Major Changes to Radwaste Treatment Systems

There were no major changes to Radwaste Treatment Systems during the reporting period.

6.5 Land Use Census Changes

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

6.6 Inoperability of Effluent Monitoring Instrumentation

All effluent monitoring instrumentation was OPERABLE within the limits specified by Specifications 3.3.3.9 and 3.3.3.10 during the reporting period.

7.0 METEROLOGICAL DATA

Meteorological data for the year 1985 is presented in Table 4 in the form of Cumulative Joint Frequency Distributions for both 10 meter and 60 meter heights.

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 and Nearest Residence From Gaseous Effluents

An assessment of doses from gaseous effluents was performed for the maximum exposed individual at the SITE BOUNDARY and 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 the noble gas exposure, inhalation, ground plane, and ingestion pathways. The ingestion pathways considered were the produce, vegetable, goat's milk, cow's milk, and meat pathways. This assessment was performed for each age group, with the Child age group receiving the highest dose.

The results of the assessment for the Child age group are presented in Table 5. It must be noted that the calculations for the SITE BOUNDARY location conservatively assume a hypothetical maximum exposed individual, while the calculation for Nearest Residence is for a real individual. It is conservatively assumed that each ingestion pathway exists at the location of the Nearest Residence.

8.2 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 ODCM describes the MEMBER OF THE PUBLIC as a hunter occupying areas within the SITE BOUNDARY for a total annual average occupancy of 448 hours per year.

The dose due to gaseous effluents was determined as a result of whole body gamma and beta skin dose from noble gases, whole body and skin dose from ground plane deposition, and organ dose from inhalation. It is assumed that the external whole body gamma radiation from Noble Gases and Ground Plane exposure irradiates internal body organs at the same numerical rate, therefore the whole body external gamma radiation dose from these sources was added to the dose from the inhalation pathway.

Historical average atmospheric conditions were used in this assessment, at a distance of 1154 meters in the NW sector.

The ingestion pathways do not exist within the SITE BOUNDARY and there are no liquid effluent discharge points within the SITE BOUNDARY.

The dose to the MEMBER OF THE PUBLIC from activities within the SITE BOUNDARY are 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 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 dose from gaseous effluents is determined as the sum of the dose at the location of the Nearest Resident and that from activities within the SITE BOUNDARY.

The Refueling Water Storage Tank, (RWST) constitutes the only potentially significant source of direct radiation dose from outside storage tanks. The activity in the RWST is determined on a weekly basis through sampling and analysis. The direct radiation dose from the RWST was determined using the methodology in the ODCM and the results of the weekly sample analysis. The location of maximum dose is approximately 1020 meters in the ESE sector.

The maximum direct radiation from the unit has been previously determined to be $9E-03$ mrad/calendar year at a distance of approximately 1222 meters in the North sector. Assuming an annual average occupancy of 448 hours per year, the direct radiation dose from the unit is $5E-4$ mrad during 1985.

The total dose to the maximum exposed MEMBER OF THE PUBLIC from all uranium fuel cycle sources within 8 km of the Callaway Plant is presented in Table 7. Organ doses are the result of each ingestion pathway, inhalation, and ground plane pathways plus the whole body gamma dose from the plume exposure pathway and direct radiation dose.

8.4 Dose Due to Liquid Effluents

The total dose to the maximum exposed individual from liquid effluents released from the Callaway Plant during 1985 is presented in Table 8.

TABLE 1A

SEMIANNUAL SUMMATION OF GASEOUS RELEASES
ALL AIRBORNE EFFLUENTS
QUARTERS 3 AND 4, 1985

TYPE OF EFFLUENT	UNIT	QUARTER 3	QUARTER 4	EST TOTAL ERROR %
A. FISSION AND ACTIVATION GASES				
1. TOTAL RELEASE	CURIES	1.96E 02	5.96E 02	3.50E 01
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	2.47E 01	7.50E 01	
3. PERCENT OF TECH SPEC LIMIT	%	1.42E-03	4.31E-03	
B. RADIOIODINES				
1. TOTAL IODINE-131	CURIES	5.76E-05	2.26E-04	3.50E01
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	7.25E-06	2.85E-05	
3. PERCENT OF TECH SPEC LIMIT	%	6.90E-06	2.71E-05	
C. PARTICULATES				
1. PARTICULATES (HALF-LIVES > 8 DAYS)	CURIES	4.31E-07	2.89E-07	3.50E 01
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	5.42E-08	3.64E-08	
3. PERCENT OF TECH SPEC LIMIT	%	3.52E-09	2.36E-09	
4. GROSS ALPHA RADIOACTIVITY	CURIES	4.31E-07	2.89E-07	
D. TRITIUM				
1. TOTAL RELEASE	CURIES	1.07E 00	1.91E 00	2.50E 01
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	1.35E-01	2.40E-01	
3. PERCENT OF TECH SPEC LIMIT	%	8.86E-06	1.58E-05	

TABLE 1B

SEMIANNUAL AIRBORNE CONTINUOUS AND BATCH RELEASES
GROUND LEVEL RELEASES
FISSION GASES, IODINES, AND PARTICULATES
QUARTERS 3 AND 4, 1985

NUCLIDE	UNIT	CONTINUOUS RELEASES		BATCH RELEASES	
		QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
1. FISSION GASES					
KR-85M	CURIES	6.57E-02	0.00E 00	7.53E-03	4.12E-01
KR-85	CURIES	0.00E 00	0.00E 00	0.00E 00	9.48E-02
KR-87	CURIES	0.00E 00	0.00E 00	0.00E 00	2.51E-02
KR-88	CURIES	0.00E 00	0.00E 00	0.00E 00	2.84E-01
XE-131M	CURIES	0.00E 00	0.00E 00	1.15E 00	3.41E 00
XE-133M	CURIES	0.00E 00	0.00E 00	4.46E-01	6.33E 00
XE-133	CURIES	1.21E 02	1.03E 02	6.63E 01	4.68E 02
XE-135M	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
XE-135	CURIES	5.82E 00	5.66E 00	2.02E-01	8.53E 00
XE-138	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
AR-41	CURIES	0.00E 00	0.00E 00	7.72E-01	3.88E-01
TOTAL FOR PERIOD	CURIES	1.27E 02	1.09E 02	6.89E 01	4.87E 02
2. IODINES					
I-131	CURIES	5.71E-05	2.19E-04	5.36E-07	6.80E-06
I-133	CURIES	1.98E-06	2.29E-05	0.00E 00	1.54E-06
I-135	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
TOTAL FOR PERIOD	CURIES	5.91E-05	2.41E-04	5.36E-07	8.35E-06
3. PARTICULATES					
H-3	CURIES	8.19E-01	1.76E 00	2.50E-01	1.48E-01
NA-24	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
MN-54	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
CO-58	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
CO-60	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
ZN-65	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
SR-89	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
MO-99	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
CS-134	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00

TABLE 1B

SEMIANNUAL AIRBORNE CONTINUOUS AND BATCH RELEASES
GROUND LEVEL RELEASES
FISSION GASES, IODINES, AND PARTICULATES
QUARTERS 3 AND 4, 1985

NUCLIDE	UNIT	CONTINUOUS RELEASES		BATCH RELEASES	
		QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
PARTICULATES CONTINUED					
CS-137	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
LA-140	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
CE-141	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
CE-144	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
SR-90	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
G ALPHA	CURIES	1.08E-07	2.59E-07	3.23E-07	2.98E-08
UNIDENTIFIED	CURIES	0.00E 00	0.00E 00	0.00E 00	0.00E 00
TOTAL FOR PERIOD	CURIES	8.19E-01	1.76E 00	2.50E-01	1.48E-01

TABLE 2A

SEMIANNUAL SUMMATION OF LIQUID RELEASES
ALL LIQUID EFFLUENTS
QUARTERS 3 AND 4, 1985

TYPE OF EFFLUENT	UNIT	QUARTER 3	QUARTER 4	EST TOTAL ERROR %
A. FISSION AND ACTIVATION PRODUCTS				
1. TOTAL RELEASE (NOT INCLUDING TRITIUM, GASES, ALPHA)	CURIES	2.63E-03	1.22E-03	2.50E 01
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	UCI/ML	5.14E-09	1.78E-09	
3. PERCENT OF APPLICABLE LIMIT	%	1.71E 00	5.93E-01	
B. TRITIUM				
1. TOTAL RELEASE	CURIES	1.27E 02	1.43E 02	2.50E 01
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	UCI/ML	2.48E-04	2.08E-04	
3. PERCENT OF APPLICABLE LIMIT	%	8.27E 00	6.93E 00	
C. DISSOLVED AND ENTRAINED GASES				
1. TOTAL RELEASE	CURIES	1.45E-01	1.06E 00	2.50E 01
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	UCI/ML	2.84E-07	1.55E-06	
3. PERCENT OF APPLICABLE LIMIT	%	1.42E-01	7.75E-01	
D. GROSS ALPHA RADIOACTIVITY				
1. TOTAL RELEASE	CURIES	5.38E-04	7.35E-04	2.50E 01
E. WASTE VOL RELEASED (PRE-DILUTION)				
	GAL	6.06E 06	7.19E 06	1.00E 01
F. VOLUME OF DILUTION WATER USED				
	GAL	1.29E 08	1.74E 08	1.00E 01

