J.F. Alexander
Nuclear Assessment Group Manager

May 10, 1999
BECo Ltr. 2.99.034

U. S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, D.C. 20555

The enclosed 1998 annual "Radioactive Effluent and Waste Disposal Report," is submitted in accordance with Pilgrim Nuclear Power Station Technical Specification 5.6.3. and Revision 1 of Regulatory Guide 1.21.

J.F. Alexander

RLC/cls/299034

Attachment

cc: Mr. Alan B. Wang, Project Manager
Project Directorate I-3
Office of Nuclear Reactor Regulation
Mail Stop: OWF 8F2
U. S. Nuclear Regulatory Commission
1 White Flint North
11555 Rockville Pike
Rockville, MD 20852

U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

Senior Resident Inspector
Pilgrim Nuclear Power Station

IE48

9905180151 981231
PDR ADOCK 05000293
R PDR

PILGRIM NUCLEAR POWER STATION

Radioactive Effluent and Waste Disposal Report

January 01 through December 31, 1998

Boston Edison

Boston Edison

PILGRIM NUCLEAR POWER STATION

RADIOACTIVE EFFLUENT AND WASTE DISPOSAL REPORT

JANUARY 01 THROUGH DECEMBER 31, 1998

Prepared by: _____ 03 May 1999
K. J. Sejkora
Senior Environmental Radiochemist

Reviewed by: _____ 5/6/99
P. O. Smalley
Chemistry Department Manager

Approved by: SR Landahl 5/6/99
S. R. Landahl
Radiation Protection Manager

TABLE OF CONTENTS

SECTION	SECTION TITLE	PAGE
1.0	EXECUTIVE SUMMARY	5
2.0	RADIOACTIVE EFFLUENT DATA	8
2.1	Supplemental Effluent Release Data	8
2.2	Gaseous Effluent Data	8
2.3	Liquid Effluent Data	9
3.0	METEOROLOGICAL DATA	22
4.0	MAXIMUM INDIVIDUAL DOSES	23
4.1	Doses From Noble Gas Releases	23
4.2	Doses From Gaseous Effluent Releases	25
4.3	Doses From Liquid Effluent Releases	31
5.0	POPULATION AND AVERAGE INDIVIDUAL DOSES	37
5.1	Doses From Gaseous Effluent Releases	38
5.2	Doses From Liquid Effluent Releases	40
6.0	OFFSITE AMBIENT RADIATION MEASUREMENTS	42
7.0	PERCENT OF ODCM EFFLUENT CONTROL LIMITS	45
7.1	Gaseous Effluent Releases	45
7.2	Liquid Effluent Releases	48
8.0	RADIOACTIVE WASTE DISPOSAL DATA	51
9.0	OFFSITE DOSE CALCULATION MANUAL REVISIONS	54
10.0	REFERENCES	55
APPENDIX A	Meteorological Joint Frequency Distributions	56
APPENDIX B	Atmospheric Dispersion And Deposition Factors	89
APPENDIX C	Offsite Dose Calculation Manual	130

LIST OF TABLES

TABLE	TABLE TITLE	PAGE
2.1	Supplemental Information	10
2.2-A	Gaseous Effluents - Summation of All Releases	12
2.2-B	Gaseous Effluents - Elevated Releases	14
2.2-C	Gaseous Effluents - Ground Level Releases	16
2.3-A	Liquid Effluents - Summation of All Releases	18
2.3-B	Liquid Effluents	20
4.1	Maximum Doses from Noble Gas Releases During 1998	24
4.2-A	Maximum Individual Organ Doses from Gaseous Effluents January-March 1998	26
4.2-B	Maximum Individual Organ Doses from Gaseous Effluents April-June 1998	27
4.2-C	Maximum Individual Organ Doses from Gaseous Effluents July-September 1998	28
4.2-D	Maximum Individual Organ Doses from Gaseous Effluents October-December 1998	29
4.2-E	Maximum Individual Organ Doses from Gaseous Effluents January-December 1998	30
4.3-A	Maximum Individual Organ Doses from Liquid Effluents January-March 1998	32
4.3-B	Maximum Individual Organ Doses from Liquid Effluents April-June 1998	33
4.3-C	Maximum Individual Organ Doses from Liquid Effluents July-September 1998	34
4.3-D	Maximum Individual Organ Doses from Liquid Effluents October-December 1998	35
4.3-E	Maximum Individual Organ Doses from Liquid Effluents January-December 1998	36
5.1-A	Population Doses From Gaseous Effluent Releases During 1998	39
5.1-B	Average Individual Doses From Gaseous Effluent Releases During 1998	39
5.2-A	Population Doses From Liquid Effluent Releases During 1998	41
5.2-B	Average Individual Doses From Liquid Effluent Releases During 1998	41
6.0	Average TLD Exposures by Distance Zone During 1998	44
7.1	Percent of ODCM Effluent Control Limits for Gaseous Effluent Releases During 1998	46
7.2	Percent of ODCM Effluent Control Limits for Liquid Effluent Releases During 1998	49
8.0	Solid Waste and Irradiated Fuel Shipments	52

EXECUTIVE SUMMARY

BOSTON EDISON COMPANY
PILGRIM NUCLEAR POWER STATION
RADIOACTIVE EFFLUENT AND WASTE DISPOSAL REPORT
INCLUDING METEOROLOGICAL DATA
JANUARY 01 THROUGH DECEMBER 31, 1998

INTRODUCTION

This report quantifies the radioactive gaseous, liquid, and radwaste releases, and summarizes the local meteorological data for the period from January 01 through December 31, 1998. This document has been prepared in accordance with the requirements set forth in the Pilgrim Nuclear Power Station (PNPS) Technical Specifications and Revision 1 of Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Material in Liquid and Gaseous Effluents from Light Water Cooled Nuclear Power Plants".

The quantity of radioactive material released from PNPS was determined from sample analyses and continuous on-line monitoring of gaseous releases from the main stack, reactor building vent, turbine building, and various decontamination facilities, and liquid releases into the discharge canal.

The quantity and volume of radioactive waste which was shipped offsite from PNPS for processing and burial were determined from data contained on the radwaste shipping documentation. The meteorological data were obtained from monitoring instruments located on the 220-foot meteorological tower located at Pilgrim Station.

GASEOUS EFFLUENTS

Gaseous radioactive releases for the reporting period are quantified in Tables 2.2-A, 2.2-B, and 2.2-C. Radioactive noble gases released during the period totaled 660 Curies. Releases of radioactive particulates and iodines totaled 0.019 Curies, and tritium releases totaled 40 Curies. No gross alpha radioactivity was detected in gaseous effluents.

Noble gases released in gaseous effluents resulted in a maximum total body dose of 0.088 mrem, with a corresponding skin dose of 0.13 mrem. The release of radioactivity in gaseous effluents from PNPS during 1998 resulted in a total body dose to the maximum-exposed hypothetical individual of about 0.33 mrem from radioactive particulates, iodines, and tritium. The maximum hypothetical dose to any organ from radioactive particulates, iodines, and tritium was about 0.60 mrem. All of these maximum doses occurred to a hypothetical individual located on property under Boston Edison (BECo) control. The maximum, hypothetical total body dose from the combined release of radioactivity in gaseous effluents was 0.42 mrem. The cumulative total body dose to the entire population within 50 miles of PNPS from combined gaseous effluents was about 0.58 person-rem. The average individual living within 50 miles of PNPS received a total body dose of about 0.00014 mrem from combined gaseous effluents released during 1998.

