EFFLUENT AND WASTE DISPOSAL

SEMIANNUAL REPORT

7/1/91 - 12/31/91

CAROLINA POWER AND LIGHT COMPANY

H. B. ROBINSON SEG PLANT - UNIT 2

FACILITY OPERATING LICENSE NO. DPR-23

DOCKET NO. 50-261

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I. EXECUTIVE SUMMARY

Significant Variances

A. The following are explanations of significant variances in this Semiannual Report:

1. The 10CFR50 Appendix I, Percent of Limits, were calculated from the last posted release for the period indicated using the Nuclear Data LRW/GRW (ODCM meteorology) Release Permit Generating System. The following is a summary of the comparison of the annual dose commitment of the ODCM and LADTAP/GASPAR dose programs.

GASEOUS	UNITS	LRW/GRW	LADTAP/GASPAR
Annual Beta Air Dose	mrad	1.37E-02	3.33E-03
Gamma Air Dose	mrad	1.75E-02	4.32E-03
I-131, I-133, Tritium & Part. >8 Day Half-Lives Dose	mrem	7.44E-02	6.21E-02
LIQUID			
Total Body Dose	mrem	2.31E-02	8.87E-03
Critical Organ Dose	mrem	4.52E-02	1.61E-02

The annual gaseous dose commitment was calculated with GASPAR using batch mixed mode, continuous mixed mode, batch ground level mode, and continuous ground level concurrent meteorology. The ODCM (GRW Software) provides day-by-day dose estimates that are higher because all releases are assigned to the limiting receptor, using the continuous ground level dispersion factors calculated from 1978 meteorology.

The annual liquid dose commitment is lower with LADTAP because total annual dilution flow is used. Day-by-day dose estimates provided by the ODCM (LRW software) utilizes dilution flow during actual release periods from Unit 2 only.

2. On March 11, 1991, the Unit was returned to service following the completion of refueling outage 13. From this date through the end of 1991, the Unit, with few exceptions, ran at steady-state power operations. Consequently, variances in most effluent parameters are relatively small when comparing the two quarters in this reporting period. Gaseous effluents showed a decrease in fission and activation gas curies as well as tritium curies in the fourth quarter as compared to the third quarter. This is mainly due to Containment Vessel purging for personnel heat stress management during July and August Containment entries. Gaseous effluents in the third and fourth quarters showed no detectable Iodine. This continues a trend which began in the third quarter of 1990 and is attributable to continued good Reactor Coolant System and fuel integrity. Some of the gaseous release parameters for this reporting period are summarized below:

GASEOUS EFFLUENTS

	UNITS	3rd QUARTER	4th QUARTER
Fission & Act. Gas	Ci	6.08E-01	7.03E-02
I-131	Ci	0.00E+00	0.00E+00
Part. >8 Day Half-Lives	Ci	6.78E-05	5.09E-05
Tritium	Ci	1.59E+00	8.22E-01

3. Little difference can be seen when comparing liquid release parameters for the third and fourth quarters of 1991. This is consistent with steady-state plant operations during the period. Some of the liquid release parameters for this reporting period are shown below:

LIQUID EFFLUENTS

	UNITS	3rd QUARTER	4th QUARTER
Fission & Act. Products	Ci	6.08E-02	5.11E-02
Dis. & Entrained Gas	Ci	9.56E-03	1.14E-02
Tritium	Ci	5.86E+01	1.09E+02
Dilution Volume	Liters	2.69E+11	2.61E+11
Waste Volume	Liters	8.12E+05	6.43E+05

B. Regulatory Compliance

1. When projected on a day-by-day basis utilizing conservative meteorological conditions, the dose commitment from gaseous and liquid effluents is a small fraction of the 10CFR50, Appendix I limits. The direct radiation assessment to the likely most exposed member of the public is reported in the Annual Radiological Environmental Operating Report. During 1991, the results of the direct radiation assessment demonstrated no measurable affect above background for plant operations. The Independent Spent Fuel Storage Installation onsite is now operational and is evaluated in Addendum 1 to this report.

2. There were no changes to the waste solidification process control program (PCP) during this reporting period.

3. There were no changes to the Radioactive Waste Systems (liquid, gaseous, or solid) during this reporting period.

4. There was a reportable instrumentation inoperability event during this reporting period. See Enclosure 2 for details.

5. There were no outside liquid holdup tanks that exceeded the ten curie limit during this reporting period.

6. There were no Waste Gas Decay Tanks that exceeded the 1.9E+04 curie limit during this reporting period.

7. There was a revision to the ODCM during this reporting period. See Enclosure 2 for details.

II. SUPPLEMENTAL INFORMATION

A. Regulatory Limits

1. Fission and Activation Gases:
   10CFR20 Limits (Instantaneous Release Rate)
      Total Body Dose ≤500 mrem/yr
         Skin Dose ≤3000 mrem/yr
   10CFR50, Appendix I
      For Calendar Quarter
         Gamma Dose ≤5 mrad
         Beta Dose ≤10 mrad
      For Calendar Year
         Gamma Dose ≤10 mrad
         Beta Dose ≤20 mrad

2. Iodine - 131 and 133, Tritium, and Particulates >8 day half-lives:
   10CFR20 Limits (Instantaneous Release Rate)
      Dose from Inhalation (only) to a child to any organ ≤1500 mrem/yr
   10CFR50, Appendix I (Organ Doses)
      For Calendar Quarter ≤7.5 mrem
      For Calendar Year ≤15 mrem

3. Liquids:
   Concentrations are specified in 10CFR20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2.00E-04 μCi/ml total activity.
   10CFR50, Appendix I
      For Calendar Quarter
         Total Body Dose ≤1.5 mrem
         Any Organ Dose ≤5 mrem
      For Calendar Year
         Total Body Dose ≤3 mrem
         Any Organ Dose ≤10 mrem

B. Measurements and Approximations of Total Radioactivity

1. Continuous Gaseous Releases

   a. Fission and Activation Gases - The total activity released is determined from the net count rate of the gaseous monitor, its calibration factor, and the total exhaust flow. The activity of radioactive gas is determined by the fraction of that radioactive gas in the isotopic analysis for that period.

b. Iodines - The activity released as iodine-131, 133, and 135 is based on isotopic analysis of the charcoal cartridge and particulate filter and the total vent flow.

c. Particulates - The activity released via particulates with half-lives greater than eight days is determined by isotopic analysis of particulate filters and the total vent flow.

d. Tritium - The activity released as tritium is based on weekly grab sample analysis and total vent flow.

2. Batch Gaseous Releases

a. Fission and Activation Gases - The activity released is based on the volume released and the activity of the individual nuclides obtained from an isotopic analysis of the grab sample taken prior to the release.

b. Iodines - The iodines from mixed mode batch releases are included in the iodine determination from the mixed mode continuous Auxiliary Building release.

c. Particulates - The particulates from mixed mode batch releases are included in the particulate determination from the mixed mode continuous Auxiliary Building release. Ground level batch particulates are reported in the batch mode accountability.

d. Tritium - The activity released as tritium is based on the grab sample analysis of each batch and the batch volume.

3. Liquid Releases

a. Fission and Activation Products - The total release values (not including tritium, strontium, iron-55, and alpha) are comprised of the sum of the individual radionuclide activities in each release to the discharge canal for the respective quarter. These values represent the activity known to be present in the liquid radwaste effluent.

b. Tritium & Alpha - The measured tritium and alpha concentrations in a monthly composite sample are used to calculate the total release and average diluted concentration during each period.

c. Strontium-89, 90, and Iron-55 - The total release values are measured quarterly from composite samples.

C. Estimated Total Errors

1. Estimated total errors for gaseous effluents are based on uncertainties in counting equipment calibration, counting statistics, vent flow rates, vent sample flow rates, non-steady release rates, chemical yield factors, and sample losses for such items as charcoal cartridges.

2. Estimated total errors for liquid effluents are based on uncertainties in counting equipment calibration, counting statistics, non-steady release flow rate, sampling and mixing losses, and volume determinations.

3. Estimated total errors for solid waste are based on uncertainties in equipment calibration, dose rate measurements, geometry, and volume determinations.

III. GASEOUS EFFLUENTS

A. Batch Releases

1. Number of Batch Releases	8.70E+01	
2. Total Time Period for Batch Releases	6.21E+04	Min
3. Maximum Time Period for a Batch Release	3.96E+03	Min
4. Average Time Period for Batch Releases	7.14E+02	Min
5. Minimum Time Period for a Batch Release	1.00E+00	Min

B. Abnormal Releases

1. Number of Releases	0.00E+00	
2. Total Activity Released	0.00E+00	Ci

C. Data Tables

The following tables provide the details of gaseous releases:

Table III-A Summation of all Releases
Table III-B Ground Level and Mixed Mode Releases
Table III-C Lower Limits of Detection

TABLE III-A
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT - 1991
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

		UNITS	3RD QUARTER	4TH QUARTER
A.	Fission and Activation Gases:			
	1. Total Release	Ci	6.08E-01	7.03E-02
	2. Estimated Total Error	%	6.00E+01	6.00E+01
	3. Average Release Rate for Period	µCi/sec	7.65E-02	8.84E-03
	4. Percent of 10CFR50, Appendix I			
	Quarterly Limit			
	Gamma Air	%	2.83E-01	2.97E-02
	Beta Air	%	5.03E-02	5.44E-03
	Annual Limit			
	Gamma Air	%	1.60E-01*	1.75E-01*
	Beta Air	%	6.56E-02*	6.84E-02*
B.	Iodines, Particulates, and Tritium:			
	Iodines			
	1. Total Iodine - 131	Ci	<LLD	<LLD
	2. Estimated Total Error	%	4.00E+01	4.00E+01
	3. Average Release Rate for Period	µCi/sec	<LLD	<LLD
	Particulates			
	1. Particulates with Half-Lives >8 days	Ci	6.78E-05	5.09E-05
	2. Estimated Total Error	%	4.00E+01	4.00E+01
	3. Average Release Rate for Period	µCi/sec	8.53E-06	6.40E-06
	4. Gross Alpha Radioactivity	Ci	<LLD	<LLD
	Tritium			
	1. Total Release	Ci	1.59E+00	8.22E-01
	2. Estimated Total Error	%	3.00E+01	3.00E+01
	3. Average Release Rate for Period	µCi/sec	2.00E-01	1.03E-01
	Percent of 10CFR50, Appendix I			
	Quarterly Limit			
	Organ Lung	%	3.57E-01	2.01E-01
	Annual Limit			
	Organ Lung	%	3.96E-01*	4.96E-01*

*Cumulative total for the year-to-date using the methodology in the ODCM.