TABLE 2B

SEMIANNUAL LIQUID CONTINUOUS AND BATCH RELEASES
 TOTALS FOR EACH NUCLIDE RELEASED
 QUARTER 3 AND 4, 1985

NUCLIDE	UNIT	CONTINUOUS RELEASES		BATCH RELEASES	
		QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
ALL NUCLIDES					
H-3	CURIES	0,00E 00	0,00E 00	1,27E 02	1,43E 02
NA-24	CURIES	0,00E 00	0,00E 00	0,00E 00	0,00E 00
CR-51	CURIES	0,00E 00	0,00E 00	0,00E 00	0,00E 00
MN-54	CURIES	0,00E 00	0,00E 00	0,00E 00	5,95E-06
FE-55	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
CO-58	CURIES	0,00E 00	0,00E 00	2,43E-03	6,74E-04
CO-60	CURIES	0,00E 00	0,00E 00	3,74E-05	0,00E 00
ZN-65	CURIES	0,00E 00	0,00E 00	0,00E 00	0,00E 00
SR-89	CURIES	0,00E 00	0,00E 00	0,00E 00	0,00E 00
ZR-95	CURIES	0,00E 00	0,00E 00	2,36E-05	0,00E 00
NB-95	CURIES	0,00E 00	0,00E 00	6,52E-05	1,50E-05
MO-99	CURIES	0,00E 00	0,00E 00	0,00E 00	0,00E 00
TC-99M	CURIES	0,00E 00	0,00E 00	0,00E 00	0,00E 00
I-131	CURIES	0,00E 00	0,00E 00	5,73E-05	3,63E-04
I-133	CURIES	0,00E 00	0,00E 00	0,00E 00	2,24E-05
I-135	CURIES	0,00E 00	0,00E 00	0,00E 00	0,00E 00
CS-134	CURIES	0,00E 00	0,00E 00	0,00E 00	0,00E 00
CS-137	CURIES	0,00E 00	0,00E 00	1,85E-05	3,67E-06
LA-140	CURIES	0,00E 00	0,00E 00	0,00E 00	0,00E 00
CE-141	CURIES	0,00E 00	0,00E 00	0,00E 00	0,00E 00
CE-144	CURIES	0,00E 00	0,00E 00	0,00E 00	1,42E-04
W-187	CURIES	0,00E 00	0,00E 00	0,00E 00	0,00E 00
KR-85M	CURIES	0,00E 00	0,00E 00	4,30E-06	4,23E-05
XE-131M	CURIES	0,00E 00	0,00E 00	5,53E-04	6,96E-03
XE-133	CURIES	0,00E 00	0,00E 00	1,43E-01	1,03E 00
XE-133M	CURIES	0,00E 00	0,00E 00	1,04E-03	1,27E-02
XE-135	CURIES	0,00E 00	0,00E 00	5,65E-04	7,63E-03
Xe-135M	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
SR-90	CURIES	0,00E 00	0,00E 00	0,00E 00	0,00E 00
G ALPHA	CURIES	0,00E 00	0,00E 00	5,38E-04	7,35E-04
UNIDENTIFIED	CURIES	0,00E 00	0,00E 00	0,00E 00	0,00E 00
TOTAL FOR PERIOD	CURIES	0,00E 00	0,00E 00	1,27E 02	1,44E 02

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR)

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (not irradiated fuel)

1. Type of waste	unit	6-month period	Est. Total Error %
a. Spent resins, filter sludges evaporator bottoms, etc.	m ³	1.04 E 2	+/-
	Ci	5.81 E 0	2.5 E 1
b. Dry compressible waste, contaminated equip. etc.	m ³	2.23 E 1	+/-
	Ci	4.43 E-1	2.5 E 1
c. Irradiated components, control rods, etc.	m ³	0.0 E 0	0.0 E 0
	Ci	0.0 E 0	
d. Other (describe)	m ³	0.0 E 0	0.0 E 0
	Ci	0.0 E 0	

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

		curies	
a.	Co-60	2%	
	H-3	69%	
	C-14	13%	
	Co-58	4%	
	Fe-55	3%	
	Be-7	2%	
	Cs-137	<1	
	Ni-63	<1	
	Sr-90	<1	
	Tc-99	<1	
	I-129	<1	
	b.	Cr-51	60%
		Co-60	<1
H-3		1	
Nb-95		11%	
Ni-63		<1	
Sr-90		<1	
Tc-99		<1	
Cs-137		<1	
Co-57		4%	
			1.3 E-1
		4.0 E-0	
		7.6 E-1	
		2.6 E-1	
		1.8 E-1	
		9.0 E-2	
		3.5 E-2	
		1.3 E-2	
		1.1 E-3	
		1.7 E-3	
		8.7 E-4	
		2.7 E-1	
		4.0 E-3	
		5.9 E-3	
		5.0 E-2	
		6.5 E-4	
		5.6 E-8	
		1.9 E-4	
		2.5 E-7	
		1.7 E-2	

A. CONT'd

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
10	Truck	Richland, WA

4. Class of Solid Waste Shipped - Class A

5. Type of Container - LSA

6. SOLIDIFICATION Agent - Cement (Applicable to waste type A.1.a)

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

HIC 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 : 0:00 HRS - 12:00AM JANUARY 1, 1985
 REPORT END TIME : 0759:00 HRS - 11:00PM DECEMBER 31, 1985
 STABILITY CLASS : A
 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	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
NNE	1.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	2.00E 00
NE	2.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	3.00E 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	0.00E-01	0.00E-01	0.00E-01	0.00E-01	1.00E 00
ESE	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
SE	0.00E-01	3.00E 00	4.00E 00	1.00E 00	0.00E-01	0.00E-01	8.00E 00
SSE	0.00E-01	0.00E-01	2.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 00
S	0.00E-01	1.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 00
SSW	0.00E-01	3.00E 00	1.00E 00	1.00E 00	0.00E-01	0.00E-01	5.00E 00
SW	1.00E 00	2.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	4.00E 00
WSW	0.00E-01	0.00E-01	2.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 00
W	0.00E-01	1.00E 00	2.00E 00	1.00E 00	0.00E-01	0.00E-01	4.00E 00
WNW	0.00E-01	2.00E 00	0.00E 00	1.00E 00	0.00E-01	0.00E-01	3.00E 01
NW	3.00E-01	3.00E 00	2.00E 00	2.00E 00	0.00E-01	0.00E-01	7.00E 00
NNW	0.00E-01	0.00E-01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	1.00E 00
TOT	4.00E 00	1.00E 01	2.40E 01	2.00E 00	0.00E-01	0.00E-01	5.20E 01

PERIODS OF CALM (HOURS) : 1.300E 01
 HOURS OF INVALID DATA : 0.980E 01

TABLE 4

HTC

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 : 0:00 HRS = 12:00AM JANUARY 1, 1985
 REPORT END TIME : 0759:00 HRS = 11:00PM DECEMBER 31, 1985
 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	3.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	4.00E 00
NNE	0.00E-01	1.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 00
NE	0.00E-01	1.00E 00	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	0.00E-01	0.00E-01	0.00E-01	0.00E-01	1.00E 00
ESE	0.00E-01	1.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 00
SE	0.00E-01	1.00E 00	2.00E 00	0.00E-01	0.00E-01	0.00E-01	3.00E 00
SSE	0.00E-01	0.00E-01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	1.00E 00
S	0.00E-01	1.00E 00	7.00E 00	0.00E-01	0.00E-01	0.00E-01	8.00E 00
SSW	0.00E-01	4.00E 00	2.00E 00	0.00E-01	0.00E-01	0.00E-01	6.00E 00
SW	0.00E-01	1.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 00
WSW	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
W	0.00E-01	1.00E 00	7.00E 00	2.00E 00	4.00E 00	0.00E-01	14.00E 01
WNW	0.00E-01	4.00E 00	1.10E 01	3.00E 00	0.00E-01	0.00E-01	8.10E 01
NW	0.00E-01	0.00E-01	4.00E 00	4.00E 00	0.00E-01	0.00E-01	8.00E 00
NNW	0.00E-01	4.00E 00	1.00E 00	4.00E 00	1.00E 00	0.00E-01	10.00E 01
TOT	0.00E-01	23.00E 01	37.00E 01	17.00E 01	5.00E 00	0.00E-01	82.00E 01

PERIODS OF CALM(HOURS): 0.00E-01
 HOURS OF INVALID DATA : 1.00E 00

REPORT CATEGORY : METEOROLOGICAL DATA, QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 0:00 HRS = 12:00AM JANUARY 1, 1965
 REPORT END TIME : 0759:00 HRS = 11:00PM DECEMBER 31, 1965
 STABILITY CLASS : C
 ELEVATION : 10 METERS