The maximum individual doses from gaseous radioactive effluents were compared to the applicable ODCM dose limits. Noble gas doses were less than 1.6% of the corresponding 10CFR50 dose objectives. Maximum doses resulting from releases of particulates, iodines, and tritium in gaseous effluents were less than 4% of corresponding 10CFR50 objectives.

LIQUID EFFLUENTS

Liquid radioactive releases for the reporting period are quantified in Tables 2.3-A and 2.3-B. Liquid effluents released into the discharge canal contained 0.0065 Curies of fission and activation products, and 2.3 Curies of tritium. No dissolved/entrained noble gases or gross alpha radioactivity were detected in liquid effluents.

The release of radioactivity in liquid effluents from PNPS during 1998 resulted in a total body dose of about 0.00023 mrem to the maximum-exposed hypothetical individual. The maximum hypothetical dose to any organ from liquid effluents was about 0.00093 mrem. The cumulative total body dose from liquid effluents to the entire population within 50 miles of PNPS was about 0.0025 person-rem. The average individual living within 50 miles of PNPS received a total body dose of about 0.00000000059 mrem from liquid effluents released during 1998.

The maximum individual doses from liquid radioactive effluents were compared to the applicable ODCM dose limits. All doses from liquid effluents were less than 0.02% of their corresponding effluent control limit. In addition, all quarterly average concentrations of radioactivity in liquids released to Cape Cod Bay were less than 0.2% of the corresponding limits.

METEOROLOGICAL DATA

Meteorological joint frequency distributions are listed in Appendix A. The data recovery for the annual reporting period exceeded 92%. The predominant wind direction was from the south-southwest, which occurred approximately 15% of the time during the reporting period. The predominant stability class was Class E, which occurred about 42% of the time during the reporting period

OFFSITE AMBIENT RADIATION MEASUREMENTS

Ambient radiation exposure was evaluated to complete the assessment of radiological impact on humans. A small number of thermoluminescent dosimeters (TLDs) indicated an increase in ambient radiation exposure on BECo property in close proximity to the station, resulting from nitrogen-16 contained within the plant steam system. The dose to a hypothetical member of the public accessing such areas on BECo property during 1998 was estimated as being about 2.5 mrem. There was no measurable increase during 1998 in ambient radiation measurements at the location of the nearest resident to PNPS.

The collective total body dose to a maximum-exposed hypothetical individual from radioactive gases, liquids, and ambient exposure resulting from PNPS operation during 1998 was calculated as being 2.9 mrem. This amount is about 0.8% of the typical dose of 300 to 400 mrem received each year by an average person from other sources of natural and man-made radiation. Although this calculated collective dose occurs to a maximum-exposed hypothetical individual, it is also well below the NRC dose limit of 100 mrem/yr specified in 10CFR20.1301, as well as the EPA dose limit of 25 mrem/yr specified in 40CFR190. Both of these limits are to be applied to real members of the general public, so the fact that the dose to the hypothetical maximum-exposed individual is within the limits ensures that any dose received by a real member of the public would be smaller and well within any applicable limit.

RADIOACTIVE SOLID WASTE DISPOSAL

Solid radioactive waste shipped offsite for processing and disposal during the reporting period is described in Table 8.0. Approximately 1048 cubic meters of solid waste, containing 496 Curies of radioactivity, were shipped during the reporting period. Following processing and volume reduction, the volume of waste disposed of via burial was about 96 cubic meters.

CONCLUSION

The PNPS Offsite Dose Calculation Manual contains effluent controls to limit doses resulting from releases of radioactivity to the environment. None of the effluent controls associated with liquid or gaseous effluents were exceeded during the reporting period, as confirmed by conservative dose assessments performed at weekly and monthly intervals. Conformance to the PNPS ODCM effluent control limits ensures that releases of radioactivity in liquid and gaseous effluents are kept as low as reasonably achievable in accordance with 10 CFR Part 50, Appendix I. Compliance with the ODCM also demonstrates that requirements of the Environmental Protection Agency's nuclear fuel cycle standard, 40CFR190.10, Subpart B, have been met. Based on the dose assessment results for 1998, there was no significant radiological impact on the general public from PNPS operation.

2.0 RADIOACTIVE EFFLUENT DATA

Radioactive gaseous and liquid releases for the reporting period are given in the standard format presented in Tables 1A, 1B, 1C, 2A, 2B, and Supplemental Information table from NRC Regulatory Guide 1.21 (Reference 1) format.

2.1 Supplemental Effluent Release Data

Supplemental information related to radioactive gaseous and liquid releases for the reporting period are given in the standard NRC Regulatory Guide 1.21 format in Table 2.1.

2.2 Gaseous Effluent Data

Gaseous radioactivity is released from Pilgrim Station to the atmosphere from the main stack, reactor building vent, turbine building, and various decontamination facilities. Combined gaseous effluent releases from all release points are summarized in Table 2.2-A. No alpha activity was detected on any of the particulate filters collected during the reporting period. The total gaseous releases for various categories of radionuclides, as well as the corresponding average release rates, can be summarized as follows:

- Noble gases: 660 Ci, 20.9 μCi/sec
- Particulates and iodines with half-life greater than 8 days: 0.0185 Ci, 0.000587 μCi/sec
- Tritium: 40.4 Ci, 1.28 μCi/sec

Effluent releases from the main stack are detailed in Table 2.2-B. The main stack is an elevated release point with a height of approximately 400 feet above sea level. The main stack is located about 700 feet west-northwest of the reactor building.

Ground-level effluent releases are detailed in Table 2.2-C. Data in this table includes releases from the reactor building vent, turbine building, and assorted equipment decontamination facilities (e.g., hot machine shop, carbon dioxide pellet decon trailer, plastic media decon trailer, etc.) used during the period. Due to the close proximity of the reactor building, both of these release points are considered to be mixed-mode/ground level release points.

2.3 Liquid Effluent Data

Liquid radioactivity is released from PNPS to Cape Cod Bay via the circulating water discharge canal. These effluents enter Cape Cod Bay at the outfall of the canal, which is located about 1100 feet north of the reactor building.