TABLE III-B
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT - 1991
GASEOUS EFFLUENTS - GROUND LEVEL AND MIXED MODE RELEAS, ,

	UNITS	CONTINUOUS MODE 3RD QUARTER	CONTINUOUS MODE 4TH QUARTER	BATCH MODE 3RD QUARTER	BATCH MODE 4TH QUARTER
1. FISSION GASES					
Ar-41	Ci	4.20E-01	<LLD	1.75E-01	6.21E-02
Kr-85	Ci	2.53E-03	<LLD	<LLD	<LLD
Xe-133	Ci	1.89E-05	<LLD	9.67E-03	8.22E-03
Xe-133m	Ci	<LLD	<LLD	7.07E-06	8.70E-06
Xe-135	Ci	<LLD	<LLD	2.53E-06	<LLD
Total for Period	Ci	4.23E-01	<LLD	1.85E-01	7.03E-02
2. IODINES[1]					
I-131	Ci	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD
3. PARTICULATES[1]					
Co-60	Ci	<LLD	<LLD	6.66E-05	4.95E-05
Cs-137	Ci	<LLD	4.52E-08	1.23E-06	1.37E-06
Total for Period	Ci	<LLD	4.52E-08	6.78E-05	5.09E-05

[1]Mixed Mode Continuous Accountability includes Mixed Mode Batch Accountability (excludes H-3).

TABLE III-C
TYPICAL LOWER LIMITS OF DETECTION FOR GASEOUS EFFLUENTS

NUCLIDE	LLD (μCi/cc)
H-3	1.00E-06
Ar-41	5.83E-09
Mn-54	1.00E-11
Co-58	1.00E-11
Fe-59	1.00E-11
Co-60	1.00E-11
Zn-65	1.00E-11
Kr-85	2.88E-06
Kr-85m	6.49E-09
Kr-87	1.00E-04
Kr-88	1.00E-04
Sr-89	1.00E-11
Sr-90	1.00E-11
Mo-99	1.00E-11
I-131	1.00E-12
I-133	1.00E-10
Xe-133	1.00E-04
Xe-133m	1.00E-04
Cs-134	1.00E-11
I-135	2.87E-10
Xe-135	1.00E-04
Xe-135m	2.28E-07
Cs-137	1.00E-11
Xe-138	1.00E-04
Ba-140	2.69E-14
La-140	7.55E-14
Ce-141	1.00E-11
Ce-144	1.00E-11
Gross Alpha	1.00E-11

IV. LIQUID EFFLUENTS

A. Batch Releases

1.	Number of Batch Releases	5.00E+01	
2.	Total Time Period for Batch Releases	9.57E+03	Min
3.	Maximum Time Period for a Batch Release	3.31E+02	Min
4.	Average Time Period for Batch Releases	1.91E+02	Min
5.	Minimum Time Period for a Batch Release	1.80E+01	Min
6.	Average Stream Flow During Release Periods	5.28E+05	GPM

B. Abnormal Releases

1.	Number of Releases	0.00E+00	
2.	Total Activity Released	0.00E+00	Ci

C. Data Tables

The following tables provide the details of liquid releases:

Table IV-A Summation of all Releases
Table IV-B Liquid Effluents
Table IV-C Lower Limits of Detection

TABLE IV-A
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT - 1991
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

		UNITS	3RD QUARTER	4TH QUARTER
A.	FISSION AND ACTIVATION PRODUCTS			
	1. Total Release	Ci	6.08E-02	5.11E-02
	2. Estimated Total Error	%	2.00E+01	2.00E+01
	3. Average Diluted Concentration	µCi/ml	2.26E-10	1.96E-10
B.	TRITIUM			
	1. Total Release	Ci	5.86E+01	1.09E+02
	2. Estimated Total Error	%	1.00E+01	1.00E+01
	3. Average Diluted Concentration	µCi/ml	2.18E-07	4.18E-07
C.	DISSOLVED AND ENTRAINED GASES			
	1. Total Release	Ci	9.56E-03	1.14E-02
	2. Estimated Total Error	%	2.00E+01	2.00E+01
	3. Average Diluted Concentration	µCi/ml	3.56E-11	4.38E-11
	4. Percent of Applicable Limit	%	1.78E-05	2.19E-05
D.	GROSS ALPHA RADIOACTIVITY			
	1. Total Release	Ci	<LLD	<LLD
	2. Estimated Total Error	%	6.00E+01	6.00E+01
E.	VOLUME OF WASTE RELEASED	Liters	8.12E+05	6.43E+05
F.	VOLUME OF DILUTION WATER	Liters	2.69E+11	2.61E+11
G.	PERCENT OF 10CFR50, APPENDIX I			
	Quarterly Limit			
	Organ GI-LLI	%	5.03E-02	NA
	Organ LIVER	%	NA	2.42E-02
	Total Body	%	1.02E-01	5.34E-02
	Annual Limit			
	Organ GI-LLI	%	4.44E-01*	4.52E-01*
	Total Body	%	7.44E-01*	7.71E-01*

*Cumulative total for the year-to-date using the methodology in the ODCM.

TABLE IV-B
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT - 1991
LIQUID EFFLUENTS - CONTINUOUS MODE AND BATCH MODE RELEASES

			CONTINUOUS MODE		BATCH MODE	
1. PARTICULATES	UNITS	3RD QUARTER	4TH QUARTER	3RD QUARTER	4TH QUARTER
F-18	Ci	<LLD	<LLD	3.41E-06	<LLD
Cr-51	Ci	<LLD	<LLD	9.30E-05	<LLD
Mn-54	Ci	<LLD	<LLD	1.14E-03	2.70E-06
Fe-55	Ci	<LLD	<LLD	9.15E-04	4.74E-02
Co-57	Ci	<LLD	<LLD	5.63E-05	<LLD
Co-58	Ci	<LLD	<LLD	5.04E-03	1.48E-04
Co-60	Ci	<LLD	<LLD	3.64E-02	2.45E-03
Nb-95	Ci	<LLD	<LLD	9.66E-06	1.66E-05
Zr-97	Ci	<LLD	<LLD	4.74E-04	<LLD
Ru-106	Ci	<LLD	<LLD	1.02E-04	<LLD
Ag-110m	Ci	<LLD	<LLD	9.70E-03	?.81E-04
Sn-113	Ci	<LLD	<LLD	6.17E-05	<LLD
Sb-125	Ci	<LLD	<LLD	6.46E-03	.78E-04
Cs-134	Ci	<LLD	<LLD	1.66E-06	1.80E-06
Cs-137	Ci	<LLD	<LLD	3.04E-04	.22E-04
Total for Period	Ci	<LLD	<LLD	6.08E-02	5.11E-02
2. GASES					
Xe-133	Ci	<LLD	<LLD	9.43E-03	1.12E-02
Xe-133m	Ci	<LLD	<LLD	1.20E-04	1.62E-04
Xe-135	Ci	<LLD	<LLD	8.67E-06	2.29E-05
Total for Period	Ci	<LLD	<LLD	9.56E-03	1.14E-02

TABLE IV-C
TYPICAL LOWER LIMITS OF DETECTION FOR LIQUID EFFLUENTS

NUCLIDE	LLD (μCi/cc)
H-3	1.00E-05
F-18	1.61E-07
Cr-51	9.91E-08
Mn-54	5.00E-07
Fe-55	1.00E-06
Co-57	6.32E-09
Co-58	5.00E-07
Fe-59	5.00E-07
Co-60	5.00E-07
Zn-65	5.00E-07
Sr-89	5.00E-08
Sr-90	5.00E-08
Nb-95	2.21E-08
Zr-95	3.97E-08
Zr-97	2.00E-07
Mo-99	5.00E-07
Tc-99m	1.54E-08
Ru-106	1.84E-07
Ag-110m	2.01E-08
Sn-113	1.81E-08
Sb-125	4.33E-08
I-131	1.00E-06
Xe-133	1.00E-05
Xe-133m	1.00E-05
Cs-134	5.00E-07
Xe-135	1.00E-05
Cs-137	5.00E-07
Ba-140	6.72E-08
La-140	5.27E-08
Ce-141	5.00E-07
Ce-144	5.00E-07
Gross Alpha	1.00E-07

V. SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
REPORT TIME PERIOD JULY 1 THROUGH DECEMBER 31, 1991

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

WASTE CLASS A

Type of Waste	Unit	6-Month Period	Est. Total Error (%)	Solid. Agent	Cont. Type	Form	No. Ship.
a. Spent resins, filter sludges, evaporator bottoms, etc	m^3 Ci	8.47E+00 9.43E+00	2.00E+01 2.00E+01	NA	HIC	Dewatered Resin	2
b. Dry compressible waste, contaminated equip, etc	m^3 Ci	9.25E+00 3.74E-01	2.00E+01 2.00E+01	NA	STP	Compacted / Uncompacted	17
c. Irradiated components, control rods, etc	m^3 Ci	NA	NA	NA	NA	NA	NA
d. Other (describe)	m^3 Ci	NA	NA	NA	NA	NA	NA

HIC = High Integrity Container
STP = Strong Tight Package

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

		g	Ci
a.	C-14	2.47E+00	2.33E-01
	Fe-55	4.39E+01	4.14E+00
	Co-58	2.30E+00	2.17E-01
	Co-60	3.58E+01	3.38E+00
	Ni-63	8.02E+00	7.57E-01
	Sb-125	1.88E+00	1.77E-01
	* Others	5.62E+00	5.30E-01
b.	Cr-51	4.14E+00	1.55E-02
	Fe-55	6.74E+01	2.52E-01
	Co-58	5.83E+00	2.18E-02
	Co-60	1.30E+01	4.85E-02
	Ni-63	8.26E+00	3.09E-02
	Nb-95	1.39E+00	5.20E-03
	I-129	3.23E-02	1.21E-04
	** Others	3.23E-02	1.21E-04

* Others include: H-3, Mn-54, Tc-99, I-129, Cs-134, Cs-137, Ce-144, Pu-238, Pu-239, Pu-240, Am-241, Pu-241, Cm-243, Cm-244

** Others include: C-14, Tc-99

Total Curie Quantity and Principle Radionuclides were determined by Estimate.

3. Solid Waste Disposition

Number of Shipments 19
Mode of Transportation Sole Use Vehicle
Destination Barnwell, S.C.

V. SOLID WASTE AND IRRADIATED FUEL SHIPMENTS (continued)

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

WASTE CLASS B

Type of Waste	Unit	6-Month Period	Est. Total Error (%)	Solid. Agent	Cont. Type	Form	No. Ship.
a. Spent resins, filter sludges, evaporator bottoms, etc	m^3 Ci	3.85E+00 6.01E+01	2.00E+01 2.00E+01	NA	HIC	Dewatered Resin	1
b. Dry compressible waste, contaminated equip, etc	m^3 Ci	NA	NA	NA	NA	NA	NA
c. Irradiated components, control rods, etc	m^3 Ci	2.16E+00 2.11E+01	2.00E+01 2.00E+01	NA	Metal Liner	Irradiated Components	1
d. Other (describe)	m^3 Ci	NA	NA	NA	NA	NA	NA

STP - Strong Tight Package

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

		%	Ci
a.	Mn-54	2.23E+00	1.34E+00
	Fe-55	1.39E+01	8.38E+00
	Co-60	3.18E+01	1.91E+01
	Ni-63	3.01E+01	1.81E+01
	Cs-134	4.61E+00	2.77E+00
	Cs-137	1.62E+01	9.77E+00
	* Others	1.13E+00	6.77E-01
b.	NA	NA	NA
c.	Ci-51	1.94E-01	4.10E-02
	Mn-54	1.26E+00	2.65E-01
	Fe-55	7.73E+01	1.63E+01
	Co-58	4.41E-01	9.30E-02
	Co-60	1.41E+01	2.98E+00
	Ni-63	6.64E+00	1.40E+00
	** Others	1.01E-01	2.14E-02

* Others include: H-3, C-14, Co-58, Sr-90, Tc-99, I-129, Eu-154, Eu-155, Pu-238, Pu-239, Pu-240, Am-241, Cm-243, Cm-244

** Others include: H-3, C-14, Fe-59, Ni-59, Tc-99, Sr-90, I-129, Cs-137, Pu-241, TRU's

Total Curie Quantity and Principle Radionuclides were determined by Estimate.

3. Solid Waste Disposition

Number of Shipments 2
Mode of Transportation Sole Use Vehicle
Destination Barnwell, S.C.

C. IRRADIATED FUEL SHIPMENTS (Non-burial)
Number of Shipments 6
Mode of Transportation Sole Use Rail
Destination C.P. & L., Shearon Harris Nuclear Project

VI. ANNUAL GASEOUS DOSE ASSESSMENTS

A. Population Distribution

The population distribution was taken from the Updated FSAR 2.1.3 based on the 1980 U.S. Bureau of the Census data projected for the year 1986.

B. Food Production Distribution

Food yields of agricultural commodities were calculated with the aid of factors published by the USDA[1]. The input parameters for commodities were based on a demographic study performed in September 1987 by the Operations Training and Technical Services Department at the Shearon Harris Energy and Environmental Center.

C. Food Production Totals

The total quantity of vegetable products within a 50 mile radius of the Robinson Plant is 1.793E+08 kilograms per year.

The total quantity of meat and egg production within a 50 mile radius of the Plant is 9.45E+07 kilograms per year.

The total quantity of milk production within a 50 mile radius of the Plant is 3.56E+07 liters per year.

D. Source Terms and Meteorological Inputs

The annual source terms were segregated by modes of release (mixed mode batch, mixed mode continuous, ground level continuous, and ground level batch) for dose calculations.

The concurrent meteorology calculations were performed using the XOQDOQ program with open terrain/recirculation factors (derived from 1978 Dames and Moore study) to compliment the above modes of releases. The mixed mode batch release meteorology used the appropriate X/Q probability level to adjust for more adverse diffusion conditions since batch releases are not random.

The dissolved and entrained noble gas source terms of liquid effluents were included with the gaseous source term of ground level continuous airborne effluents for dose assessments.

E. Maximum Individual Doses

To demonstrate conformance with 10CFR50, Appendix I, doses were calculated for all sectors for the hypothetical maximum individual at the site boundary, the hypothetical maximum onsite member of the public and the true offsite maximum individual with nearest resident, garden and meat pathways. The doses from the cow/goat-milk-man pathways were excluded since there is no known milk production within a five mile radius of the H. B. Robinson site based on 1985 through 1991 land use census reports.

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[1]USDA:ERS, "Conversion Factors and Weights and Measures for Agricultural Commodities and Their Products," Statistical Bulletin No. 362 (June 1963).

The Hypothetical Maximum Individual at the site boundary (SSE Sector) used for Technical Specification compliance has the highest doses (Table VI-A). The true offsite maximum individual doses are summarized in Table VI-B. The onsite hypothetical maximum member of the public doses are summarized in Table VI-C.

F. Integrated Population Doses

Since there is no known milk production within the five mile radius of the H. B. Robinson site, the milk productions, listed in Section C (Food Production Totals), were used beyond the five mile radius for the integrated population doses. The offsite annual integrated population doses are summarized in Table VI-D.

G. Onsite Integrated and Recreational Population Doses for 1991.

1. The assessment of the radiation doses from radioactive gaseous effluents to members of the public due to their activities inside the site boundary are listed in Table VI-E.

The following assumptions/site specific data were used to assess the onsite total integrated and recreational population doses from gaseous effluents during 1991.

ESTIMATED SITE USAGE DATA

ACTIVITY	LOCATION	USAGE
Spouses in Parking Lot	East Lot	6 people/day, 15 min./day, 240 days/yr
	West Lot	2 people/day, 15 min./day, 240 days/yr
Picnicking	Picnic Area	10 picnics/yr, 100 people/picnic, 4 hrs/picnic
Occupational	Darlington Co. Plant	17 employees, 240 days/yr, 8 hrs/day
	Visitor Ctr.	1 employee, 240 days/yr, 8 hrs/day
Visits	Visitor Ctr.	4000 visitors, 2 hr/visit
Swimming	Lake Robinson	1000 people/day, 180 days/yr, 2 hrs/day
Boating	Lake Robinson	100 boats/day, 4 people/boat, 365 days/yr
Shoreline	Lake Robinson	1000 people/day, 180 days/yr, 4 hrs/day
Fishing	Lake Robinson	14 people/day, 365 days/yr, 6 hrs/day

2. The following exposure pathways were used for the dose assessment based on the activities listed below:

ACTIVITY	EXPOSURE PATHWAY
Spouses in Parking Lot	Ground Plane, Inhalation, Plume
Picnicking	Ground Plane, Inhalation, Plume
Occupational	Ground Plane, Inhalation, Plume
Visits	Ground Plane, Inhalation, Plume
Swimming	Inhalation, Plume
Boating	Inhalation, Plume
Shoreline	Ground Plane, Inhalation, Plume
Fishing	Inhalation, Plume

3. The assumptions below were used for the dose assessment of the maximum onsite individual.

   a. The maximum onsite individual is an adult.
   b. The exposure pathways are the same as in 2 above.
   c. The site usage assumptions are as follows:

ACTIVITY OR LOCATION	DISTANCE METERS	SECTOR	TOTAL HOURS
Swimming	803	E	6.80E+01
	803	ENE	6.80E+01
	803	NE	6.80E+01
	2414	NNE	6.80E+01
	3219	N	6.80E+01
Boating	803	E	3.80E+01
	803	ENE	3.80E+01
	803	NE	3.80E+01
	2414	NNE	3.80E+01
	3219	N	3.80E+01
Fishing	803	E	8.00E+01
	803	ENE	8.00E+01
	803	NE	8.00E+01
	2414	NNE	8.00E+01
	3219	N	8.00E+01
Shoreline	1303	ENE	1.70E+02
	2529	NE	1.70E+02
Visitor Center	302	S	2.00E+00
Darlington Co. Plant	1062	NNW	1.92E+03
Picnic Area	402	SE	4.00E+01
West Parking Lot	402	SW	6.00E+01
East Parking Lot	201	SE	6.00E+01