WIND SPEED(MPH) AT 10 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	25-30	TOTAL
N	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
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	1.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	1.00E 00
ENE	0.00E-01	2.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	3.00E 00
E	1.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	2.00E 00
ESE	0.00E-01	4.00E 00	2.00E 00	0.00E-01	0.00E-01	0.00E-01	6.00E 00
SE	2.00E 00	2.00E 00	5.00E 00	0.00E-01	0.00E-01	0.00E-01	9.00E 00
SSE	0.00E-01	6.00E 00	2.00E 00	4.00E 00	0.00E-01	0.00E-01	1.20E 01
S	0.00E-01	6.00E 00	6.00E 00	6.00E 00	0.00E-01	0.00E-01	1.80E 01
SSW	1.00E 00	1.00E 00	3.00E 00	0.00E 00	0.00E-01	0.00E-01	1.30E 01
SW	0.00E-01	1.00E 00	4.00E 00	0.00E-01	0.00E-01	0.00E-01	5.00E 00
WSW	0.00E-01	0.00E-01	2.00E 00	1.00E 00	0.00E-01	0.00E-01	3.00E 00
W	0.00E-01	2.00E 00	1.10E 01	4.00E 00	1.00E 00	0.00E-01	1.00E 01
WNW	0.00E-01	4.00E 00	2.30E 01	1.00E 01	1.00E 00	0.00E-01	3.00E 01
NW	1.00E 00	4.00E 00	1.20E 01	6.00E 00	1.00E 00	0.00E-01	2.40E 01
NNW	0.00E-01	3.00E 00	0.00E 00	2.00E 00	0.00E-01	0.00E-01	1.30E 01
TOT	5.00E 00	3.70E 01	7.90E 01	4.10E 01	3.00E 00	0.00E-01	1.65E 02

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

REPORT CATEGORY : METEOROLOGICAL DATA, QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 0:00 HRS = 12:00AM JANUARY 1, 1965
 REPORT END TIME : 8759:00 HRS = 11:00PM DECEMBER 31, 1965
 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	6.00E 00	6.20E 01	9.00E 01	1.20E 01	3.00E-01	0.00E-01	1.70E 02
NNE	8.00E 00	8.30E 01	5.00E 01	2.00E 00	0.00E-01	1.00E 00	1.52E 02
NE	7.00E 00	5.20E 01	3.70E 01	0.00E-01	0.00E-01	0.00E-01	9.60E 01
ENE	5.00E 00	5.30E 01	3.90E 01	1.00E 00	0.00E-01	0.00E-01	9.00E 01
E	7.00E 00	3.00E 01	3.00E 01	1.00E 00	0.00E-01	0.00E-01	7.60E 01
ESE	4.00E 00	3.80E 01	4.10E 01	7.00E 00	0.00E-01	0.00E-01	9.20E 01
SE	6.00E 00	5.40E 01	7.20E 01	9.00E 00	0.00E-01	1.00E 00	1.42E 02
SSE	8.00E 00	6.40E 01	8.60E 01	1.90E 01	2.00E 00	0.00E-01	1.79E 02
S	4.00E 00	6.70E 01	1.17E 02	2.90E 01	6.00E 00	0.00E-01	2.23E 02
SSW	2.00E 00	5.00E 01	8.70E 01	1.60E 01	2.00E 00	0.00E-01	1.57E 02
SW	3.00E 00	4.10E 01	7.00E 01	4.20E 01	0.00E 00	1.00E 00	1.73E 02
WSW	5.00E 00	2.70E 01	3.70E 01	1.00E 01	0.00E 00	2.00E 00	9.40E 01
W	4.00E 00	5.60E 01	4.90E 01	2.00E 01	1.30E 01	1.00E 00	1.51E 02
WNW	6.00E 00	8.80E 01	1.10E 02	4.20E 01	7.00E 00	0.00E-01	2.53E 02
NW	1.40E 01	7.00E 01	1.15E 02	7.20E 01	3.00E 00	0.00E-01	2.02E 02
NNW	1.00E 01	9.40E 01	1.15E 02	2.40E 01	7.00E 00	0.00E-01	2.50E 02
TOT	9.90E 01	9.45E 02	1.16E 03	3.24E 02	5.30E 01	4.00E 00	2.59E 03

PERIODS OF CALM (HOURS): 9.000E 00
 HOURS OF INVALID DATA : 9.000E 01

TABLE 4

HTC

PAGE 5 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA, QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 0:00 HRS = 12:00AM JANUARY 1, 1985
 REPORT END TIME : 0759:00 HRS = 11:00PM DECEMBER 31, 1985
 STABILITY CLASS : E
 ELEVATION : 10 METERS

WIND SPEED(MPH) AT 10 METER LEVEL

	1-3	4-7	8-12	13-18	19-24	24	TOTAL
N	1.60E 01	1.19E 02	6.20E 01	1.50E 01	0.00E-01	0.00E-01	2.12E 02
NNE	1.60E 01	1.01E 02	3.70E 01	5.00E 00	0.00E-01	0.00E-01	1.57E 02
NE	4.20E 01	1.19E 02	4.20E 01	0.00E 00	0.00E-01	0.00E-01	3.11E 02
ENE	2.00E 01	0.20E 01	5.40E 01	5.00E 00	0.00E-01	0.00E-01	1.67E 02
E	2.60E 01	0.40E 01	4.00E 01	1.00E 00	0.00E-01	0.00E-01	1.51E 02
ESE	1.70E 01	0.00E 01	6.00E 01	0.00E 00	1.00E 00	0.00E-01	1.74E 02
SE	1.10E 01	1.41E 02	1.33E 02	6.00E 00	1.00E 00	0.00E-01	2.92E 02
SSE	1.00E 01	1.51E 02	1.19E 02	2.40E 01	2.00E 00	0.00E-01	3.06E 02
S	1.00E 01	1.21E 02	1.50E 02	3.00E 01	4.00E 00	2.00E 00	3.33E 02
SSW	1.00E 01	7.00E 01	0.40E 01	1.50E 01	1.00E 00	0.00E-01	1.00E 02
SW	1.00E 01	5.00E 01	6.70E 01	1.70E 01	0.00E-01	0.00E-01	1.52E 02
WSW	1.50E 01	6.70E 01	4.30E 01	1.90E 01	3.00E 00	0.00E-01	1.47E 02
W	1.70E 01	6.70E 01	6.50E 01	4.20E 01	1.00E 00	0.00E-01	1.92E 02
WNW	2.00E 01	1.01E 02	9.50E 01	3.10E 01	0.00E-01	0.00E-01	2.50E 02
NW	1.90E 01	1.10E 02	7.60E 01	2.70E 01	1.00E 00	1.00E 00	2.34E 02
NNW	2.10E 01	1.13E 02	5.40E 01	6.00E 00	2.00E 00	1.00E 00	1.97E 02
TOT	3.04E 02	1.59E 03	1.19E 03	2.59E 02	1.60E 01	4.00E 00	3.36E 03
PERIODS OF CALM(HOURS):	1.500E 01						
HOURS OF INVALID DATA :	6.500E 01						

REPORT CATEGORY : METEOROLOGICAL DATA, QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 0:00 HRS = 12:00AM JANUARY 1, 1985
 REPORT END TIME : 8759:00 HRS = 11:00PM DECEMBER 31, 1985
 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	8.00E 00	3.60E 01	3.00E 00	0.00E-01	0.00E-01	0.00E-01	4.70E 01
NNE	1.30E 01	2.40E 01	2.00E 00	0.00E-01	0.00E-01	0.00E-01	3.90E 01
NE	1.70E 01	3.40E 01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	5.10E 01
ENE	2.40E 01	2.40E 01	2.00E 00	0.00E-01	0.00E-01	0.00E-01	5.00E 01
E	2.10E 01	1.80E 01	9.00E 00	0.00E-01	0.00E-01	0.00E-01	4.80E 01
ESE	1.60E 01	4.40E 01	1.40E 01	1.80E 00	0.00E-01	0.00E-01	7.50E 01
SE	2.00E 01	1.31E 02	2.10E 01	1.00E 00	0.00E-01	0.00E-01	1.73E 02
SSE	1.30E 01	1.59E 02	2.00E 01	1.00E 00	0.00E-01	0.00E-01	2.01E 02
S	0.00E 00	1.04E 02	3.40E 01	0.00E-01	0.00E-01	0.00E-01	1.46E 02
SSW	9.00E 00	5.70E 01	1.60E 01	2.00E 00	0.00E-01	0.00E-01	8.40E 01
SW	9.00E 00	4.60E 01	1.70E 01	0.00E-01	0.00E-01	0.00E-01	7.20E 01
WSW	0.00E 00	2.00E 01	4.00E 00	1.00E 00	1.00E 00	0.00E-01	3.40E 01
W	1.20E 01	2.60E 01	2.00E 00	0.00E-01	0.00E 01	0.00E-01	4.00E 01
WNW	2.10E 01	3.40E 01	2.00E 00	1.00E 00	0.00E-01	0.00E-01	5.60E 01
NW	1.10E 01	5.90E 01	1.00E 00	1.00E 00	0.00E-01	1.00E 00	7.30E 01
NNW	0.00E 00	2.90E 01	2.00E 00	0.00E-01	0.00E-01	0.00E-01	3.90E 01
TOT	2.18E 02	8.40E 02	1.57E 02	0.00E 00	1.00E 00	1.00E 00	1.23E 03