Liquid effluent releases are summarized in Table 2.3-A. Detailed breakdowns for individual radionuclides are listed in Table 2.3-B. No dissolved/entrained gases or gross alpha radioactivity were detected in liquid effluents released during the reporting period. Total releases for the various categories of radionuclides, as well as their corresponding mean concentrations, can be summarized as follows:

- Total Effluent Volume: 558,000 Liters
- Total Dilution Volume: 3,420,000,000 Liters
- Fission/Activation products: 0.00654 Ci, 0.00000000191 μCi/mL
- Tritium: 2.27 Ci, 0.000000664 μCi/mL
- Dissolved/entrained noble gases: Not Detected

Table 2.1
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Supplemental Information
January-June 1998

FACILITY: PILGRIM NUCLEAR POWER STATION **LICENSE: DPR-35**

1. REGULATORY LIMITS

a. Fission and activation gases:	500 mrem/yr total body and 3000 mrem/yr for skin at site boundary
b,c. Iodines, particulates with half-life: >8 days, tritium	1500 mrem/yr to any organ at site boundary
d. Liquid effluents:	0.06 mrem/month for whole body and 0.2 mrem/month for any organ (without radwaste treatment)

2. EFFLUENT CONCENTRATION LIMITS

a. Fission and activation gases:	10CFR20 Appendix B Table II
b. Iodines:	10CFR20 Appendix B Table II
c. Particulates with half-life > 8 days:	10CFR20 Appendix B Table II
d. Liquid effluents:	2E-04 µCi/mL for entrained noble gases; 10CFR20 Appendix B Table II values for all other radionuclides

3. AVERAGE ENERGY Not Applicable

4. MEASUREMENTS AND APPROXIMATIONS OF TOTAL RADIOACTIVITY

a. Fission and activation gases:	High purity germanium gamma spectroscopy for all gamma emitters; radiochemistry analysis for H-3, Fe-55 (liquid effluents), Sr-89, and Sr-90
b. Iodines:	
c. Particulates:	
d. Liquid effluents:	

5. BATCH RELEASES

	Jan-Mar 1998	Apr-Jun 1998
a. Liquid Effluents		
1. Total number of releases:	1.20E+01	1.70E+01
2. Total time period (minutes):	6.13E+02	1.29E+03
3. Maximum time period (minutes):	1.95E+02	1.80E+02
4. Average time period (minutes):	5.11E+01	7.59E+01
5. Minimum time period (minutes):	2.00E+01	2.50E+01
6. Average stream flow (Liters/min): during periods of release of effluents into a flowing stream	1.17E+06	1.20E+06
b. Gaseous Effluents	None	None

6. ABNORMAL RELEASES

a. Liquid Effluents	None	None
b. Gaseous Effluents	None	None

Table 2.1 (continued)
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Supplemental Information
July-December 1998

FACILITY: PILGRIM NUCLEAR POWER STATION **LICENSE: DPR-35**

1. REGULATORY LIMITS

a. Fission and activation gases:	500 mrem/yr total body and 3000 mrem/yr for skin at site boundary
b,c. Iodines, particulates with half-life: >8 days, tritium	1500 mrem/yr to any organ at site boundary
d. Liquid effluents:	0.06 mrem/month for whole body and 0.2 mrem/month for any organ (without radwaste treatment)

2. EFFLUENT CONCENTRATION LIMITS

a. Fission and activation gases:	10CFR20 Appendix B Table II
b. Iodines:	10CFR20 Appendix B Table II
c. Particulates with half-life > 8 days:	10CFR20 Appendix B Table II
d. Liquid effluents:	2E-04 µCi/mL for entrained noble gases; 10CFR20 Appendix B Table II values for all other radionuclides

3. AVERAGE ENERGY Not Applicable

4. MEASUREMENTS AND APPROXIMATIONS OF TOTAL RADIOACTIVITY

a. Fission and activation gases:	High purity germanium gamma spectroscopy for all gamma emitters; radiochemistry analysis for H-3, Fe-55 (liquid effluents), Sr-89, and Sr-90
b. Iodines:	
c. Particulates:	
d. Liquid effluents:	

5. BATCH RELEASES

	Jul-Sep 1998	Oct-Dec 1998
a. Liquid Effluents		
1. Total number of releases:	1.30E+01	7.00E+00
2. Total time period (minutes):	6.99E+02	2.90E+02
3. Maximum time period (minutes):	1.60E+02	1.30E+02
4. Average time period (minutes):	5.38E+01	4.14E+01
5. Minimum time period (minutes):	2.50E+01	2.50E+01
6. Average stream flow (Liters/min): during periods of release of effluents into a flowing stream	1.17E+06	1.17E+06
b. Gaseous Effluents	None	None

6. ABNORMAL RELEASES

a. Liquid Effluents	None	None
b. Gaseous Effluents	None	None

Table 2.2-A
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Gaseous Effluents - Summation of All Releases
January-June 1998

	Period: Jan-Mar 1998	Period: Apr-Jun 1998	Estimated Total Error
A. FISSION AND ACTIVATION GASES			
Total Release: Ci	1.07E+02	1.32E+02	±22%
Average Release Rate During Period: µCi/sec	1.35E+01	1.67E+01	
Percent of Effluent Control Limit	*	*	
B. IODINES			
Total Iodine-131 Release: Ci	3.04E-04	6.11E-04	±20%
Average Release Rate During Period: µCi/sec	3.86E-05	7.74E-05	
Percent of Effluent Control Limit	*	*	
C. PARTICULATES			
Total Release: Ci	3.49E-04	5.54E-04	±21%
Average Release Rate During Period: µCi/sec	4.42E-05	7.02E-05	
Percent of Effluent Control Limit	*	*	
Gross Alpha Radioactivity: Ci	NDA	NDA	
D. TRITIUM			
Total Release: Ci	9.92E+00	9.04E+00	±20%
Average Release Rate During Period: µCi/sec	1.26E+00	1.15E+00	
Percent of Effluent Control Limit	*	*	

Notes for Table 2.2-A:

* Percent of Effluent Control Limit values based on dose assessments are provided in Section 7 of this report.

1. NDA stands for No Detectable Activity.
2. LLD for airborne gross alpha activity listed as NDA is 1E-11 µCi/cc.

Table 2.2-A (continued)
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Gaseous Effluents - Summation of All Releases
July-December 1998

	Period: Jul-Sep 1998	Period: Oct-Dec 1998	Estimated Total Error
A. FISSION AND ACTIVATION GASES			
Total Release: Ci	2.14E+02	2.07E+02	±22%
Average Release Rate During Period: µCi/sec	2.71E+01	2.62E+01	
Percent of Effluent Control Limit	*	*	
B. IODINES			
Total Iodine-131 Release: Ci	6.86E-04	6.28E-04	±20%
Average Release Rate During Period: µCi/sec	8.70E-05	7.96E-05	
Percent of Effluent Control Limit	*	*	
C. PARTICULATES			
Total Release: Ci	5.79E-04	3.42E-04	±21%
Average Release Rate During Period: µCi/sec	7.34E-05	4.34E-05	
Percent of Effluent Control Limit	*	*	
Gross Alpha Radioactivity: Ci	NDA	NDA	
D. TRITIUM			
Total Release: Ci	1.01E+01	1.13E+01	±20%
Average Release Rate During Period: µCi/sec	1.28E+00	1.43E+00	
Percent of Effluent Control Limit	*	*	

Notes for Table 2.2-A:

* Percent of Effluent Control Limit values based on dose assessments are provided in Section 7 of this report.