4. The following data was used in assessing integrated onsite dose.

LAKE ROBINSON

DISTANCE METERS	SECTOR	(TOTAL HRS)	(% LAKE SURFACE)	=	HOURS	PERSON-YRS
3219	N	1.25E+06	0.71	=	8.875E+05	101
2414	NNE	1.25E+06	0.13	=	1.625E+05	19
803	NE	1.25E+06	0.08	=	1.000E+05	11
803	ENE	1.25E+06	0.06	=	7.500E+04	9
803	E	1.25E+06	0.02	=	2.500E+04	3
			TOTAL	=	1.250E+06	143

OCCUPATIONAL

DISTANCE METERS	LOCATION	SECTOR	TOTAL HOURS	PERSON-YRS
1062	Darlington Co. Plant	NNW	3.26E+04	4
302	Visitor Center	S	1.92E+03	1

OTHER

DISTANCE METERS	LOCATION	SECTOR	TOTAL HOURS	PERSON-YRS
201	East Lot	SE	3.60E+02	0.1
402	West Lot	SW	1.20E+02	1
402	Picnic Area	SE	4.00E+03	0.9
302	Visitor Center	S	8.00E+03	1
2529	Easterlings/ Atkinsons Landing	NE	3.63E+05	42
1303	Johnson Landing	ENE	3.63E+05	41

H. DATA TABLES

The following tables provide the details of the Annual Gaseous Dose Assessments:

Table VI-A	Hypothetical Site Boundary Maximum Individual Doses for 1991
Table VI-B	True Offsite Maximum Individual Doses for 1991
Table VI-C	Onsite Hypothetical Maximum Individual Doses for 1991
Table VI-D	Offsite Annual Integrated Population Dose Summary for 1991
Table VI-E	Onsite Annual Integrated and Recreational Population Doses for 1991

TABLE VI-A

GASEOUS PATHWAY
HYPOTHETICAL SITE BOUNDARY MAXIMUM INDIVIDUAL DOSES FOR 1991
(MILLIREM)

ANNUAL BETA AIR DOSE = 3.33E-03 MILLIRADS
ANNUAL GAMMA AIR DOSE = 4.32E-03 MILLIRADS

SECTOR: SOUTH-SOUTHEAST
DISTANCE: 418.0 METERS

ADULT	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	2.87E-03	2.87E-03	2.87E-03	2.87E-03	2.87E-03	2.87E-03	2.89E-03	5.81E-03
GROUND PLANE	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	4.16E-02
INHALATION	3.45E-03	3.72E-03	8.54E-06	3.45E-03	3.43E-03	3.43E-03	9.56E-03	3.43E-03
VEGETATION	6.91E-03	1.10E-02	1.79E-04	6.69E-03	6.27E-03	6.19E-03	6.21E-03	6.19E-03
MEAT & POULTRY	1.06E-03	2.26E-03	1.53E-05	9.83E-04	8.96E-04	8.89E-04	8.92E-04	8.89E-04
TOTAL	4.97E-02	5.52E-02	3.85E-02	4.94E-02	4.89E-02	4.88E-02	5.50E-02	5.80E-02

TEENAGER	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	2.87E-03	2.87E-03	2.87E-03	2.87E-03	2.87E-03	2.87E-03	2.89E-03	5.81E-03
GROUND PLANE	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	4.16E-02
INHALATION	3.48E-03	3.72E-03	1.20E-05	3.48E-03	3.46E-03	3.45E-03	1.24E-02	3.45E-03
VEGETATION	8.06E-03	1.20E-02	2.86E-04	7.84E-03	7.21E-03	7.08E-03	7.13E-03	7.08E-03
MEAT & POULTRY	6.64E-04	1.27E-03	1.27E-05	6.04E-04	5.36E-04	5.30E-04	5.33E-04	5.30E-04
TOTAL	5.05E-02	5.53E-02	3.86E-02	5.02E-02	4.95E-02	4.93E-02	5.84E-02	5.85E-02

TABLE VI-A
(Continued)

GASEOUS PATHWAY
HYPOTHETICAL SITE BOUNDARY MAXIMUM INDIVIDUAL DOSES FOR 1991
(MILLIREM)

CHILD	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	2.87E-03	2.87E-03	2.87E-03	2.87E-03	2.87E-03	2.87E-03	2.89E-03	5.81E-03
GROUND PLANE	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	4.16E-02
INHALATION	3.08E-03	3.15E-03	1.62E-05	3.08E-03	3.06E-03	3.05E-03	1.03E-02	3.05E-03
VEGETATION	1.28E-02	1.42E-02	6.74E-04	1.22E-02	1.12E-02	1.10E-02	1.11E-02	1.10E-02
MEAT & POULTRY	8.24E-04	1.01E-03	2.34E-05	7.31E-04	6.48E-04	6.41E-04	6.43E-04	6.41E-04
TOTAL	5.49E-02	5.66E-02	3.90E-02	5.43E-02	5.32E-02	5.29E-02	6.03E-02	6.21E-02

INFANT	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	2.87E-03	2.87E-03	2.87E-03	2.87E-03	2.87E-03	2.87E-03	2.89E-03	5.81E-03
GROUND PLANE	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	4.16E-02
INHALATION	1.77E-03	1.79E-03	9.80E-06	1.77E-03	1.76E-03	1.75E-03	6.39E-03	1.75E-03
TOTAL	4.00E-02	4.01E-02	3.83E-02	4.00E-02	4.00E-02	4.00E-02	4.47E-02	4.92E-02

TABLE VI-B

GASEOUS PATHWAY
TRUE OFFSITE MAXIMUM INDIVIDUAL DOSES FOR 1991
(MILLIREM)

ANNUAL BETA AIR DOSE = 3.16E-03 MILLIRADS
ANNUAL GAMMA AIR DOSE = 4.10E-03 MILLIRADS

SECTOR: SOUTH-SOUTHEAST
DISTANCE: 482.8 METERS

ADULT	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.74E-03	5.52E-03
GROUND PLANE	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	3.30E-02
INHALATION	3.28E-03	3.49E-03	9.49E-06	3.28E-03	3.27E-03	3.27E-03	7.92E-03	3.27E-03
TOTAL	3.41E-02	3.43E-02	3.08E-02	3.41E-02	3.41E-02	3.41E-02	3.87E-02	4.18E-02

TEENAGER	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.74E-	5.52E-03
GROUND PLANE	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	3.30E-02
INHALATION	3.31E-03	3.49E-03	9.09E-06	3.31E-03	3.29E-03	3.29E-03	1.01E-02	3.29E-03
TOTAL	3.4 -02	3.43E-02	3.08E-02	3.41E-02	3.41E-02	3.41E-02	4.09E-02	4.18E-02

TABLE VI-B
(Continued)

GASEOUS PATHWAY
TRUE OFFSITE MAXIMUM INDIVIDUAL DOSES FOR 1991
(MILLIREM)

CHILD	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.74E-03	5.52E-03
GROUND PLANE	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	3.30E-02
INHALATION	2.93E-03	2.98E-03	1.23E-05	2.93E-03	2.91E-03	2.91E-03	8.42E-03	2.91E-03
TOTAL	3.37E-02	3.38E-02	3.08E-02	3.37E-02	3.37E-02	3.37E-02	3.92E-02	4.14E-02

INFANT	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.74E-03	5.52E-03
GROUND PLANE	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	3.30E-02
INHALATION	1.68E-03	1.70E-03	7.44E-06	1.69E-03	1.67E-03	1.67E-03	5.19E-03	1.67E-03
TOTAL	3.25E-02	3.25E-02	3.08E-02	3.25E-02	3.25E-02	3.25E-02	3.60E-02	4.02E-02

TABLE VI-C

GASEOUS PATHWAY
ONSITE HYPOTHETICAL MAXIMUM INDIVIDUAL DOSES FOR 1991
(MILLIREM)

ANNUAL BETA AIR DOSE = 2.03E-04 MILLIRADS
ANNUAL GAMMA AIR DOSE = 2.98E-04 MILLIRADS

SECTOR: NORTH-NORTHWEST
DISTANCE: 1062.0 METERS

ADULT	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.98E-04	1.98E-04	1.98E-04	1.98E-04	1.98E-04	1.98E-04	1.99E-04	3.84E-04
GROUND PLANE	5.17E-04	5.17E-04	5.17E-04	5.17E-04	5.17E-04	5.17E-04	5.17E-04	6.09E-04
INHALATION	1.96E-04	1.98E-04	6.68E-08	1.96E-04	1.96E-04	1.96E-04	2.43E-04	1.96E-04
TOTAL	9.12E-04	9.14E-04	7.17E-04	9.12E-04	9.12E-04	9.12E-04	9.60E-04	1.19E-03

TABLE VI-D

GASEOUS PATHWAY
OFFSITE ANNUAL INTEGRATED POPULATION DOSE SUMMARY FOR 1991
(PERSON-REM)