PERIODS OF CALM (HOURS): 1.100E 01
 HOURS OF INVALID DATA : 2.000E 01

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 0:00 HRS - 12:00AM JANUARY 1, 1905
 REPORT END TIME : 0759:00 HRS - 11:00PM DECEMBER 31, 1905
 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	5.00E 00	1.40E 01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 01
NNE	9.00E 00	1.70E 01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	2.90E 01
NE	1.10E 01	4.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	1.50E 01
ENE	5.00E 00	6.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	1.20E 01
E	7.00E 00	2.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	1.00E 01
ESE	9.00E 00	0.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	1.00E 01
SE	7.00E 00	4.90E 01	0.00E 00	0.00E-01	0.00E-01	0.00E-01	6.40E 01
SSE	0.00E 00	4.90E 01	9.00E 00	0.00E-01	0.00E-01	0.00E-01	6.60E 01
S	1.00E 01	1.00E 01	3.00E 00	1.00E 00	0.00E-01	0.00E-01	3.20E 01
SSW	1.20E 01	1.40E 01	1.00E 00	1.00E 00	0.00E-01	1.00E 00	2.90E 01
SW	0.00E 00	2.40E 01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	3.30E 01
WSW	6.00E 00	6.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	1.20E 01
W	5.00E 00	3.00E 00	2.00E 00	0.00E-01	0.00E-01	0.00E-01	1.00E 01
WNW	1.00E 01	4.00E 00	0.00E-01	3.00E 00	0.00E-01	0.00E-01	1.70E 01
NW	4.00E 00	1.60E 01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	2.00E 01
NNW	1.00E 01	1.30E 01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	2.30E 01
TOT	1.26E 02	2.49E 02	2.90E 01	5.00E 00	0.00E-01	1.00E 00	4.10E 02

PERIODS OF CALM (HOURS): 1.400E 01
 HOURS OF INVALID DATA : 1.600E 01
 HOURS OF GOOD DATA : 7.955E 03 = 98.0% OF TOTAL HOURS

TABLE 4

REPORT CATEGORY : METEOROLOGICAL DATA, QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 0:00 HRS = 12:00AM JANUARY 1, 1985
 REPORT END TIME : 0759:00 HRS = 11:00PM DECEMBER 31, 1985
 STABILITY CLASS : A
 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	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
NNE	0.00E-01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	1.00E 00
NE	2.00E 00	1.00E 01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	2.00E 01
ENE	0.00E 00	1.60E 01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	2.40E 01
E	2.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	2.00E 00
ESE	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
SE	3.00E 00	3.00E 00	2.00E 00	3.00E 00	0.00E-01	0.00E-01	1.10E 01
SSE	3.00E 00	1.00E 00	1.00E 00	2.00E 00	0.00E-01	0.00E-01	7.00E 00
S	0.00E-01	1.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 00
SSW	4.00E 00	1.00E 00	0.00E-01	2.00E 00	0.00E-01	0.00E-01	7.00E 00
SW	5.00E 00	5.00E 00	1.00E 00	1.00E 00	0.00E-01	0.00E-01	1.20E 01
WSW	6.00E 00	4.00E 00	0.00E-01	3.00E 00	0.00E-01	0.00E-01	1.30E 01
W	3.00E 00	0.00E-01	1.00E 00	2.00E 00	0.00E-01	1.00E 00	7.00E 00
WNW	1.00E 00	2.00E 00	3.00E 00	1.00E 01	0.00E-01	0.00E-01	1.60E 01
NW	1.00E 00	2.00E 00	3.00E 00	4.00E 00	0.00E-01	0.00E-01	1.00E 01
NNW	1.00E 00	1.00E 00	0.00E-01	1.00E 00	0.00E-01	0.00E-01	3.00E 00
TOT	3.90E 01	5.50E 01	1.20E 01	2.00E 01	0.00E-01	1.00E 00	1.35E 02

PERIODS OF CALM (HOURS): 3.000E 00
 HOURS OF INVALID DATA : 1.600E 01

TABLE 4

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 : 0:00 HRS = 12:00AM JANUARY 1, 1985
 REPORT END TIME : 0759:00 HRS = 11:00PM DECEMBER 31, 1985
 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	0.00E-01	2.00E 00	3.00E 00	0.00E-01	0.00E-01	0.00E-01	5.00E 00
NNE	0.00E-01	0.00E-01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	1.00E 00
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	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
ESE	0.00E-01	1.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 00
SE	0.00E-01	2.00E 00	1.00E 00	1.00E 00	0.00E-01	0.00E-01	4.00E 00
SSE	0.00E-01	0.00E-01	2.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 00
S	0.00E-01	0.00E-01	3.00E 00	4.00E 00	0.00E-01	0.00E-01	7.00E 00
SSW	0.00E-01	0.00E-01	2.00E 00	1.00E 00	0.00E-01	0.00E-01	3.00E 00
SW	0.00E-01	0.00E-01	1.00E 00	1.00E 00	0.00E-01	0.00E-01	2.00E 00
WSW	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01	0.00E-01
W	0.00E-01	0.00E-01	2.00E 00	1.00E 00	2.00E 00	4.00E 00	9.00E 00
WNW	0.00E-01	1.00E 00	5.00E 00	1.10E 01	3.00E 00	0.00E-01	2.00E 01
NW	0.00E-01	0.00E-01	3.00E 00	4.00E 00	2.00E 00	0.00E-01	9.00E 00
NNW	0.00E-01	2.00E 00	1.00E 00	2.00E 00	4.00E 00	1.00E 00	1.00E 01
TOT	0.00E-01	9.00E 00	2.50E 01	2.50E 01	1.10E 01	5.00E 00	7.50E 01

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

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 0:00 HRS = 12:00AM JANUARY 1, 1985
 REPORT END TIME : 0759:00 HRS = 11:00PM DECEMBER 31, 1985
 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	0.00E-01	1.00E 00	0.00E-01	0.00E-01	1.00E 00
NNE	0.00E-01	3.00E 00	0.00E-01	0.00E-01	0.00E-01	0.00E-01	3.00E 00
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	2.00E 00	1.00E 00	0.00E-01	0.00E-01	0.00E-01	3.00E 00
E	1.00E 00	0.00E-01	1.00E 00	0.00E-01	0.00E-01	0.00E-01	2.00E 00
ESE	0.00E-01	1.00E 00	3.00E 00	1.00E 00	0.00E-01	0.00E-01	5.00E 00
SE	0.00E-01	1.00E 00	9.00E 00	0.00E-01	0.00E-01	0.00E-01	1.00E 01
SSE	1.00E 00	2.00E 00	3.00E 00	2.00E 00	3.00E 00	0.00E-01	1.10E 01
S	0.00E-01	7.00E 00	5.00E 00	5.00E 00	0.00E-01	0.00E-01	1.70E 01
SSW	0.00E-01	3.00E 00	4.00E 00	5.00E 00	1.00E 00	0.00E-01	1.30E 01
SW	0.00E-01	0.00E-01	4.00E 00	5.00E 00	0.00E-01	0.00E-01	9.00E 00
WSW	1.00E 00	0.00E-01	1.00E 00	0.00E-01	1.00E 00	0.00E-01	3.00E 00
W	0.00E-01	0.00E-01	2.00E 00	0.00E 00	1.00E 00	4.00E 00	1.50E 01
WNW	0.00E-01	2.00E 00	9.00E 00	2.30E 01	0.00E 00	0.00E-01	4.20E 01
NW	0.00E-01	2.00E 00	0.00E 00	0.00E 00	2.00E 00	0.00E-01	2.00E 01
NNW	0.00E-01	0.00E-01	4.00E 00	0.00E 00	0.00E-01	0.00E-01	1.00E 01
TOT	3.00E 00	2.30E 01	5.40E 01	6.40E 01	1.60E 01	4.00E 00	1.64E 02