1. NDA stands for No Detectable Activity.
2. LLD for airborne gross alpha activity listed as NDA is 1E-11 µCi/cc.

Table 2.2-B
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Gaseous Effluents - Elevated Release
January-June 1998

Nuclide Released	Continuous Mode		Batch Mode	
	Jan-Mar 1998	Apr-Jun 1998	Jan-Mar 1998	Apr-Jun 1998
1. FISSION AND ACTIVATION GASES - Ci				
Kr-85m	2.56E+01	2.90E+01	N/A	N/A
Kr-87	9.48E+00	1.41E+01	N/A	N/A
Kr-88	4.79E+01	5.65E+01	N/A	N/A
Xe-131m	NDA	NDA	N/A	N/A
Xe-133	2.20E+01	2.41E+01	N/A	N/A
Xe-135	2.48E+00	8.55E+00	N/A	N/A
Xe-135m	NDA	NDA	N/A	N/A
Xe-138	NDA	NDA	N/A	N/A
Total for period	1.07E+02	1.32E+02	N/A	N/A
2. IODINES - Ci				
I-131	2.44E-04	4.16E-04	N/A	N/A
I-133	1.15E-03	2.08E-03	N/A	N/A
Total for period	1.39E-03	2.50E-03	N/A	N/A
3. PARTICULATES - Ci				
Co-60	1.31E-06	NDA	N/A	N/A
Sr-89	4.56E-05	1.43E-04	N/A	N/A
Sr-90	NDA	1.75E-06	N/A	N/A
Cs-134	NDA	NDA	N/A	N/A
Cs-137	NDA	5.80E-06	N/A	N/A
Ba/La-140	1.83E-04	2.71E-04	N/A	N/A
Total for period	2.30E-04	4.22E-04	N/A	N/A
4. TRITIUM - Ci				
H-3	5.84E-01	6.90E-01	N/A	N/A

Notes for Table 2.2-B:

1. N/A stands for not applicable.
2. NDA stands for No Detectable Activity.
3. LLD for airborne radionuclides listed as NDA are as follows:
   Fission Gases: 1E-04 µCi/cc
   Iodines: 1E-12 µCi/cc
   Particulates: 1E-11 µCi/cc

Table 2.2-B (continued)
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Gaseous Effluents - Elevated Release
July-December 1998

Nuclide Released	Continuous Mode		Batch Mode	
	Jul-Sep 1998	Oct-Dec 1998	Jul-Sep 1998	Oct-Dec 1998
1. FISSION AND ACTIVATION GASES - Ci				
Kr-85m	3.91E+01	4.24E+01	N/A	N/A
Kr-87	2.13E+01	1.90E+01	N/A	N/A
Kr-88	7.77E+01	7.81E+01	N/A	N/A
Xe-131m	NDA	NDA	N/A	N/A
Xe-133	3.50E+01	4.01E+01	N/A	N/A
Xe-135	2.78E+01	2.69E+01	N/A	N/A
Xe-135m	NDA	NDA	N/A	N/A
Xe-138	NDA	NDA	N/A	N/A
Total for period	2.01E+02	2.07E+02	N/A	N/A
2. IODINES - Ci				
I-131	3.86E-04	2.73E-04	N/A	N/A
I-133	2.02E-03	1.55E-03	N/A	N/A
Total for period	2.41E-03	1.82E-03	N/A	N/A
3. PARTICULATES - Ci				
Co-60	NDA	NDA	N/A	N/A
Sr-89	8.02E-05	3.80E-05	N/A	N/A
Sr-90	5.39E-07	6.95E-07	N/A	N/A
Cs-134	NDA	NDA	N/A	N/A
Cs-137	NDA	1.24E-06	N/A	N/A
Ba/La-140	2.96E-04	1.47E-04	N/A	N/A
Total for period	3.77E-04	1.87E-04	N/A	N/A
4. TRITIUM - Ci				
H-3	1.04E+00	1.33E+00	N/A	N/A

Notes for Table 2.2-B:

1. N/A stands for not applicable.
2. NDA stands for No Detectable Activity.
3. LLD for airborne radionuclides listed as NDA are as follows:
   Fission Gases: 1E-04 µCi/cc
   Iodines: 1E-12 µCi/cc
   Particulates: 1E-11 µCi/cc

Table 2.2-C
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Gaseous Effluents - Ground Level Release
January-June 1998

Nuclide Released	Continuous Mode		Batch Mode	
	Jan-Mar 1998	Apr-Jun 1998	Jan-Mar 1998	Apr-Jun 1998
1. FISSION AND ACTIVATION GASES - Ci				
Kr-85m	NDA	NDA	N/A	N/A
Kr-87	NDA	NDA	N/A	N/A
Kr-88	NDA	NDA	N/A	N/A
Xe-133	NDA	NDA	N/A	N/A
Xe-135	NDA	NDA	N/A	N/A
Xe-135m	NDA	NDA	N/A	N/A
Xe-138	NDA	NDA	N/A	N/A
Total for period	NDA	NDA	N/A	N/A
2. IODINES - Ci				
I-131	6.02E-05	1.95E-04	N/A	N/A
I-133	8.01E-04	1.51E-03	N/A	N/A
Total for period	8.61E-04	1.71E-03	N/A	N/A
3. PARTICULATES - Ci				
Co-60	9.74E-06	1.04E-05	N/A	N/A
Sr-89	1.09E-04	1.22E-04	N/A	N/A
Sr-90	NDA	NDA	N/A	N/A
Cs-134	NDA	NDA	N/A	N/A
Cs-137	NDA	NDA	N/A	N/A
Ba/La-140	NDA	NDA	N/A	N/A
Total for period	1.19E-04	1.32E-04	N/A	N/A
4. TRITIUM - Ci				
H-3	9.34E+00	8.35E+00	N/A	N/A

Notes for Table 2.2-C:

1. N/A stands for not applicable.
2. NDA stands for No Detectable Activity.
3. LLD for airborne radionuclides listed as NDA are as follows:
   Fission Gases: 1E-04 µCi/cc
   Iodines: 1E-12 µCi/cc
   Particulates: 1E-11 µCi/cc

Table 2.2-C (continued)
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Gaseous Effluents - Ground Level Release
July-December 1998

Nuclide Released	Continuous Mode		Batch Mode	
	Jul-Sep 1998	Oct-Dec 1998	Jul-Sep 1998	Oct-Dec 1998
1. FISSION AND ACTIVATION GASES - Ci				
Kr-85m	NDA	NDA	N/A	N/A
Kr-87	NDA	NDA	N/A	N/A
Kr-88	NDA	NDA	N/A	N/A
Xe-133	1.34E+01	NDA	N/A	N/A
Xe-135	NDA	NDA	N/A	N/A
Xe-135m	NDA	NDA	N/A	N/A
Xe-138	NDA	NDA	N/A	N/A
Total for period	1.34E+01	NDA	N/A	N/A
2. IODINES - Ci				
I-131	3.00E-04	3.55E-04	N/A	N/A
I-133	1.90E-03	3.46E-03	N/A	N/A
Total for period	2.20E-03	3.82E-03	N/A	N/A
3. PARTICULATES - Ci				
Co-60	3.14E-06	4.82E-06	N/A	N/A
Sr-89	1.63E-04	1.50E-04	N/A	N/A
Sr-90	NDA	NDA	N/A	N/A
Cs-134	NDA	NDA	N/A	N/A
Cs-137	NDA	NDA	N/A	N/A
Ba/La-140	3.59E-05	NDA	N/A	N/A
Total for period	2.02E-04	1.55E-04	N/A	N/A
4. TRITIUM - Ci				
H-3	9.09E+00	9.96E+00	N/A	N/A