	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	4.11E-04	4.11E-04	4.10E-04	4.11E-04	4.11E-04	4.11E-04	4.27E-04	1.87E-03
GROUND PLANE	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	2.08E-03
INHALATION	3.17E-03	3.18E-03	5.54E-07	3.17E-03	3.17E-03	3.17E-03	3.52E-03	3.17E-03
VEGETATION	2.73E-03	2.82E-03	6.79E-06	2.73E-03	2.71E-03	2.71E-03	2.71E-03	2.71E-03
COW MILK	2.64E-04	2.65E-04	1.23E-06	2.65E-04	2.64E-04	2.63E-04	2.64E-04	2.63E-04
MEAT & POU' NY	5.81E-04	6.27E-04	8.24E-07	5.77E-04	5.73E-04	5.72E-04	5.72E-04	5.72E-04
TOTAL	8.92E-03	9.06E-03	2.18E-03	8.91E-03	8.89E-03	8.89E-03	9.26E-03	1.07E-02

TABLE VI-E

GASEOUS PATHWAY
ONSITE ANNUAL INTEGRATED AND RECREATIONAL POPULATION DOSES FOR 1991
(PERSON-REM)

	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	6.74E-05	6.74E-05	6.74E-05	6.74E-05	6.74E-05	6.74E-05	6.81E-05	1.66E-04
GROUND PLANE	8.20E-05	8.20E-05	8.20E-05	8.20E-05	8.20E-05	8.20E-05	8.20E-05	9.65E-05
INHALATION	1.31E-04	1.31E-04	2.27E-08	1.31E-04	1.31E-04	1.31E-04	1.45E-04	1.31E-04
TOTAL	2.80E-04	2.81E-04	1.49E-04	2.80E-04	2.80E-04	2.80E-04	2.95E-04	3.93E-04

VII. ANNUAL LIQUID DOSE ASSESSMENTS

A. Environmental Inputs and Assumptions

In this section, parameters which are used in making dose calculations to individuals and populations are described. Extensive use has been made of the parameters outlined in NRC Regulatory Guide 1.109, but these have been supplemented, particularly in the case of population doses, with the site specific information. In the calculation of population doses, considerable reliance has been placed on the selection of clearly conservative assumptions.

1. Mixing Ratios

For all calculations, the mixing ratios used to determine concentrations of isotopes at the point of exposure have been conservatively estimated. For calculation of doses to individuals, the mixing ratio of 0.835 was used to account for dilution by the discharge flow, initial dilution in the lake, and accumulation in the lake. For calculation of population doses, a mixing ratio of 0.817 was used. The method of estimating concentrations of radionuclides in Lake Robinson and downstream of the lake are given below.

Lake Robinson is supplied by surface runoff in several creeks and discharges as a continuance of Black Creek. Condenser cooling water is drawn from the lower end of the lake and is returned near the upper end. Liquid waste enters the lake via the condenser cooling water; since the cooling water flow exceeds the flow through the lake, complete mixing may be assumed.

Assuming zero initial concentration and complete mixing, the time dependent concentration of each radionuclide in the lake due to Plant releases will be

$$C_1 = \frac{Q(1-e^{-\Lambda t})}{V\Lambda}$$

where: C_1 = Average concentration of each radionuclide in the lake (Ci/m^3)
Q = Rate of addition of each radionuclide into cooling water (Ci/yr)
V = Volume of water in lake (m^3)
Λ = Effective loss rate constant of each radionuclide from the lake
t = Time in years

After equilibrium is reached, the average concentration of each radionuclide in the lake will be

$$C_1 = \frac{Q}{V\Lambda}$$

Assuming removal of radioactivity from the lake by outflow, but not by radioactive decay, the effective loss rate constant is

$$\Lambda = \frac{f_2}{V}$$

where: f_2 = average volumetric flow from lake (m^3/yr)

After equilibrium is reached, the concentration of each radionuclide in Lake Robinson is represented by

$$C_1 = \frac{Q}{V\Lambda} = \frac{Q}{f_2}$$

The concentration of each radionuclide in the discharge canal is determined by:

$$Cd = C_1 + Ca = C_1 + \frac{Q}{f_1} = \frac{Q}{f_2} + \frac{Q}{f_1}$$

where:
- C_d is the concentration in the discharge canal (Ci/m^3)
- C_1 is the equilibrium concentration in the lake (Ci/m_3)
- C_a is the concentration added to the water while passing through the plant - Q/f_1 (Ci/m^3)
- f_1 is the cooling water flow rate (m^3/yr)

Assuming each gallon of water from discharge canal is diluted with 9 gallons of lake water, the concentration at the edge of the mixing zone C_m is

$$C_m = (C_d + 9C_1) \div 10$$

$$= \left(\frac{Q}{f_1} + \frac{Q}{f_2} + \frac{9Q}{f_2}\right) \div 10$$

$$= \frac{Q}{f_2} + \frac{Q}{10f_1}$$

The mixing ratio at the edge of the mixing zone M_m is the ratio:

$$M_m = \frac{\textit{concentration at edge of mixing zone}}{\textit{concentration in discharge canal}} = \frac{C_m}{C_d}$$

$$= \frac{\frac{Q}{f_2} + \frac{Q}{10f_1}}{\frac{Q}{f_2} + \frac{Q}{f_1}}$$

$$= \frac{10f_1 + f_2}{10(f_1 + f_2)}$$

For Robinson f_1 = 9.59E8 m^3/yr
and f_2 = 2.15E8 m^3/yr
thus M_m = 0.835

The mixing ratio for the lake in general M_1 is the ratio

$$\frac{\textit{Equilibrium lake concentration}}{\textit{Concentration in disacharge canal}} = \frac{C_1}{C_d}$$

$$= \frac{\frac{Q}{f_2}}{\frac{Q}{f_1} + \frac{Q}{f_2}} = \frac{f_1}{f_1 + f_2}$$

For Robinson M_1 = 0.817

The validity of ignoring radioactive decay was checked by determining which isotopes were the most significant dose contributors. They were Co^{60}, Cs^{134}, and Cs^{137}. All of these isotopes have decay constants which are at least 12 times smaller than the loss rate constant of the lake

$$\frac{f_2}{V} = \frac{2.15E8 m^3/yr}{5.06E7 m^3} = 4.24 \text{ per year.}$$

Thus, ignoring normal decay should have little effect.

For Auburndale Plantation the equation for mixing ratio is $e^{-.02}$ (distance downstream [Km]). Equation was derived from EPA-520/5-76-005 study.

2. Potable Water Use

There is no potable water use of any water resource which is affected by the Robinson liquid discharge. Therefore, no pathways involving potable water are evaluated.

3. Irrigated Foods

Located ten miles east of Robinson Site, the Auburndale Plantation uses water from Black Creek for irrigating during dry seasons. The following are conservative assumptions that were used for dose calculations:

a. Meat (beef)

1. No drinking water for cattle from creek
2. Transit time = 1.00E+01 hours
3. Irrigation rate = 1.00E+02 liter/m^2/month
4. Non-irrigated feed fraction = 9.00E-01
5. Total 50 mile production = 1.96E+08 kg/yr
6. Total meat irrigated = 1.00E+06 kg/yr
7. Food process time = 4.80E+00 hours

b. Produce

1. Irrigation rate = 1.00E+02 liters/m^2/month
2. Total 50 mile production = 6.10E+06 kg/yr
3. Total crop irrigation = 4.00E+03 kg/yr

c. Leafy Vegetables

1. Irrigation rate = 1.00E+02 liter/m^2/month
2. Total 50 mile production = 2.59E+08 kg/yr
3. Total crop irrigated = 2.00E+03 kg/yr

4. Other Pathways

No other pathways which would be likely to produce 10% of the dose calculated by these pathways described above were identified for the liquid discharge for H. B. Robinson Unit No. 2.

B. Recreational Activities

1. Seasonal Population Variations

Within the 10-mile area surrounding the Plant, there are no major seasonal population variations. During the entire year, Lake Robinson is used for fishing, boating, picnicking, and other recreational activities. Based on a 1975 creek and recreational survey, the daily summer peak transient population is approximately 550-650 people. This figure would include people who are boating on Lake Robinson, as well as those using shore facilities. Also, during the winter months, Lake Prestwood, located on the north side of Hartsville, is utilized by local residents for recreation. Lake Prestwood is a comparatively small body of water, and it is estimated that 50-100 people would be using the area on a peak day. Based on this survey, the seasonal variation did not warrant any special dose assessments.

2. Water Recreation for Maximum Individual Doses

Because suitable statistics are unavailable, assumptions were made for purposes of assessing doses from each of the swimming, boating, and shoreline recreational pathways. These assumptions are summarized as follows:

Boating

Adult - 120 days/yr x 2 hrs/day = 240 hrs/yr
Teen - 180 days/yr x 2 hrs/day = 360 hrs/yr
Child - 90 days/yr x 2 hrs/day = 180 hrs/yr

Swimming

Adult - 90 days/yr x 2 hrs/day = 180 hrs/yr
Teen - 180 days/yr x 2 hrs/day = 360 hrs/yr
Child - 90 days/yr x 3 hrs/day = 270 hrs/yr

Fresh water fish and shoreline exposure: default to NRC Regulatory Guide 1.109 values.