PERIODS OF CALM (HOURS): 0.000E-01
 HOURS OF INVALID DATA : 1.200E 01

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 0:00 HRS = 12:00AM JANUARY 1, 1985
 REPORT END TIME : 8759:00 HRS = 11:00PM DECEMBER 31, 1985
 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	5.00E 00	3.60E 01	8.90E 01	4.10E 01	3.00E 00	0.00E-01	1.74E 02
NNE	2.00E 00	4.70E 01	7.70E 01	1.70E 01	1.00E 00	0.00E-01	1.44E 02
NE	7.00E 00	4.20E 01	5.10E 01	4.00E 00	0.00E-01	0.00E-01	1.10E 02
ENE	9.00E 00	3.40E 01	5.00E 01	1.80E 01	0.00E-01	0.00E-01	1.11E 02
E	1.00E 00	3.80E 01	3.10E 01	1.50E 01	0.00E-01	0.00E-01	8.50E 01
ESE	6.00E 00	2.70E 01	2.80E 01	9.00E 00	0.00E-01	0.00E-01	7.00E 01
SE	4.00E 00	3.60E 01	7.30E 01	2.90E 01	1.00E 00	1.00E 00	1.44E 02
SSE	5.00E 00	3.30E 01	7.40E 01	3.80E 01	3.00E 00	1.00E 00	1.54E 02
S	2.00E 00	3.60E 01	1.10E 02	7.40E 01	1.80E 01	4.00E 00	2.44E 02
SSW	4.00E 00	3.60E 01	8.00E 01	4.90E 01	9.00E 00	4.00E 00	1.82E 02
SW	3.00E 00	3.90E 01	4.80E 01	7.40E 01	1.10E 01	3.00E 00	1.78E 02
WSW	2.00E 00	1.10E 01	2.80E 01	2.40E 01	1.30E 01	1.00E 01	8.80E 01
W	4.00E 00	1.50E 01	4.70E 01	4.30E 01	1.80E 01	2.00E 01	1.47E 02
WNW	4.00E 00	4.70E 01	6.90E 01	1.00E 02	3.50E 01	1.40E 01	2.89E 02
NW	6.00E 00	3.90E 01	6.80E 01	1.05E 02	3.80E 01	4.00E 00	2.60E 02
NNW	4.00E 00	3.60E 01	8.80E 01	6.70E 01	1.30E 01	7.00E 00	2.15E 02
TOT	6.80E 01	5.58E 02	1.01E 03	7.07E 02	1.63E 02	6.00E 01	2.58E 03

PERIODS OF CALM(HOURS): 1.00E 00
 HOURS OF INVALID DATA : 1.19E 02

TABLE 4

MID

PAGE 5 OF 7

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 0:00 HRS = 12:00AM JANUARY 1, 1985
 REPORT END TIME : 0759:00 HRS = 11:00PM DECEMBER 31, 1985
 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	2.00E 00	2.90E 01	9.60E 01	3.80E 01	2.00E 00	0.00E-01	1.67E 02
NNE	9.00E 00	4.20E 01	1.14E 02	2.80E 01	6.00E 00	1.00E 00	2.00E 02
NE	9.00E 00	5.70E 01	9.10E 01	1.50E 01	0.00E-01	0.00E-01	1.72E 02
ENE	3.00E 00	5.40E 01	1.09E 02	3.20E 01	1.00E 00	0.00E-01	1.99E 02
E	4.00E 00	4.90E 01	8.20E 01	1.10E 01	0.00E-01	0.00E-01	1.46E 02
ESE	1.00E 00	3.90E 01	9.20E 01	3.50E 01	2.00E 00	0.00E-01	1.69E 02
SE	5.00E 00	4.00E 01	1.33E 02	8.90E 01	3.00E 00	0.00E-01	2.70E 02
SSE	2.00E 00	3.10E 01	1.21E 02	1.32E 02	9.00E 00	5.00E 00	3.00E 02
S	0.00E-01	2.00E 01	1.26E 02	1.36E 02	2.30E 01	1.10E 01	3.16E 02
SSW	2.00E 00	2.00E 01	6.40E 01	1.12E 02	1.10E 01	1.00E 00	2.10E 02
SW	3.00E 00	3.30E 01	6.50E 01	7.70E 01	1.40E 01	1.00E 00	1.93E 02
WSW	7.00E 00	1.70E 01	4.60E 01	5.00E 01	1.20E 01	1.00E 00	1.33E 02
W	4.00E 00	2.70E 01	5.10E 01	6.10E 01	3.70E 01	4.00E 00	1.83E 02
WNW	3.00E 00	1.60E 01	7.80E 01	1.15E 02	2.20E 01	6.00E 00	2.40E 02
NW	3.00E 00	2.10E 01	1.07E 02	9.90E 01	1.10E 01	4.00E 00	2.45E 02
NNW	1.00E 00	2.70E 01	8.70E 01	4.80E 01	1.00E 00	0.00E-01	1.64E 02
TOT	5.80E 01	5.22E 02	1.46E 03	1.08E 03	1.53E 02	3.40E 01	3.31E 03

PERIODS OF CALM(HOURS): 3.000E 00
 HOURS OF INVALID DATA : 1.370E 02

TABLE 4

MID

PAGE 6 OF 7

REPORT CATEGORY : METEROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 : EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD : QUARTER # ***
 REPORT START TIME : 0:00 HRS = 12:00AM JANUARY 1, 1985
 REPORT END TIME : 8759:00 HRS = 11:00PM DECEMBER 31, 1985
 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	4.00E 00	2.10E 01	1.20E 01	0.00E-01	0.00E-01	3.60E 01
NNE	2.00E 00	6.00E 00	2.70E 01	1.10E 01	0.00E-01	0.00E-01	4.60E 01
NE	1.00E 00	1.00E 01	2.60E 01	2.00E 00	0.00E-01	0.00E-01	3.90E 01
ENE	1.00E 00	9.00E 00	3.70E 01	5.00E 00	0.00E-01	0.00E-01	5.20E 01
E	0.00E-01	7.00E 00	3.50E 01	5.00E 00	1.00E 00	0.00E-01	4.60E 01
ESE	1.00E 00	6.00E 00	5.90E 01	8.00E 00	0.00E-01	0.00E-01	7.40E 01
SE	2.00E 00	1.80E 01	7.00E 01	3.00E 01	1.00E 00	0.00E-01	1.21E 02
SSE	1.00E 00	1.20E 01	8.50E 01	4.40E 01	0.00E-01	0.00E-01	1.42E 02
S	0.00E-01	1.30E 01	1.05E 02	7.40E 01	1.00E 00	0.00E-01	1.93E 02
SSW	0.00E-01	1.40E 01	6.20E 01	7.40E 01	2.00E 00	0.00E-01	1.52E 02
SW	0.00E-01	7.00E 00	4.00E 01	3.00E 01	5.00E 00	0.00E-01	9.00E 01
WSW	3.00E 00	4.00E 00	1.70E 01	1.50E 01	0.00E-01	0.00E-01	3.90E 01
W	0.00E-01	4.00E 00	1.70E 01	6.00E 00	0.00E-01	0.00E-01	2.70E 01
WNW	3.00E 00	3.00E 00	3.50E 01	2.50E 01	0.00E-01	0.00E-01	6.60E 01
NW	1.00E 00	9.00E 00	2.90E 01	1.50E 01	1.00E 00	0.00E-01	5.50E 01
NNW	0.00E-01	5.00E 00	2.70E 01	1.90E 01	0.00E-01	0.00E-01	5.10E 01
TOT	1.60E 01	1.31E 02	6.92E 02	3.83E 02	1.10E 01	0.00E-01	1.23E 03

PERIODS OF CALM (HOURS): 0.000E 01
 HOURS OF INVALID DATA : 3.600E 01

REPORT CATEGORY : METEOROLOGICAL DATA. QUARTERLY TOTALS OF HOURS AT
 PERIOD OF RECORD : EACH WIND SPEED AND DIRECTION
 REPORT START TIME : QUARTER # ***
 REPORT END TIME : 0:00 HRS = 12:00AM JANUARY 1, 1985
 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	0.00E-01	1.10E 01	1.10E 01	0.00E-01	0.00E-01	2.20E 01
NNE	0.00E-01	4.00E 00	1.50E 01	0.00E 00	0.00E-01	0.00E-01	2.70E 01
NE	1.00E 00	5.00E 00	1.80E 01	5.00E 00	0.00E-01	0.00E-01	2.90E 01
ENE	0.00E-01	6.00E 00	9.00E 00	5.00E 00	0.00E-01	0.00E-01	2.00E 01
E	0.00E-01	0.00E-01	1.10E 01	4.00E 00	0.00E-01	0.00E-01	1.50E 01
ESE	0.00E-01	5.00E 00	1.30E 01	3.00E 00	0.00E-01	0.00E-01	2.10E 01
SE	0.00E-01	9.00E 00	1.90E 01	6.00E 00	0.00E-01	0.00E-01	3.40E 01
SSE	0.00E-01	6.00E 00	2.00E 01	1.30E 01	0.00E-01	0.00E-01	3.90E 01
S	0.00E-01	3.00E 00	4.30E 01	1.30E 01	0.00E-01	0.00E-01	5.90E 01
SSW	0.00E-01	6.00E 00	2.10E 01	1.00E 01	1.00E 00	0.00E-01	3.80E 01
SW	0.00E-01	2.00E 00	1.80E 01	2.50E 01	0.00E-01	0.00E-01	4.50E 01
WSW	0.00E-01	4.00E 00	9.00E 00	1.10E 01	0.00E-01	0.00E-01	2.40E 01
W	0.00E-01	2.00E 00	6.00E 00	1.00E 00	0.00E-01	0.00E-01	9.00E 00
WNW	0.00E-01	0.00E-01	3.00E 00	7.00E 00	1.00E 00	0.00E-01	1.30E 01
NW	0.00E-01	1.00E 00	3.00E 00	1.00E 00	0.00E-01	0.00E-01	5.00E 00
NNW	0.00E-01	0.00E-01	5.00E 00	6.00E 00	0.00E-01	0.00E-01	1.10E 01
TOT	1.00E 00	5.30E 01	2.24E 02	1.31E 02	2.00E 00	0.00E-01	4.11E 02