Notes for Table 2.2-C:

1. N/A stands for not applicable.
2. NDA stands for No Detectable Activity.
3. LLD for airborne radionuclides listed as NDA are as follows:
   Fission Gases: 1E-04 µCi/cc
   Iodines: 1E-12 µCi/cc
   Particulates: 1E-11 µCi/cc

Table 2.3-A
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Liquid Effluents - Summation of All Releases
January-June 1998

	Period: Jan-Mar 1998	Period: Apr-Jun 1998	Estimated Total Error
A. FISSION AND ACTIVATION PRODUCTS			
Total Release (not including H-3, noble gas, or alpha): Ci	1.51E-03	4.29E-03	±12%
Average Diluted Concentration During Period: µCi/mL	2.10E-09	2.79E-09	
Percent of Effluent Concentration Limit*	2.81E-02%	1.13E-01%	
B. TRITIUM			
Total Release: Ci	4.17E-02	2.20E+00	±9.4%
Average Diluted Concentration During Period: µCi/mL	5.79E-08	1.43E-06	
Percent of Effluent Concentration Limit*	5.79E-03%	1.43E-01%	
C. DISSOLVED AND ENTRAINED GASES			
Total Release: Ci	NDA	NDA	±16%
Average Diluted Concentration During Period: µCi/mL	NDA	NDA	
Percent of Effluent Concentration Limit*	NDA	NDA	
D. GROSS ALPHA RADIOACTIVITY			
Total Release: Ci	NDA	NDA	±34%
E. VOLUME OF WASTE RELEASED PRIOR TO DILUTION			
Waste Volume: Liters	9.83E+04	3.30E+05	±5.7%
F. VOLUME OF DILUTION WATER USED DURING PERIOD			
Dilution Volume: Liters	7.20E+08	1.54E+09	±10%

Notes for Table 2.3-A:

* Additional percent of Effluent Control Limit values based on dose assessments are provided in Section 7 of this report.

1. NDA stands for No Detectable Activity.
2. LLD for dissolved and entrained gases listed as NDA is 1E-05 µCi/mL.
3. LLD for liquid gross alpha activity listed as NDA is 1E-07 µCi/mL.

Table 2.3-A (continued)
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Liquid Effluents - Summation of All Releases
July-December 1998

	Period: Jul-Sep 1998	Period: Oct-Dec 1998	Estimated Total Error
A. FISSION AND ACTIVATION PRODUCTS			
Total Release (not including H-3, noble gas, or alpha): Ci	5.10E-04	2.31E-04	±12%
Average Diluted Concentration During Period: µCi/mL	6.21E-10	6.79E-10	
Percent of Effluent Concentration Limit*	3.45E-02%	2.47E-02%	
B. TRITIUM			
Total Release: Ci	1.69E-02	1.14E-02	±9.4%
Average Diluted Concentration During Period: µCi/mL	2.06E-08	3.35E-08	
Percent of Effluent Concentration Limit*	2.06E-03%	3.35E-03%	
C. DISSOLVED AND ENTRAINED GASES			
Total Release: Ci	NDA	NDA	±16%
Average Diluted Concentration During Period: µCi/mL	NDA	NDA	
Percent of Effluent Concentration Limit*	NDA	NDA	
D. GROSS ALPHA RADIOACTIVITY			
Total Release: Ci	NDA	NDA	±34%
E. VOLUME OF WASTE RELEASED PRIOR TO DILUTION			
Waste Volume: Liters	8.87E+04	4.06E+04	±5.7%
F. VOLUME OF DILUTION WATER USED DURING PERIOD			
Dilution Volume: Liters	8.21E+08	3.40E+08	±10%

Notes for Table 2.3-A:

* Additional percent of Effluent Control Limit values based on dose assessments are provided in Section 7 of this report.

1. NDA stands for No Detectable Activity.
2. LLD for dissolved and entrained gases listed as NDA is 1E-05 µCi/mL.
3. LLD for liquid gross alpha activity listed as NDA is 1E-07 µCi/mL.

Table 2.3-B
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Liquid Effluents
January-June 1998

Nuclide Released	Continuous Mode		Batch Mode	
	Jan-Mar 1998	Apr-Jun 1998	Jan-Mar 1998	Apr-Jun 1998
1. FISSION AND ACTIVATION PRODUCTS - Ci				
Cr-51	N/A	N/A	NDA	NDA
Mn-54	N/A	N/A	1.13E-04	5.95E-04
Fe-55	N/A	N/A	1.04E-03	1.47E-03
Fe-59	N/A	N/A	NDA	2.10E-05
Co-58	N/A	N/A	NDA	NDA
Co-60	N/A	N/A	2.57E-04	7.71E-04
Zn-65	N/A	N/A	NDA	NDA
Sr-89	N/A	N/A	7.75E-07	1.76E-05
Sr-90	N/A	N/A	3.08E-06	2.68E-05
Zr/Nb-95	N/A	N/A	NDA	NDA
Mo-99/Tc-99m	N/A	N/A	NDA	NDA
Ag-110m	N/A	N/A	NDA	NDA
Sb-124	N/A	N/A	NDA	NDA
I-131	N/A	N/A	NDA	NDA
I-133	N/A	N/A	NDA	NDA
Cs-134	N/A	N/A	NDA	NDA
Cs-137	N/A	N/A	9.62E-05	1.39E-03
Ba/La-140	N/A	N/A	NDA	NDA
Ce-141	N/A	N/A	NDA	NDA
Total for period	N/A	N/A	1.51E-03	4.29E-03
2. DISSOLVED AND ENTRAINED GASES - Ci				
Xe-133	N/A	N/A	NDA	NDA
Xe-135	N/A	N/A	NDA	NDA
Total for period	N/A	N/A	NDA	NDA

Notes for Table 2.3-B:

1. N/A stands for not applicable.
2. NDA stands for No Detectable Activity.
3. LLD for liquid radionuclides listed as NDA are as follows:
   - Strontium: 5E-08 µCi/mL
   - Iodines: 1E-06 µCi/mL
   - Noble Gases: 1E-05 µCi/mL
   - All Others: 5E-07 µCi/mL

Table 2.3-B
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Liquid Effluents
July-December 1998

Nuclide Released	Continuous Mode		Batch Mode	
	Jul-Sep 1998	Oct-Dec 1998	Jul-Sep 1998	Oct-Dec 1998
1. FISSION AND ACTIVATION PRODUCTS - Ci				
Cr-51	N/A	N/A	NDA	NDA
Mn-54	N/A	N/A	2.84E-05	7.26E-06
Fe-55	N/A	N/A	1.23E-04	1.22E-04
Fe-59	N/A	N/A	NDA	NDA
Co-58	N/A	N/A	NDA	NDA
Co-60	N/A	N/A	1.28E-04	3.10E-05
Zn-65	N/A	N/A	NDA	NDA
Sr-89	N/A	N/A	NDA	NDA
Sr-90	N/A	N/A	8.32E-06	1.83E-06
Zr/Nb-95	N/A	N/A	NDA	NDA
Mo-99/Tc-99m	N/A	N/A	NDA	NDA
Ag-110m	N/A	N/A	NDA	NDA
Sb-124	N/A	N/A	NDA	NDA
I-131	N/A	N/A	NDA	NDA
I-133	N/A	N/A	NDA	NDA
Cs-134	N/A	N/A	NDA	NDA
Cs-137	N/A	N/A	2.22E-04	6.87E-05
Ba/La-140	N/A	N/A	NDA	NDA
Ce-141	N/A	N/A	NDA	NDA
Total for period	N/A	N/A	5.10E-04	2.31E-04
2. DISSOLVED AND ENTRAINED GASES - Ci				
Xe-133	N/A	N/A	NDA	NDA
Xe-135	N/A	N/A	NDA	NDA
Total for period	N/A	N/A	NDA	NDA