3. Population Doses

The following assumptions/site specifics are listed:

Water Recreation Data

Activity	Location	Usage
Swimming	Lake Robinson	1000 people/day, 180 days/yr, 2 hr/day
	Lake Prestwood	100 people/day 180 days/yr, 2 hr/day
	Black Creek	10 people/mile, 50 miles, 180 days/yr, 2 hr/day
Boating	Lake Robinson	100 boats/day, 4 people/boat, 365 days/yr, 2 hr/day
	Lake Prestwood	10 boats/day, 4 people/boat, 365 days/yr, 2 hr/day
	Black Creek	1 boat/day, 2 people/boat, 180 days/yr, 5.6 hrs/day
Shoreline	Lake Robinson	1000 people/day, 180 days/yr, 4 hr/day
	Lake Prestwood	100 people/day, 180 days/yr, 4 hr/day
	Black Creek	10 people/mile, 50 miles, 365 days/yr, 4 hr/day

4. Aquatic Foods (Fish)

There are no shellfish or aquatic plants harvested in Lake Robinson or within 50 miles downstream of the site. Assuming approximately 8000 fish are taken from the lake each year and an edible yield of 1 kg per fish, this amounts to 8000 kg per year. An additional 800 kg per year are assumed to come from Lake Prestwood and another 8000 kg from the Black Creek downstream of Lake Robinson.

C. Maximum Individual Dose

To demonstrate conformance of 10CFR50, Appendix I, doses were calculated for all the age groups for the total body and all organs using the fish, shoreline, swimming, and boating pathways. The hypothetical maximum individual doses for the liquid pathway was calculated to show compliance with Technical Specifications. These doses were onsite at the end of the discharge canal in the North sector and are summarized in Table VII-A.

D. Onsite Integrated Population Doses

The assessment of the radiation doses from radioactive liquid effluents to members of the public due to their activities inside the site boundary are listed in Table VII-B.

E. Annual Integrated Population Doses

The assessment of the annual radiation doses from radioactive liquid effluents within the 50 mile radius of the H. B. Robinson site (inclusive of the onsite doses) are summarized in Table VII-C.

F. Data Tables

The following tables provide the details of the Annual Liquid Dose Assessment:

Table VII-A	Hypothetical Maximum Individual Doses for 1991
Table VII-B	Lake Robinson (onsite) Annual Integrated and Recreational Population Doses for 1991
Table VII-C	Annual Integrated Population Dose Summary for 1991

TABLE VII-A

LIQUID PATHWAY
HYPOTHETICAL MAXIMUM INDIVIDUAL DOSES FOR 1991
(MILLIREM)

ADULT DOSES

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	0.00E+00	8.16E-03	1.18E-02	8.07E-03	3.46E-04	4.08E-03	1.72E-03	8.81E-03
SHORELINE	7.90E-04	6.73E-04	6.73E-04	6.73E-04	6.73E-04	6.73E-04	6.73E-04	6.73E-04
SWIMMING	0.00E+00	7.66E-05	7.66E-05	7.66E-05	7.66E-05	7.66E-05	7.66E-05	7.66E-05
BOATING	0.00E+00	5.11E-05	5.11E-05	5.11E-05	5.11E-05	5.11E-05	5.11E-05	5.11E-05
TOTAL	7.90E-04	8.96E-03	1.26E-02	8.87E-03	1.15E-03	4.88E-03	2.52E-03	9.61E-03

	USAGE (KG/YR, HR/YR)	DILUTION	TIME(HR)	
FISH	21.0	1.2	24.0	SHORE WIDTH FACTOR = 0.3
SHORELINE	12.0	1.2	0.0	
SWIMMING	180.0	1.2	0.0	
BOATING	240.0	1.2	0.0	

TEENAGER DOSES

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	0.00E+00	8.71E-03	1.22E-02	4.75E-03	2.66E-04	4.15E-03	1.94E-03	6.22E-03
SHORELINE	4.41E-03	3.76E-03	3.76E-03	3.76E-03	3.76E-03	3.76E-03	3.76E-03	3.76E-03
SWIMMING	0.00E+00	1.53E-04	1.53E-04	1.53E-04	1.53E-04	1.53E-04	1.53E-04	1.53E-04
BOATING	0.00E+00	7.66E-05	7.66E-05	7.66E-05	7.66E-05	7.66E-05	7.66E-05	7.66E-05
TOTAL	4.41E-03	1.27E-02	1.61E-02	8.74E-03	4.26E-03	8.14E-03	5.93E-03	1.02E-02

	USAGE (KG/YR, HR/YR)	DILUTION	TIME(HR)	
FISH	16.0	1.2	24.0	SHORE WIDTH FACTOR = 0.3
SHORELINE	67.0	1.2	0.0	
SWIMMING	360.0	1.2	0.0	
BOATING	360.0	1.2	0.0	

TABLE VII-A
(Continued)

LIQUID PATHWAY
HYPOTHETICAL MAXIMUM INDIVIDUAL DOSES FOR 1991
(MILLIREM)

CHILD DOSES

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	0.00E+00	1.10E-02	1.09E-02	2.24E-03	2.20E-04	3.57E-03	1.57E-03	2.33E-03
SHORELINE	9.21E-04	7.86E-04	7.86E-04	7.86E-04	7.86E-04	7.86E-04	7.86E-04	7.86E-04
SWIMMING	0.00E+00	1.15E-04	1.15E-04	1.15E-04	1.15E-04	1.15E-04	1.15E-04	1.15E-04
BOATING	0.00E+00	3.83E-05	3.83E-05	3.83E-05	3.83E-05	3.83E-05	3.83E-05	3.83E-05
TOTAL	9.21E-04	1.19E-02	1.19E-02	3.18E-03	1.16E-03	4.51E-03	2.51E-03	3.27E-03

	USAGE (KG/YR, HR/YR)	DILUTION	TIME(HR)
FISH	6.9	1.2	24.0
SHORELINE	14.0	1.2	0.0
SWIMMING	270.0	1.2	0.0
BOATING	180.0	1.2	0.0

SHORE WIDTH FACTOR = 0.3

TABLE VII-B

LIQUID PATHWAY
LAKE ROBINSON (ONSITE) ANNUAL INTEGRATED AND RECREATIONAL POPULATION DOSES FOR 1991
(PERSON-REM)

PATHWAY	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI	SKIN
FISH	3.87E-03	5.18E-03	2.96E-03	1.40E-04	1.78E-03	7.63E-04	2.84E-03	0.00E+00
SHORELINE	4.04E-02	4.04E-02	4.04E-02	4.04E-02	4.04E-02	4.04E-02	4.04E-02	4.74E-02
SWIMMING	1.53E-04	1.53E-04	1.53E-04	1.53E-04	1.53E-04	1.53E-04	1.53E-04	0.00E+00
BOATING	6.22E-05	6.22E-05	6.22E-05	6.22E-05	6.22E-05	6.22E-05	6.22E-05	0.00E+00
TOTAL	4.45E-02	4.60E-02	4.37E-02	4.09E-02	4.25E-02	4.15E-02	4.38E-02	4.74E-02

TABLE VII-C

LIQUID PATHWAY
ANNUAL INTEGRATED POPULATION DOSE SUMMARY FOR 1991
(PERSON-REM)

PATHWAY	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI	SKIN
FISH	8.04E-03	1.08E-02	6.15E-03	2.91E-04	3.69E-03	1.58E-03	5.89E-03	0 00E+00
SHORELINE	7.11E-02	7.11E-02	7.11E-02	7.11E-02	7.11E-02	7.11E-02	7.11E-02	8.34E-02
SWIMMING	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	0.00E+00
BOATING	6.87E-05	6.87E-05	6.87E-05	6.87E-05	6.87E-05	6.87E-05	6.87E-05	0.00E+00
IRRI. VEG.	1.78E-05	9.95E-05	9.77E-05	8.10E-05	8.45E-05	8.64E-05	1.76E-04	0.00E+00
IRRI. LEAFY VEG.	3.32E-06	2.10E-05	2.09E-05	1.72E-05	1.79E-05	1.83E-05	4.35E-05	0.00E+00
IRRI. MEAT	1.42E-05	2.74E-05	2.46E-05	1.49E-05	1.59E-05	1.99E-05	9.25E-05	0.00E+00
TOTAL	7.95E-02	8.23E-02	7.77E-02	7.18E-02	7.52E-02	7.31E-02	7.76E-02	8.34E-02

VIII. 40CFR190 DOSE CONFORMANCE

The direct radiation assessment to the most likely exposed member of the public is reported in the Annual Radiological Environmental Operating Report. The results of the assessment demonstrate no measurable affect above background from Plant Operations. Since no 10CFR50 Appendix I limits have been exceeded and the evaluation of the Independent Spent Fuel Storage Installation (refer to Addendum I) indicates only a small fraction of the total dose to the environs, this demonstrates conformance with 40CFR190, Environmental Radiation Protection Standards for Nuclear Power Operation.

IX. METEOROLOGICAL DATA

A. Continuous Release Diffusion Analysis

Table IX-A presents the number and frequency of wind direction occurrences by wind speed class as recorded at the onsite meteorological system during the period January 1 through December 31, 1991.

The frequencies are presented as a percent of total occurrences for each stability class as well as a summary for all classes for the lower (10 meter) sensor elevation.