PERIODS OF CALM (HOURS): 0.000E-01
 HOURS OF INVALID DATA : 2.700E 01
 HOURS OF GOOD DATA : 7.907E 03 = 90.3% OF TOTAL HOURS

TABLE 5

DOSE AT THE SITE BOUNDARY AND NEAREST RESIDENT
1985

<u>ORGAN</u>	<u>SITE BOUNDARY</u>		<u>NEAREST RESIDENT</u>	
	Location: SSE 1.40 km Age Group: Child		Location: NNW 2.87 km Age Group: Child	
	<u>DOSE</u>	<u>% LIMIT</u>	<u>DOSE</u>	<u>% LIMIT</u>
Gamma Air Dose (mrad)	1.44E-2	1E-1%	8.17E-3	N/A
Beta Air Dose (mrad)	3.89E-2	2E-1%	2.21E-2	N/A
Whole Body (mrem)*	1.22E-2	N/A	6.92E-3	N/A
Skin (mrem)	2.83E-2	N/A	1.61E-2	N/A
Bone (mrem)	1.42E-4	N/A	6.62E-5	4E-4%
Liver (mrem)	1.07E-3	N/A	5.65E-4	4E-3%
Total Body (mrem)	1.01E-3	N/A	5.40E-4	4E-3%
Thyroid (mrem)	4.51E-2	N/A	2.11E-2	1E-1%
Kidney (mrem)	1.15E-3	N/A	6.06E-4	4E-3%
Lung (mrem)	9.35E-4	N/A	5.04E-4	3E-3%
GI-LLI (mrem)	9.47E-4	N/A	5.08E-4	3E-3%

* Noble Gas Exposure Only

TABLE 6

DOSE TO THE MEMBER OF THE PUBLIC FROM ACTIVITIES
WITHIN THE SITE BOUNDARY
1985

<u>ORGAN</u>	<u>GASEOUS</u> <u>EFFLUENTS DOSE</u> <u>(mrem)</u>
Skin	7.86E-3
Bone	3.39E-3
Liver	3.41E-3
Total Body	3.41E-3
Thyroid	3.44E-3
Kidney	3.41E-3
Lung	3.41E-3
GI-LLI	3.41E-3

TABLE 7
TOTAL DOSE DUE TO THE URANIUM
FUEL CYCLE
1985

ORGAN	DOSE TO NEAREST RESIDENT (mrem)	EFFLUENTS DOSE WITHIN THE SITE BOUNDARY (mrem)	DIRECT RADIATION FROM THE UNIT (mrem)	DIRECT RADIATION FROM OUTSIDE TANKS (mrem)	TOTAL DOSE 1985 (mrem)	Z LIMIT
Skin	1.61E-2	7.86E-3	5E-4	3.9E-10	2.45E-2	N/A
Bone	6.99E-3	3.39E-3	5E-4	3.9E-10	1.09E-2	0.044Z
Liver	7.48E-3	3.41E-3	5E-4	3.9E-10	1.14E-2	0.046Z
Total Body	7.46E-3	3.41E-3	5E-4	3.9E-10	1.14E-2	0.046Z
Thyroid	2.80E-2	3.44E-3	5E-4	3.9E-10	3.19E-2	0.043Z
Kidney	7.53E-3	3.41E-3	5E-4	3.9E-10	1.14E-2	0.046Z
Lung	7.42E-3	3.41E-3	5E-4	3.9E-10	1.14E-2	0.046Z
GI-LLI	7.43E-3	3.41E-3	5E-4	3.9E-10	1.14E-2	0.046Z

TABLE 8

DOSE DUE TO LIQUID EFFLUENTS

Reporting Period: January 1 - December 30, 1985

<u>Organ</u>	<u>Dose</u> <u>(mrem)</u>	<u>% Limit</u>
BONE	9.20E-4	0.0092%
LIVER	5.52E-2	0.55%
TOTAL BODY	5.48E-2	1.8%
THYROID	6.01E-2	0.60%
KIDNEY	5.44E-2	0.54%
LUNG	5.41E-2	0.54%
GI-LLI	6.58E-2	0.66%

Controlling Age Group: Adult

TABLE 4.11-1
RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

LIQUID RELEASE TYPE	SAMPLING FREQUENCY	MINIMUM ANALYSIS FREQUENCY	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD) ⁽¹⁾ ($\mu\text{Ci/ml}$)	
1. Batch Waste Release Tanks ⁽²⁾	P Each Batch	P Each Batch	Principal Gamma Emitters ⁽³⁾	5×10^{-7}	
			I-131	1×10^{-6}	
	a. Waste Monitor Tank	P One Batch/M	M	Dissolved and Entrained Gases (Gamma Emitters)	1×10^{-5}
	b. Secondary Liquid Waste Monitor Tank	P Each Batch	M Composite ⁽⁴⁾	H-3	1×10^{-5}
				Gross Alpha	1×10^{-7}
	c. Discharge Monitor Tank	P Each Batch	Q Composite ⁽⁴⁾	Sr-89, Sr-90	5×10^{-8}
				Fe-55	1×10^{-6}
	2. Continuous Releases ⁽⁵⁾	Daily ⁽⁶⁾ Grab Sample	W Composite ⁽⁴⁾	Principal Gamma Emitters ⁽³⁾	5×10^{-7}
				I-131	1×10^{-6}
		Steam Generator Blowdown	M Grab Sample	M	Dissolved and Entrained Gases (Gamma Emitters)
Daily ⁽⁶⁾ Grab Sample					M Composite ⁽⁴⁾
		Gross Alpha	1×10^{-7}		
Daily ⁽⁶⁾ Grab Sample		Q Composite ⁽⁴⁾	Sr-89, Sr-90	5×10^{-8}	
			Fe-55	1×10^{-6}	

TABLE 4.11-1 (Continued)

TABLE NOTATIONS

- (1) The LLD is defined, for purposes of these specifications, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66 s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot \exp(-\lambda \Delta t)}$$

Where:

LLD = the "a priori" lower limit of detection (microCuries per unit mass or volume),

s_b = the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (counts per minute),

E = the counting efficiency (counts per disintegration),

V = the sample size (units of mass or volume),

2.22×10^6 = the number of disintegrations per minute per microCurie,

Y = the fractional radiochemical yield; when applicable,

λ = the radioactive decay constant for the particular radionuclide (s^{-1}), and

Δt = the elapsed time between the midpoint of sample collection and the time of counting (s).

Typical values of E, V, Y, and Δt should be used in the calculation.

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement.

- (2) A batch release is the discharge of liquid wastes of a discrete volume. Prior to sampling for analyses, each batch shall be isolated, and then thoroughly mixed by a method described in the ODCM to assure representative sampling.

TABLE 4.11-1 (Continued)TABLE NOTATIONS (Continued)

- (3) The principal gamma emitters for which the LLD specification applies include the following radionuclides: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141, and Ce-144. This list does not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Semiannual Radioactive Effluent Release Report pursuant to Specification 6.9.1.7, in the format outlined in Regulatory Guide 1.21, Appendix B, Revision 1, June 1974.
- (4) A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged and in which the method of sampling employed results in a specimen that is representative of the liquids released. Prior to analysis, all samples taken for the composite shall be thoroughly mixed in order for the composite samples to be representative of the effluent release.
- (5) A continuous release is the discharge of liquid wastes of a nondiscrete volume, e.g., from a volume of a system that has an input flow during the continuous release.
- (6) Samples shall be taken at the initiation of effluent flow and at least once per 24 hours thereafter while the release is occurring. To be representative of the liquid effluent, the sample volume shall be proportioned to the effluent stream discharge volume. The ratio of sample volume to effluent discharge volume shall be maintained constant for all samples taken for the composite sample.