Notes for Table 2.3-B:

1. N/A stands for not applicable.
2. NDA stands for No Detectable Activity.
3. LLD for liquid radionuclides listed as NDA are as follows:
   - Strontium: 5E-08 µCi/mL
   - Iodines: 1E-06 µCi/mL
   - Noble Gases: 1E-05 µCi/mL
   - All Others: 5E-07 µCi/mL

3.0 METEOROLOGICAL DATA

Meteorological data (References 2 and 3) are summarized for the reporting period in Appendix A, in the standard joint frequency distribution format as given in NRC Regulatory Guide 1.21.

The predominant meteorological conditions observed during the annual reporting period can be summarized with their corresponding frequencies as follows:

- Stability Class: Class E, 42%
- Wind Direction (from): South-southwest, 15%
- 33-ft Wind Speed: 4-7 mph, 51%
- 220-ft Wind Speed: 13-18 mph, 32%

There were a limited number of instances when data collection from the 220-ft meteorological tower was not continuous. Typically, such data losses were attributed to loss of power, malfunction of the sensors, and/or malfunction of the digital dataloggers. Data recovery for the period was about 97% for the 33-ft level, and 92% for the 220-ft level of the tower. These data recovery values exceed the NRC's recommended annual recovery goal of 90%.

4.0 MAXIMUM INDIVIDUAL DOSES

Doses to the maximum exposed individual resulting from radionuclides in effluents released offsite were calculated using methods presented in the PNPS Offsite Dose Calculation Manual (ODCM, Reference 4), NRC Regulatory Guide 1.109 (Reference 5), NRC Regulatory Guide 1.111 (Reference 6), and the Pilgrim Station Unit 1 Appendix I Evaluation (Reference 7). Maximum individual doses are calculated separately for: (1) noble gases in gaseous effluents, (2) particulates, iodines, and tritium in gaseous effluents; and, (3) liquid effluents. Maximum consumption and use factors for various pathways from Table E-5 of the PNPS ODCM are used for calculating the doses to the maximum exposed individual.

Information related to liquid and gaseous effluent releases are summarized Section 2 of this report. These effluent release data were used as input to computer programs to calculate the resulting doses. The Duke Engineering and Services "YODA"-series of computer programs (Reference 8) was used to compile the dose contributions to the various organs in each age class from major exposure pathways.

4.1 Doses From Noble Gas Releases

Gaseous effluent release data presented in Tables 2.2-A, 2.2-B, and 2.2-C from this effluent release report were used as input to the Duke Engineering "YODA" computer programs to calculate radiation doses. These data include gaseous releases from the PNPS main stack, reactor building vent, and turbine building roof exhausters. Meteorological data obtained from the PNPS 220-foot meteorological tower during 1998 were also used as input to the Duke Engineering's "AEOLUS" computer program (Reference 9). This program calculated the atmospheric dispersion and deposition factors used in the "YODA"-series of computer programs to calculate maximum individual doses. These various dispersion (χ/Q) and deposition (D/Q) factors are presented in Appendix B.

The maximum individual doses resulting from radioactive noble gases released in gaseous effluents are presented in Table 4.1 according to specific receptor locations. This table includes all noble gas doses for the individual calendar quarters and total calendar year.

It should be noted that doses calculated for the entire year may not equal the sum of the doses for individual quarters. Doses from gaseous effluents are largely dependent on the meteorological conditions during the release period, as prescribed by the NRC in regulatory guides 1.109 and 1.111. Changes in meteorological conditions throughout the year can affect the amount of dispersion of gaseous effluents and the resulting dose. For example, a release of gaseous effluent during a period when there is little mixing in the air will yield a higher dose than if the same amount of radioactivity is released during a period when atmospheric mixing is high. Quarterly dose values presented in the following tables were calculated using meteorological conditions observed during the applicable quarterly period. In the case of the annual dose values presented, the radionuclide activity from the four quarters were summed for the entire year and doses were calculated using annual-average meteorological conditions.

Noble gases released in gaseous effluents from PNPS during 1998 resulted in a maximum total body dose of 0.088 mrem. The maximum skin dose was 0.13 mrem. Both of these doses occurred to a hypothetical individual, located at the shoreline 0.15 kilometers E (total body dose) or 0.10 kilometers NNE (skin dose) of the PNPS Reactor Building. This area is under Boston Edison Control. Doses to more "realistic" individuals at offsite locations would be lower than doses for these hypothetical site boundary individuals.

Table 4.1

Maximum Doses From Noble Gas Releases During 1998

Release Period	Gamma Air Dose (location)	Beta Air Dose (location)	Total Body Dose (location)	Skin Dose (location)
Jan-Mar	1.82E-02 mrad (0.34 km SSW)	4.10E-03 mrad (1.23 km SSW)	1.23E-02 mrem (0.34 km SSW)	1.44E-02 mrem (0.34 km SSW)
Apr-Jun	3.29E-02 mrad (0.08 km N)	3.57E-03 mrad (1.23 km SSW)	2.22E-02 mrem (0.80 km N)	2.55E-02 mrem (0.80 km N)
Jul-Sep	7.92E-02 mrad (0.10 km NNE)	1.46E-01 mrad (0.10 km NNE)	5.23E-02 mrem (0.10 km NNE)	1.04E-01 mrem (0.10 km NNE)
Oct-Dec	5.82E-02 mrad (0.15 km E)	2.78E-03 mrad (1.23 km SSW)	3.93E-02 mrem (0.15 km E)	4.52E-02 mrem (0.15 km E)
Jan-Dec	1.31E-01 mrad (0.15 km E)	9.72E-02 mrad (0.80 km N)	8.81E-02 mrem (0.15 km E)	1.27E-01 mrem (0.10 km NNE)

4.2 Doses From Gaseous Effluent Releases

Gaseous effluent release data presented in Tables 2.2-A, 2.2-B, and 2.2-C from this effluent release report were used as input to the Duke Engineering "YODA" computer programs to calculate radiation doses. These data include gaseous releases from the PNPS main stack, reactor building vent, and turbine building roof exhausters. Meteorological data obtained from the PNPS 220-foot meteorological tower during 1998 were also used as input to the Duke Engineering's "AEOLUS" computer program (Reference 9). This program calculated the atmospheric dispersion and deposition factors used in the "YODA"-series of computer programs to calculate maximum individual doses. These various dispersion (χ/Q) and deposition (D/Q) factors are presented in Appendix B.