Pertinent information available from the tables is as follows:

1. Stability

Percent occurrence Pasquill Stability categories based on lower level (10m) wind distribution:

A	B	C	D	E	F	G
2.29	3.11	4.63	35.97	31.49	10.49	12 02

2. Wind Speed — 10 Meter

Average Speed (mph)	4.6
Percent Calm	1.1
Percent Less than 3.5 mph	38.4

3. Wind Direction — 10 Meter

Prevailing	SSW
Percent Occurrence	10.2

4 Data Recovery — 10 Meter

Percent Good Hours	97.4

RNP GROUND CONTINIOUS 1991

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS A

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.000	0.000	0.[illegible]	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.000	0.023
3.35	0.047	0.012	0.[illegible]	0.164	0.094	0.117	0.164	0.047	0.012	0.023	0.012	0.000	0.012	0.047	0.023	0.000	0.844
5.59	0.117	0.000	0.141	0.176	0.000	0.000	0.047	0.035	0.129	0.129	0.117	0.070	0.059	0.129	0.117	0.082	1.348
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.012	0.000	0.000	0.012	0.012	0.012	0.070
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.16	0.01	0.21	0.34	0.09	0.13	0.21	0.08	0.14	0.18	0.14	0.07	0.07	0.20	0.15	0.09	2.29

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS B

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.000	0.000	0.000	0.012	0.000	0.012	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.000	0.047
3.35	0.141	0.059	0.047	0.141	0.164	0.[illegible]1	0.047	0.082	0.106	0.047	0.082	0.106	0.070	0.117	0.070	0.035	1.454
5.59	0.164	0.176	0.117	0.094	0.000	0.000	0.047	0.094	0.082	0.117	0.117	0.059	0.047	0.117	0.094	0.152	1.477
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.035	0.059	0.000	0.000	0.023	0.012	0.000	0.129
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.30	0.23	0.16	0.25	0.16	0.15	0.09	0.19	0.19	0.20	0.26	0.16	0.12	0.27	0.18	0.19	3.11

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS C

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.012	0.012	0.000	0.000	0.012	0.035	0.012	0.000	0.000	0.000	0.023	0.000	0.000	0.000	0.000	0.000	0.106
3.35	0.305	0.176	0.199	0.375	0.106	0.152	0.234	0.117	0.199	0.106	0.211	0.[illegible]	0.270	0.047	0.11[illegible]	0.082	2.873
5.59	0.152	0.258	0.234	0.047	0.012	0.000	0.023	0.059	0.106	0.223	0.106	0.117	0.[illegible]35	0.082	0.082	0.070	1.606
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.023	0.000	0.000	0.000	0.047
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.[illegible]	0.[illegible]	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.[illegible]	0.000
TOTAL	0.47	0.45	[illegible].43	0.42	0.1[illegible]	0.19	0.27	0.18	0.30	0.33	0.35	0.30	0.30	0.15	0.20	0.15	4.63

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS D

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.234	0.375	0.340	0.434	0.504	0.399	0.328	0.305	0.293	0.387	0.457	0.328	0.317	0.199	0.258	0.164	5.323
3.35	2.122	2.650	2.427	1.923	1.032	0.844	1.243	1.888	1.454	1.876	1.524	1.360	0.879	0.680	0.399	1.020	23.320
5.59	0.715	1.958	0.621	0.211	0.035	0.012	0.106	0.188	0.692	0.879	0.575	0.223	0.176	0.223	0.152	0.258	7.023
8.27	0.012	0.035	0.000	0.000	0.000	0.012	0.000	0.000	0.117	0.023	0.035	0.012	0.012	0.047	0.000	0.000	0.305
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	3.08	5.02	3.39	2.57	1.57	1.27	1.68	2.38	2.56	3.17	2.59	1.92	1.38	1.15	0.81	1.44	35.97

RNP GROUND CONTINUOUS 1991

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS E

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.005	0.006	0.007	0.005	0.004	0.004	0.002	0.002	0.002	0.047
1.56	0.481	0.457	0.539	0.575	0.422	0.223	0.387	1.208	1.747	1.981	1.301	0.879	0.903	0.786	0.551	0.657	13.096
3.35	0.997	1.501	1.477	0.903	0.363	0.305	0.328	1.219	2.298	1.981	1.114	0.786	0.446	0.352	0.762	1.313	16.145
5.59	0.164	0.387	0.117	0.023	0.000	0.023	0.047	0.106	0.399	0.281	0.129	0.117	0.012	0.000	0.059	0.281	2.146
8.27	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.012	0.012	0.000	0.023	0.000	0.000	0.000	0.000	0.000	0.059
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	1.64	2.36	2.14	1.50	0.79	0.55	0.76	2.55	4.46	4.25	2.57	1.79	1.36	1.14	1.37	2.25	31.49

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS F

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.012	0.006	0.006	0.002	0.001	0.001	0.001	0.009	0.020	0.022	0.018	0.019	0.012	0.011	0.012	0.026	0.177
1.56	0.539	0.293	0.246	0.094	0.070	0.070	0.070	0.434	0.915	1.032	0.797	0.856	0.563	0.492	0.539	1.196	8.207
3.35	0.070	0.035	0.035	0.059	0.012	0.000	0.012	0.035	0.129	0.070	0.129	0.117	0.012	0.106	0.352	0.844	2.017
5.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094	0.094
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.62	0.33	0.29	0.15	0.08	0.07	0.08	0.48	1.06	1.12	0.94	0.99	0.59	0.61	0.90	2.16	10.49

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS G

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.064	0.026	0.022	0.004	0.009	0.002	0.012	0.023	0.062	0.066	0.057	0.06	0.045	0.089	0.108	0.175	0.856
1.56	0.786	0.317	0.270	0.047	0.117	0.035	0.141	0.281	0.762	0.809	0.703	0.7	0.5	1.090	1.325	2.134	10.470
3.35	0.188	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.070	0.035	0.0	0.000	0.012	0.387	0.692
5.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.000	0.000	0.000	0.000
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	1.04	0.34	0.29	0.05	0.13	0.04	0.15	0.30	0.82	0.87	0.83	0.83	0.55	1.18	1.44	2.70	12.02

TOTAL HOURS CONSIDERED ARE 8529.

WIND MEASURED AT 11.0 METERS

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	7.3	8.7	6.9	5.3	3.0	2.4	3.3	6.2	9.5	10.1	7.7	6.1	4.8	4.7	5.1	9.0	100.0

IX. METEOROLOGICAL DATA

B. Mixed Mode Batch Release Diffusion Analysis

Table IX-B presents the number and frequency of wind direction occurrences by wind speed class as recorded at the onsite metecrological system during mixed mode batch releases for the period January 1 through December 31, 1991.

The frequencies are presented as a percent of total occurrences for each stabili-y class as well as a summary for all classes for the lower (10 meter) senso.- elevation.

XOQDOQ - ROBINSON MIXED-MODE BATCH RELEASES - 1991

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION — ATMOSPHERIC STABILITY CLASS A

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.000	0.000	0.083
3.35	0.000	0.000	0.000	0.000	0.000	0.083	0.166	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.000	0.000	0.332
5.59	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.000	0.000	0.000	0.166	0.000	0.000	0.166	0.000	0.000	0.415
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.000	0.000	0.000	0.000	0.000	0.000	0.083
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.00	0.00	0.00	0.00	0.08	0.25	0.00	0.00	0.08	0.17	0.00	0.00	0.33	0.00	0.00	0.91

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION — ATMOSPHERIC STABILITY CLASS B

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.000	0.000	0.000	0.000	0.000	0.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.000	0.000	0.166
3.35	0.000	0.000	0.000	0.083	0.083	0.249	0.000	0.166	1.000	0.000	0.083	0.000	0.083	0.415	0.166	0.000	1.328
5.59	0.249	0.083	0.000	0.166	0.000	0.000	0.000	0.083	0.083	0.000	0.083	0.000	0.000	0.332	0.000	0.000	1.079
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.25	0.08	0.00	0.25	0.08	0.33	0.00	0.25	0.08	0.00	0.17	0.00	0.08	0.83	0.17	0.00	2.57

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION — ATMOSPHERIC STABILITY CLASS C

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.000	0.000	0.000
3.35	0.000	0.083	0.083	0.166	0.000	0.083	0.332	0.000	0.083	0.000	0.249	0.249	0.498	0.000	0.166	0.000	1.992
5.59	0.166	0.332	0.249	0.000	0.000	0.000	0.000	0.000	0.083	0.332	0.083	0.000	0.000	0.166	0.083	0.000	1.494
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.17	0.42	0.33	0.17	0.00	0.08	0.33	0.00	0.17	0.33	0.33	0.25	0.50	0.17	0.25	0.00	3.49

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION — ATMOSPHERIC STABILITY CLASS D

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.083	0.000	0.332	0.083	0.332	0.083	0.332	0.249	0.415	0.581	1.245	0.498	0.581	0.581	0.083	0.166	5.645
3.35	1.411	0.664	1.079	0.996	1.411	1.162	1.494	2.739	1.411	2.573	1.660	0.996	0.747	0.415	0.664	0.415	19.839
5.59	0.415	0.913	0.913	0.415	0.000	0.083	0.083	0.083	0.498	1.660	0.581	0.332	0.249	0.000	0.166	0.166	6.558
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.332	0.000	0.083	0.000	0.000	0.000	0.000	0.000	0.415
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	1.91	1.58	2.32	.49	1.74	1.33	1.91	3.07	2.66	4.81	3.57	1.83	1.58	1.00	0.91	0.75	32.46

XQQDQ - ROBINSON MIXED-MODE BATCH RELEASES - 1991

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION — ATMOSPHERIC STABILITY CLASS E