TABLE 4.11-2

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

GASEOUS RELEASE TYPE	SAMPLING FREQUENCY	MINIMUM ANALYSIS FREQUENCY	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD) ⁽¹⁾ ($\mu\text{Ci/ml}$)
1. Waste Gas Decay Tank	P Each Tank Grab Sample	P Each Tank	Principal Gamma Emitters ⁽²⁾	1×10^{-4}
2. Containment Purge or Vent ⁽³⁾	P Each PURGE ⁽³⁾ Grab Sample	P Each PURGE ⁽³⁾	Principal Gamma Emitters ⁽²⁾	1×10^{-4}
		M	H-3 (oxide)	1×10^{-6}
3. Unit Vent	M ^{(3),(4)} Grab Sample	M ⁽³⁾	Principal Gamma Emitters ⁽²⁾	1×10^{-4}
		M ⁽⁴⁾	H-3 (oxide)	1×10^{-6}
4. Spent Fuel Building Exhaust	M ⁽⁵⁾ Grab Sample	M	Principal Gamma Emitters ⁽²⁾	1×10^{-4}
		M ⁽⁵⁾	H-3 (oxide)	1×10^{-6}
5. Radwaste Building Vent	M Grab Sample	M	Principal Gamma Emitters ⁽²⁾	1×10^{-4}
6. All Release Types as listed in 1., 2., 3., 4., and 5. above	Continuous ^{(6) (8)}	W ⁽⁷⁾ Charcoal Sample	I-131	1×10^{-12}
			I-333	1×10^{-10}
	Continuous ^{(6) (8)}	W ⁽⁷⁾ Particulate Sample	Principal Gamma Emitters ⁽²⁾	1×10^{-11}
			Gross Alpha	1×10^{-11}
Continuous ^{(6) (8)}	M Composite Particulate Sample			
Continuous ^{(6) (8)}	Q Composite Particulate Sample		Sr-89, Sr-90	1×10^{-11}

TABLE 4.11-2 (Continued)

TABLE NOTATIONS

(1) The LLD is defined, for purposes of these specifications, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66 s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot \exp(-\lambda \Delta t)}$$

Where:

LLD = the "a priori" lower limit of detection (microCuries per unit mass or volume),

s_b = the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (counts per minute),

E = the counting efficiency (counts per disintegration),

V = the sample size (units of mass or volume),

2.22×10^6 = the number of disintegrations per minute per microCurie,

Y = the fractional radiochemical yield, when applicable,

λ = the radioactive decay constant for the particular radionuclide (s^{-1}), and

Δt = the elapsed time between the midpoint of sample collection and the time of counting (s).

Typical values of E, V, Y, and Δt should be used in the calculation.

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement.

TABLE 4.11-2 (Continued)TABLE NOTATIONS (Continued)

- (2) The principal gamma emitters for which the LLD specification applies include the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, and Xe-138 in noble gas releases and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, I-131, Cs-134, Cs-137, Ce-141, and Ce-144 in iodine and particulate releases. This list does not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Semiannual Radioactive Effluent Release Report pursuant to Specification 6.9.1.7, in the format outlined in Regulatory Guide 1.21, Appendix B, Revision 1, June 1974.
- (3) Sampling and analysis shall also be performed following shutdown, startup, or a THERMAL POWER change exceeding 15% of RATED THERMAL POWER within 1 hour period.
- (4) Iritium grab samples shall be taken and analyzed at least once per 24 hours when the refueling canal is flooded.
- (5) Iritium grab samples shall be taken and analyzed at least once per 7 days from the ventilation exhaust from the spent fuel pool area, whenever spent fuel is in the spent fuel pool. Grab samples need to be taken only when spent fuel is in the spent fuel pool.
- (6) The ratio of the sample flow rate to the sampled stream flow rate shall be known for the time period covered by each dose or dose rate calculation made in accordance with Specifications 3.11.2.1, 3.11.2.2, and 3.11.2.3.
- (7) Samples shall be changed at least once per 7 days and analyses shall be completed within 48 hours after changing, or after removal from sampler. For unit vent, sampling shall also be performed at least once per 24 hours for at least 7 days following each shutdown, STARTUP or THERMAL POWER change exceeding 15% of RATED THERMAL POWER within a 1-hour period and analyses shall be completed within 48 hours of changing. When samples collected for 24 hours are analyzed, the corresponding LLDs may be increased by a factor of 10. This requirement does not apply if: (1) analysis shows that the DOSE EQUIVALENT I-131 concentration in the reactor coolant has not increased more than a factor of 3, and (2) the noble gas monitor shows that effluent activity has not increased more than a factor of 3.
- (8) Continuous sampling of the spent fuel building exhaust needs to be performed only when spent fuel is in the spent fuel pool.

ATTACHMENT 3

PROCESS CONTROL PROGRAM CHANGES

This Attachment contains the following:

1. Callaway Plant ORC Meeting Minutes (applicable sections)
pages 1 through 4

2. Process Control Program Procedure Request Form Package
pages 1 through 5

all file

CALLAWAY PLANT
ORC MEETING MINUTES

Meeting Number 450 (REVISED) Date 8/9/85

II. Attendees

- Chairman/Vice-Chairman A.P. NEUHACFEN
- Member/Alternate James C. Meacham
- Member/Alternate H. L. Stubbins
- Member/Alternate Albert S. White
- Member/Alternate Marvin R. Spaulmer
- Member/Alternate J. J. P. [unclear]
- Member/Alternate J. [unclear]
- Member/Alternate [unclear]

UNCONTROLLED COPY

III. Proposed Items

	Recommended Disposition		
A. <u>CMP 84-0357, Rev. A</u>	Approval <input checked="" type="checkbox"/>	Disapproval <input type="checkbox"/>	Open <input type="checkbox"/>
B. <u>CMP 84-0530, Rev. C</u>	Approval <input checked="" type="checkbox"/>	Disapproval <input type="checkbox"/>	Open <input type="checkbox"/>
C. <u>CMP 84-0513, Rev. A</u>	Approval <input checked="" type="checkbox"/>	Disapproval <input type="checkbox"/>	Open <input type="checkbox"/>
D. <u>CMP 84-0525, Rev. A</u>	Approval <input checked="" type="checkbox"/>	Disapproval <input type="checkbox"/>	Open <input type="checkbox"/>
E. <u>CMP 84-0781, (F.N.-02)</u>	Approval <input checked="" type="checkbox"/>	Disapproval <input type="checkbox"/>	Open <input type="checkbox"/>
F. <u>CMP 84-0786, Rev. C</u>	Approval <input checked="" type="checkbox"/>	Disapproval <input type="checkbox"/>	Open <input type="checkbox"/>
G. Attached list of Procedure Request forms and Safety Evaluations	Approval <input checked="" type="checkbox"/> W/O Exception	Disapproval <input type="checkbox"/> W/Exceptions	Identify exceptions & reason on attached list & carry as open item

NOTE: For items A through G, a recommendation for approval signifies that ORC found that the items did not constitute an unreviewed safety question unless otherwise specifically stipulated in the ORC minutes.

NOTE: Open Items must be rescheduled for future meetings. Disapproval and Open categories must have supporting rationale attached in writing. Dissenting opinions require an attached statement of reason. Attached pages shall be uniquely identified by indicating in a prominent manner the meeting number, the date and page number of the attachment to this form.

ORC Chairman/Vice-Chairman Andrew P. Neuhalfen

Distribution

- ORC File - w/Attachments (QA Record)
- MSRB - w/Attachments
- ISEG - w/Attachments
- Members - w/Attachments
- Supt., Training - w/Attachments

CA-#138
02/11/84
APA-22-00050

Total of 11 pages
9th 8-12

CALLAWAY PLANT
ORC MEETING MINUTES

Meeting Number 450 Date 8/9/85

II. Attendees

Chairman/Vice-Chairman _____
 Member/Alternate M. J. EVANS BY TELECON
 Member/Alternate Charles Naslund *[Signature]*
 Member/Alternate J.E. Merciel
 Member/Alternate J.M. PRICE BY TELECON
 Member/Alternate _____
 Member/Alternate _____
 Member/Alternate DWR Robinson

III. Proposed Items

Recommended Disposition

		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A. <u>CMP 34-C310, (FCM-C1)</u>	Approval	<input checked="" type="checkbox"/>	Disapproval	<input type="checkbox"/>	Open <input type="checkbox"/>
B. <u>CMP 35-0001, Rev. A</u>	Approval	<input checked="" type="checkbox"/>	Disapproval	<input type="checkbox"/>	Open <input type="checkbox"/>
C. <u>CMP 35-0149, Rev. A</u>	Approval	<input checked="" type="checkbox"/>	Disapproval	<input type="checkbox"/>	Open <input type="checkbox"/>
D. <u>CMP 35-0200, Rev. B</u>	Approval	<input checked="" type="checkbox"/>	Disapproval	<input type="checkbox"/>	Open <input type="checkbox"/>
E. <u>CMP 35-0259, Rev. A</u>	Approval	<input checked="" type="checkbox"/>	Disapproval	<input type="checkbox"/>	Open <input type="checkbox"/>
F. <u>CMP 35-0313, Rev. A</u>	Approval	<input checked="" type="checkbox"/>	Disapproval	<input type="checkbox"/>	Open <input type="checkbox"/>
G. Attached list of Procedure Request forms and Safety Evaluations	Approval	<input type="checkbox"/>	Approval	<input type="checkbox"/>	Identify exceptions & reason on attached list & carry as open item.
	W/O Exception	<input type="checkbox"/>	W/Exceptions	<input type="checkbox"/>	

NOTE: For items A through G, a recommendation for approval signifies that ORC found that the items did not constitute an unreviewed safety question unless otherwise specifically stipulated in the ORC minutes.