The maximum individual doses resulting from radioactive particulates, iodines, and tritium released in gaseous effluents are presented in Tables 4.2-A through 4.2-E. These tables cover the individual calendar quarters and the total calendar year, respectively. Doses resulting from releases of noble gases are addressed independently in the PNPS ODCM. Therefore, none of these tables for maximum individual doses include any dose contribution from noble gases. The presentation and analysis of doses resulting from noble gases are addressed in Section 4.1 of this report.

Tables 4.2-A through 4.2-E summarize the maximum total body and organ doses for the adult, teen, child, and infant age classes resulting from the major gaseous exposure pathways. These tables present the dose data according to specific receptor location and the exposure pathways assumed to occur at that location. For example, the second column of the tables presents the information for the hypothetical maximum-exposed at the most restrictive site boundary location, where only inhalation and ground deposition exposure pathways are assumed to occur. Since this is a shoreline location controlled by Boston Edison Company, the other pathways of garden vegetable production, milk production, and meat production are assumed not to occur. Doses for other offsite locations not under Boston Edison control, where other exposure pathways can and do occur, are presented in subsequent columns of the tables, and represent the potential maximum doses to individuals at these locations.

It should be noted that doses calculated for the entire year may not equal the sum of the doses for individual quarters. As was the case with noble gas doses described in Section 4.1, quarterly doses were calculated using meteorological conditions observed during the applicable quarterly period. Annual dose values are based on the sum of the quarterly noble gas releases, along with the annual-average meteorological conditions. A more detailed discussion of the reasons for the differences in annual doses from the summed quarterly doses can be found in Section 4.1.

Radioactivity released in gaseous effluents from PNPS during 1998 resulted in a maximum total body dose (teen age class) of 0.33 mrem. The maximum organ dose (child age class, thyroid) was 0.60 mrem. Both of these doses occurred to hypothetical individuals at the shoreline 0.08 kilometers N of the PNPS Reactor Building, an area under Boston Edison Control. For the more "realistic" individuals at offsite locations, the maximum total body dose was 0.017 mrem (child age class at a location 0.8 kilometers SE from the Reactor Building), while the maximum organ dose was 0.068 mrem (infant thyroid at a location 4 kilometers WSW from the Reactor Building, yielding vegetables, cow milk, and goat milk).

Table 4.2-A

Maximum Individual Organ Dose at Receptor Location -- mrem
From Gaseous Release Period: January-March 1998

Receptor: Direction: Distance[1]: Pathway[2]:	Bound N 0.08 km DI	Cow/Goat WSW 3.97 km DIVCG[3]	Garden SE 0.82 km DIV[3]	Cow/Meat W 5.77 km DIVCM[3]	Resident SE 0.79 km DI	Meat S 3.80 km DIVM[3]
Age Class: Adult						
Bone	3.06E-03	4.77E-05	6.87E-04	2.29E-05	1.26E-04	3.34E-05
GI-LLI	6.83E-02	2.20E-04	4.23E-03	1.55E-04	1.31E-03	1.52E-04
Kidney	6.82E-02	2.17E-04	4.13E-03	1.53E-04	1.31E-03	1.46E-04
Liver	6.81E-02	2.15E-04	4.13E-03	1.52E-04	1.31E-03	1.46E-04
Lung	6.92E-02	2.12E-04	4.14E-03	1.51E-04	1.32E-03	1.46E-04
Thyroid	8.13E-02	1.34E-03	5.10E-03	5.64E-04	1.53E-03	2.97E-04
Total Body	6.81E-02	2.14E-04	4.14E-03	1.52E-04	1.31E-03	1.47E-04
Age Class: Teen						
Bone	3.16E-03	7.58E-05	9.83E-04	3.40E-05	1.27E-04	4.71E-05
GI-LLI	6.87E-02	2.61E-04	4.67E-03	1.71E-04	1.32E-03	1.61E-04
Kidney	6.86E-02	2.61E-04	4.55E-03	1.69E-04	1.32E-03	1.55E-04
Liver	6.85E-02	2.57E-04	4.55E-03	1.68E-04	1.31E-03	1.54E-04
Lung	7.03E-02	2.52E-04	4.58E-03	1.67E-04	1.35E-03	1.55E-04
Thyroid	8.60E-02	1.98E-03	5.47E-03	7.66E-04	1.61E-03	2.84E-04
Total Body	6.85E-02	2.56E-04	4.58E-03	1.68E-04	1.31E-03	1.55E-04
Age Class: Child						
Bone	3.28E-03	1.77E-04	2.17E-03	7.73E-05	1.29E-04	1.05E-04
GI-LLI	6.10E-02	3.75E-04	6.32E-03	2.37E-04	1.18E-03	2.14E-04
Kidney	6.10E-02	3.84E-04	6.24E-03	2.39E-04	1.18E-03	2.10E-04
Liver	6.10E-02	3.78E-04	6.24E-03	2.37E-04	1.18E-03	2.10E-04
Lung	6.25E-02	3.68E-04	6.26E-03	2.34E-04	1.20E-03	2.10E-04
Thyroid	8.29E-02	3.77E-03	7.58E-03	1.39E-03	1.55E-03	4.03E-04
Total Body	6.09E-02	3.77E-04	6.30E-03	2.38E-04	1.18E-03	2.12E-04
Age Class: Infant						
Bone	3.14E-03	1.65E-04	1.19E-04	3.79E-05	1.27E-04	4.73E-06
GI-LLI	3.62E-02	3.00E-04	6.88E-04	1.03E-04	7.28E-04	2.28E-05
Kidney	3.63E-02	3.26E-04	6.89E-04	1.11E-04	7.29E-04	2.29E-05
Liver	3.63E-02	3.21E-04	6.89E-04	1.10E-04	7.29E-04	2.29E-05
Lung	3.76E-02	2.97E-04	7.11E-04	1.03E-04	7.52E-04	2.41E-05
Thyroid	5.66E-02	8.29E-03	1.02E-03	2.69E-03	1.08E-03	4.57E-05
Total Body	3.62E-02	3.11E-04	6.88E-04	1.06E-04	7.28E-04	2.28E-05

[1] Distances are measured with respect to the reactor vent

[2] Pathway designations are as follows:

D = Deposition (Ground Plane) I = Inhalation V = Vegetable Garden
C = Cow Milk G = Goat Milk M = Meat

[3] Doses are conservative since it is unlikely for vegetables to be grown outside or for animals to be fed on pasture during winter months.