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.498	0.332	0.415	0.498	0.332	0.000	0.166	1.577	2.241	2.158	1.660	1.992	1.079	0.581	0.415	0.166	14.111
3.35	0.996	1.245	1.909	0.830	0.498	0.166	0.166	2.158	2.490	3.984	1.909	1.162	0.747	0.415	1.328	0.664	20.669
5.59	0.083	0.415	0.166	0.000	0.000	0.000	0.000	0.166	1.162	0.498	0.249	0.332	0.000	0.000	0.000	0.000	3.071
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.083	0.000	0.166	0.000	0.000	0.000	0.000	0.000	0.332
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	1.58	1.99	2.49	1.33	0.83	0.17	0.33	3.98	5.98	6.64	3.98	3.49	1.83	1.00	1.74	0.83	38.18

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION — ATMOSPHERIC STABILITY CLASS F

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.008	0.008	0.017	0.008	0.008	0.000	0.008	0.066
1.56	0.415	0.249	0.332	0.083	0.166	0.000	0.000	0.498	0.913	1.245	1.411	1.743	0.747	0.747	0.332	1.328	10.210
3.35	0.166	0.000	0.083	0.000	0.083	0.000	0.083	0.000	0.083	0.000	0.249	0.166	0.000	0.083	0.083	0.581	1.660
5.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.58	0.25	0.42	0.08	0.25	0.00	0.08	0.50	1.00	1.25	1.67	1.93	0.76	0.84	0.42	1.92	11.94

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION — ATMOSPHERIC STABILITY CLASS G

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.100	0.042	0.091	0.000	0.017	0.000	0.017	0.017	0.033	0.083	0.058	0.091	0.166	0.125	0.083	0.149	1.071
1.56	0.830	0.332	0.747	0.000	0.166	0.000	0.166	0.166	0.249	0.664	0.498	0.747	1.328	0.996	0.664	1.245	8.799
3.35	0.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.000	0.000	0.000	0.000	0.415	0.581
5.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	1.01	0.37	0.84	0.00	0.18	0.00	0.18	0.18	0.28	0.75	0.64	0.84	1.49	1.12	0.75	1.81	10.45

TOTAL HOURS CONSIDERED ARE 1205.

WIND MEASURED AT 11.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	5.5	4.7	6.4	3.3	3.1	2.0	3.1	8.0	10.2	13.9	10.5	8.3	6.2	5.3	4.2	5.3	100.0

IX. METEOROLOGICAL DATA

C. Ground Level Batch Release Diffusion Analysis

Table IX-C presents the number and frequency of wind direction occurrenc s by wind speed class as recorded at the onsite meteorological system during ground level batch releases for the period January 1 through December 31, 1991.

The frequencies are presented as a percent of total occurrences for each stability class as well as a summary for all classes for the lower (10 meter) sensor elevation.

XOQDOQ - ROBINSON GROUND BATCH RELEASES - 1991

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION — ATMOSPHERIC STABILITY CLASS A

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.201	0.000	0.000	0.201
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.20

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION — ATMOSPHERIC STABILITY CLASS B

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.201	0.000	0.000	0.000	0.000	0.201	0.201	0.000	0.000	0.602
5.59	0.201	0.000	0.402	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.201	0.201	0.402	1.405
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.20	0.00	0.40	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.20	0.40	0.20	0.40	2.61

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION — ATMOSPHERIC STABILITY CLASS C

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.35	0.000	0.000	0.000	0.602	0.201	0.000	0.201	0.000	0.000	0.000	0.000	0.402	0.201	0.402	0.000	0.000	0.000	2.008
5.59	0.000	0.201	0.402	0.402	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.201	0.000	0.402	1.606
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.20	0.40	1.00	0.20	0.00	0.20	0.00	0.00	0.00	0.00	0.40	0.20	0.40	0.20	0.00	0.40	3.61

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION — ATMOSPHERIC STABILITY CLASS D

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.602	0.402	0.602	0.803	0.602	0.803	0.201	0.000	0.000	0.000	0.000	0.000	0.000	0.201	0.402	0.402	5.019
3.35	2.409	4.015	7.027	2.811	1.606	1.004	0.201	1.004	0.402	0.803	0.803	1.807	1.004	0.602	0.201	1.004	26.701
5.59	0.402	2.008	0.201	0.000	0.000	0.000	0.000	0.000	0.000	0.803	0.803	0.402	0.201	0.000	0.000	0.602	5.421
8.27	0.000	0.201	0.000	0.000	0.000	0.000	0.000	0.000	0.201	0.402	0.000	0.000	0.000	0.000	0.000	0.000	0.603
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	3.41	6.63	7.83	3.61	2.21	1.81	0.40	1.00	0.60	2.01	1.61	2.21	1.20	0.80	0.60	2.01	37.94

XQQDOQ ROBINSON GROUND BATCH RELEASES - 1991

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS E

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.56	0.402	1.004	1.606	1.405	1.004	0.201	0.000	0.602	0.803	1.004	0.602	0.602	1.004	0.201	0.201	0.402	11.042
3.35	0.803	2.610	3.212	1.606	0.602	0.402	0.000	0.803	1.205	0.201	0.201	1.205	1.405	0.000	0.402	1.405	16.061
5.59	0.803	1.807	0.201	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.402	0.201	0.000	0.000	0.000	0.201	3.614
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	2.01	5.42	5.02	3.01	1.61	0.60	0.00	1.41	2.01	1.20	1.20	2.01	2.41	0.20	0.60	2.01	30.72

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS F

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.020	0.040	0.020	0.000	0.000	0.000	0.000	0.000	0.020	0.020	0.020	0.020	0.020	0.000	0.000	0.040	0.221
1.56	0.402	1.004	0.402	0.201	0.000	0.000	0.000	0.201	0.602	0.402	0.402	0.402	0.402	0.201	0.201	1.205	6.023
3.35	0.201	0.201	0.201	0.803	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.201	0.000	0.201	3.205	3.011
5.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.62	1.24	0.62	1.00	0.00	0.00	0.00	0.20	0.62	0.42	0.42	0.42	0.62	0.20	0.40	2.45	9.26

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS G

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.34	0.020	0.020	0.020	0.000	0.000	0.000	0.020	0.020	0.040	0.020	0.020	0.040	0.020	0.020	0.020	0.120	0.402
1.56	0.803	1.004	0.803	0.000	0.000	0.000	0.602	0.402	1.205	0.602	0.803	1.606	0.602	0.402	0.803	4.417	14.053
3.35	0.402	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.405	1.807
5.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	1.22	1.02	0.82	0.00	0.00	0.00	0.62	0.42	1.24	0.62	0.82	1.65	0.62	0.42	0.82	5.94	16.26

TOTAL HOURS CONSIDERED ARE 498.

WIND MEASURED AT 11.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	7.5	14.5	15.1	8.6	4.0	2.4	1.2	3.2	4.5	4.3	4.5	6.5	5.5	2.4	2.6	13.2	100.0

CHANGES TO ODCM, PCP, AND RADIOACTIVE WASTE SYSTEMS

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Enclosure 2

I. CHANGES TO THE ODCM

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Title Page	Changed Revision 6 to Revision 7 and changed date
i	See Justification A, C, and E
2-1	See Justification A and B
2-3	See Justification A and B
2-4	See Justification A
2-5	See Justification B
2-6	See Justification A
2-14	See Justification A and B
2-22	Corrected the headers for the columns in Table 2.3-1 (minor editorial change)
3-1	See Justification A, B, and C
3-2	See Justification D
3-3	See Justification A and C
3-4	See Justification C
3-5	See Justification C
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3-7	See Justification C
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3-16	See Justification D
3-18	See Justification D
3-19	See Justification C
3-23	See Justification D
3-24	See Justification D
3-27	In equation 3.3-8, the inhalation dose contribution from mixed mode batch releases was added
3-28	See Justification D
3-29	Minor editorial changes; the Q_{TV} added "plant vent" in lieu of "vent"
3-30	See Justification D
3-63	See Justification A
3-64	See Justification A
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D-1	See Justification A and B
D-2	See Justification A and C
D-3	See Justification A and B
D-4	See Justification A and C

Justification for Change in ODCM Revision 7

A. The Radiation Monitoring System's nomenclature for valves is RMS-# and for radiation monitors is R-#. All monitors in the ODCM have been changed from RMS-# to R-#.

B. Plant modification #898 replaced Steam Generator Blowdown monitor R-19 (which monitored all three steam generators) with three monitors (R-19A, R-19B, and R-19C) one for each respective generator.

C. Plant modification #1005 replaced R-14, R-34, R-35, and R-36 with R-14A, R-14B, R-14C, R-14D, and R-14E using isokinetic sampling. R-35, R-36, R-14D, and R-14E are accident monitors and are not germane to this document. The modification also deleted the isolation function of R-15 (condenser vacuum pump vent) which vented to atmosphere and diverted flow to the plant vent stack upon high alarm. This modification allows continuous venting to the plant vent stack (an additional 300 cfm per pump) which is monitored by R-14A, R-14B, and R-14C. This required a Technical Specification change (Amendment No. 131). The methodology for R-15 setpoint calculation has been removed from the ODCM and is controlled by approved plant procedures. R-14A (particulate monitor) replaced the R-34 beta channel and R-14B replaced the R-34 iodine channel.

D. Robinson Plant has four types of releases: mixed mode continuous, mixed mode batch, ground level continuous, and, on rare occasions, ground level batch. For clarification purposes, the annual average relative dilution factors (X/Q) have been redefined and referenced to the vents to which they may apply.

E. The setpoint methodology for R-22 (Environmental & Radiation Control Building exhaust) and for R-23 (Radwaste Building exhaust) iodine and particulate channels have been included in this revision.