NOTE: Open Items must be rescheduled for future meetings. Disapproval and Open categories must have supporting rationale attached in writing. Dissenting opinions require an attached statement of reason. Attached pages shall be uniquely identified by indicating in a prominent manner the meeting number, the date and page number of the attachment to this form.

ORC Chairman/Vice-Chairman _____

Distribution

ORC File - w/Attachments (QA Record)	Members - w/Attachments
NSRB - w/Attachments	Supt., Training - w/Attachments
ISEG - w/Attachments	

CA-#138
02/11/84
APA-ZZ-00050

CALLAWAY PLANT
ORC MEETING MINUTES

Meeting Number 450 Date 8/9/85

II. Attendees

Chairman/Vice-Chairman _____
 Member/Alternate _____
 Member/Alternate _____
 Member/Alternate _____
 Member/Alternate _____
 Member/Alternate _____
 Member/Alternate _____

III. Proposed Items

Recommended Disposition

A. <u>IR 25-2233</u>	Approval	<input checked="" type="checkbox"/>	Disapproval	<input type="checkbox"/> Open <input type="checkbox"/>
B. <u>PCP REV. 4</u>	Approval	<input checked="" type="checkbox"/>	Disapproval	<input type="checkbox"/> Open <input type="checkbox"/>
C. <u>CMP 84-03-21 REV. A FCY-01</u>	Approval	<input checked="" type="checkbox"/>	Disapproval	<input type="checkbox"/> Open <input type="checkbox"/>
D. <u>APA-ZZ-00125 REV. 3</u>	Approval	<input checked="" type="checkbox"/>	Disapproval	<input type="checkbox"/> Open <input type="checkbox"/>
E. <u>APA-ZZ-00121 REV. 5</u>	Approval	<input checked="" type="checkbox"/>	Disapproval	<input type="checkbox"/> Open <input type="checkbox"/>
F. <u>EIP-ZZ-A0010 REV. 2</u>	Approval	<input checked="" type="checkbox"/>	Disapproval	<input type="checkbox"/> Open <input type="checkbox"/>
G. Attached list of Procedure Request forms and Safety Evaluations	Approval W/O Exception	<input type="checkbox"/>	Approval W/Exceptions	<input type="checkbox"/> Identify exceptions & reason on attached list & carry as open item.

NOTE: For items A through G, a recommendation for approval signifies that ORC found that the items did not constitute an unreviewed safety question unless otherwise specifically stipulated in the ORC minutes.

NOTE: Open Items must be rescheduled for future meetings. Disapproval and Open categories must have supporting rationale attached in writing. Dissenting opinions require an attached statement of reason. Attached pages shall be uniquely identified by indicating in a prominent manner the meeting number, the date and page number of the attachment to this form.

ORC Chairman/Vice-Chairman _____

Distribution

ORC File - w/Attachments (QA Record)	Members - w/Attachments
NSRB - w/Attachments	Supt., Training - w/Attachments
ISEG - w/Attachments	

CA-#138
02/11/84
APA-ZZ-00050

CALLAWAY PLANT
ORC MEETING MINUTES

Meeting Number 450 Date 8/9/85

II. Attendees

- Chairman/Vice-Chairman _____
- Member/Alternate _____
- Member/Alternate _____
- Member/Alternate _____
- Member/Alternate _____
- Member/Alternate _____
- Member/Alternate _____
- Member/Alternate _____

III. Proposed Items

Recommended Disposition

	Approval	Disapproval	Open
A. <u>LER 85-032</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. <u>APA-ZZ-00161 REV. 4</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. <u>IR 85-291</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. Attached list of Procedure Request forms and Safety Evaluations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

W/O Exception Approval Identify exceptions & reason on attached list & carry as open item.

NOTE: For items A through G, a recommendation for approval signifies that ORC found that the items did not constitute an unreviewed safety question unless otherwise specifically stipulated in the ORC minutes.

NOTE: Open Items must be rescheduled for future meetings. Disapproval and Open categories must have supporting rationale attached in writing. Dissenting opinions require an attached statement of reason. Attached pages shall be uniquely identified by indicating in a prominent manner the meeting number, the date and page number of the attachment to this form.

ORC Chairman/Vice-Chairman _____

Distribution

- ORC File - w/Attachments (QA Record)
- NSRB - w/Attachments
- ISEG - w/Attachments
- Members - w/Attachments
- Supt., Training - w/Attachments

CA-#138
02/11/84
APA-ZZ-00050

PROCEDURE REQUEST FORM

1001

1. Procedure Number

PCP

Revision Number

3

Procedure Title

Callaway Plant Process Control Program

- New Procedure Request
- Removing Deficiencies
- Procedure Deletion
- Procedure Revision, New Revision Number 4
- Temporary Procedure Change, effective until incorporated into next revision. TCM# _____
- One Time Temporary Procedure Change, effective from _____ to _____, TCM# _____

INFORMATION ONLY
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2. New Procedure/Change Summary

2.1 Procedure Page Numbers Affected by Proposed Change

Attachment 1

2.2 Description of New Procedure/Changes/Deficiencies Removed

Revised Attachment 1 (Resin Solidification Formulations) to incorporate formulation for resin slurries having a waste classification of Class A which will be disposed of as "UNSTABLE" waste.
(Use additional pages if required.)

2.3 Reason for New Procedure/Change/Deficiency Removal

Based upon in plant testing of both test samples and full scale drums, a solidified product can be obtained having 0.0% free-standing liquids. However, disposal of this waste would have to be done by treating the waste as UNSTABLE waste form. Provided waste can be shown to be Class A this formulation may be utilized. This change is consistent with applicable shipping and disposal requirements.
(Use additional pages if required.)

3. Prepared by

Derry W. Hamilton
Signature

Radwaste Engineer
Title

7/30/85
Date

4. Qualified Review (Check appropriate boxes)

4.a Cross Disciplinary Review Required? NO YES (If Yes, complete 4.b below.)

ORC Review Required? NO YES

Reviewed by

J. Prusakshank
Signature

Rad Chem Foreman
Title

8-6-85
Date

4.b Cross Disciplinary Review Required

(Signature/Date):

Date Due

- | | | | | | |
|---------------------------------|---|---|--------------------------|--|--------|
| <input type="checkbox"/> Eng | / | <input type="checkbox"/> P & S | / | <input checked="" type="checkbox"/> QA | 8/2/85 |
| <input type="checkbox"/> H.P. | / | <input type="checkbox"/> Admin-S | / | <input type="checkbox"/> Mat'l. | / |
| <input type="checkbox"/> R.W. | / | <input type="checkbox"/> Trng. | / | <input type="checkbox"/> Admin-P | / |
| <input type="checkbox"/> Chem. | / | <input type="checkbox"/> Sec. | / | <input type="checkbox"/> I & C | / |
| <input type="checkbox"/> Ops | / | <input checked="" type="checkbox"/> Comp. | Sharon E. Muehl / 8/6/85 | <input type="checkbox"/> | / |
| <input type="checkbox"/> Maint. | / | <input type="checkbox"/> Outages | / | <input type="checkbox"/> | / |

5. Responsible Department Head (Check appropriate box and sign):

5.a Approved for Issue

5.b Approved for ORC Review

J. Prusakshank / 8/6/85

6. Temporary Procedure Change Preliminary Approval (Signature/Date)

- Member Management Staff _____/_____/_____
- Senior Reactor Operator _____/_____/_____
- Manager, Callaway Plant _____/_____/_____

7. Temporary Procedure Change Final Approval (Signature/Date; required within 14 days of Preliminary Approval.)

- Responsible Dept. Head _____/_____/_____
- Manager, Callaway Plant _____/_____/_____

8. Procedure Approval (Signature/Date)

for Manager, Callaway Plant (Signature) / Aug 9, 1985

(1) Applicable for new procedures and procedure revisions only.
(2) Applicable for Temporary Procedure changes only; not all signatures are required in these sections. See APA-22-00101 Section 5.1 for approval requirements.

Total: 21 pages

2.3 Reason for Change (cont.)

shipping and disposal site requirements. The reasoning for requiring wastes solidified using this formulation to be treated as "UNSTABLE" waste is that stability requirements for "STABLE" waste form have not been tested for (ie., biodegradation, immersion testing, etc.) using this formulation, either ^{with 11/2/85} by

cc distribution for ULNRC- 1265

with enclosures

Director, Resource Management
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Director
Office of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Mr. Bill Kesler
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NRC Resident Inspector

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