Table 4.2-B

Maximum Individual Organ Dose at Receptor Location -- mrem
From Gaseous Release Period: April-June 1998

Receptor:	Bound	Cow/Goat	Garden	Cow/Meat	Resident	Meat
Direction:	N	WSW	SE	W	NW	S
Distance[1]:	0.08 km	3.97 km	0.82 km	5.77 km	0.74 km	3.80 km
Pathway[2]:	DI	DIVCG	DIV	DIVCM	DI	DIVM
Age Class: Adult						
Bone	4.64E-03	1.59E-04	3.34E-04	5.28E-05	1.11E-04	5.78E-05
GI-LLI	1.03E-01	5.70E-04	2.92E-03	2.70E-04	1.74E-03	1.05E-04
Kidney	1.03E-01	5.70E-04	2.88E-03	2.67E-04	1.73E-03	9.80E-05
Liver	1.03E-01	5.66E-04	2.87E-03	2.66E-04	1.73E-03	9.80E-05
Lung	1.05E-01	5.48E-04	2.88E-03	2.63E-04	1.76E-03	9.76E-05
Thyroid	1.54E-01	4.61E-03	4.20E-03	1.18E-03	2.53E-03	3.19E-04
Total Body	1.03E-01	5.68E-04	2.88E-03	2.68E-04	1.73E-03	1.02E-04
Age Class: Teen						
Bone	4.85E-03	2.46E-04	4.77E-04	7.59E-05	1.14E-04	7.93E-05
GI-LLI	1.04E-01	6.77E-04	3.23E-03	2.97E-04	1.75E-03	1.11E-04
Kidney	1.04E-01	6.90E-04	3.18E-03	2.97E-04	1.75E-03	1.04E-04
Liver	1.03E-01	6.83E-04	3.17E-03	2.95E-04	1.74E-03	1.04E-04
Lung	1.07E-01	6.53E-04	3.19E-03	2.91E-04	1.79E-03	1.04E-04
Thyroid	1.70E-01	6.86E-03	4.46E-03	.61E-03	2.78E-03	2.94E-04
Total Body	1.03E-01	6.78E-04	3.18E-03	2.97E-04	1.74E-03	1.09E-04
Age Class: Child						
Bone	5.12E-03	5.51E-04	1.05E-03	1.63E-04	1.18E-04	1.67E-04
GI-LLI	9.19E-02	9.72E-04	4.39E-03	4.13E-04	1.55E-03	1.45E-04
Kidney	9.22E-02	1.02E-03	4.36E-03	4.21E-04	1.56E-03	1.40E-04
Liver	9.20E-02	1.01E-03	4.36E-03	4.19E-04	1.55E-03	1.41E-04
Lung	9.47E-02	9.55E-04	4.37E-03	4.09E-04	1.60E-03	1.40E-04
Thyroid	1.74E-01	1.32E-02	6.18E-03	2.96E-03	2.83E-03	4.23E-04
Total Body	9.18E-02	1.00E-03	4.39E-03	4.22E-04	1.55E-03	1.51E-04
Age Class: Infant						
Bone	4.83E-03	4.91E-04	5.77E-05	7.29E-05	1.14E-04	4.43E-06
GI-LLI	5.46E-02	7.77E-04	4.56E-04	1.78E-04	9.36E-04	1.61E-05
Kidney	5.49E-02	8.81E-04	4.58E-04	1.98E-04	9.40E-04	1.62E-05
Liver	5.48E-02	8.95E-04	4.58E-04	1.99E-04	9.39E-04	1.62E-05
Lung	5.72E-02	7.72E-04	4.75E-04	1.79E-04	9.76E-04	1.75E-05
Thyroid	1.30E-01	2.94E-02	1.02E-03	5.84E-03	2.12E-03	4.86E-05
Total Body	5.46E-02	8.21E-04	4.56E-04	1.86E-04	9.36E-04	1.61E-05

[1] Distances are measured with respect to the reactor vent

[2] Pathway designations are as follows:

D = Deposition (Ground Plane) I = Inhalation V = Vegetable Garden
C = Cow Milk G = Goat Milk M = Meat

Table 4.2-C

Maximum Individual Organ Dose at Receptor Location -- mrem
From Gaseous Release Period: July-September 1998

Receptor: Direction: Distance[1]: Pathway[2]:	Bound NNE 0.10 km DI	Cow/Goat WSW 3.97 km DIVCG	Garden SE 0.82 km DIV	Cow/Meat W 5.77 km DIVCM	Resident ESE 0.80 km DI	Meat S 3.80 km DIVM
Age Class: Adult						
Bone	3.88E-03	8.84E-05	2.98E-04	3.39E-05	2.82E-05	1.03E-05
GI-LLI	1.23E-01	4.22E-04	1.75E-03	2.02E-04	1.17E-03	1.42E-05
Kidney	1.23E-01	4.23E-04	1.70E-03	2.00E-04	1.17E-03	1.26E-05
Liver	1.22E-01	4.15E-04	1.70E-03	1.98E-04	1.16E-03	1.24E-05
Lung	1.25E-01	4.07E-04	1.71E-03	1.96E-04	1.19E-03	1.24E-05
Thyroid	2.00E-01	3.64E-03	3.11E-03	1.08E-03	1.86E-03	7.74E-05
Total Body	1.22E-01	4.14E-04	1.71E-03	1.98E-04	1.16E-03	1.29E-05
Age Class: Teen						
Bone	4.20E-03	1.42E-04	4.42E-04	5.10E-05	3.11E-05	1.45E-05
GI-LLI	1.24E-01	5.03E-04	1.93E-03	2.23E-04	1.18E-03	1.49E-05
Kidney	1.24E-01	5.12E-04	1.88E-03	2.23E-04	1.18E-03	1.33E-05
Liver	1.23E-01	4.99E-04	1.88E-03	2.20E-04	1.17E-03	1.31E-05
Lung	1.28E-01	4.85E-04	1.89E-03	2.17E-04	1.21E-03	1.33E-05
Thyroid	2.23E-01	5.42E-03	3.19E-03	1.50E-03	2.07E-03	6.84E-05
Total Body	1.23E-01	4.96E-04	1.89E-03	2.20E-04	1.17E-03	1.38E-05
Age Class: Child						
Bone	4.60E-03	3.35E-04	1.02E-03	1.17E-04	3.47E-05	3.24E-05
GI-LLI	1.09E-01	7.25E-04	2.62E-03	3.10E-04	1.04E-03	1.90E-05
Kidney	1.10E-01	7.59E-04	2.59E-03	3.17E-04	1.04E-03	1.80E-05
Liver	1.09E-01	7.39E-04	2.59E-03	3.12E-04	1.04E-03	1.78E-05
Lung	1.13E-01	7.11E-04	2.60E-03	3.06E-04	1.08E-03	1.79E-05
Thyroid	2.32E-01	1.04E-02	4.48E-03	2.77E-03	2.15E-03	1.00E-04
Total Body	1.09E-01	7.37E-04	2.61E-03	3.13E-04	1.04E-03	1.93E-05
Age Class: Infant						
Bone	4.17E-03	3.16E-04	1.74E-05	5.69E-05	3.08E-05	3.59E-07
GI-LLI	6.41E-02	5.79E-04	2.54E-04	1.33E-04	6.06E-04	1.85E-06
Kidney	6.45E-02	6.54E-04	2.56E-04	1.51E-04	6.10E-04	1.87E-06
Liver	6.44E-02	6.42E-04	2.56E-04	1.48E-04	6.09E-04	1.87E-06
Lung	6.80E-02	5.73E-04	2.69E-04	1.33E-04	6.41E-04	2.17E-06
Thyroid	1.78E-01	2.33E-02	6.85E-04	5.61E-03	1.63E-03	9.19E-06
Total Body	6.41E-02	6.09E-04	2.55E-04	1.40E-04	6.06E-04	1.85E-06

[1] Distances are measured with respect to the reactor vent

[2] Pathway designations are as follows:

D = Deposition (Ground Plane) I = Inhalation V = Vegetable Garden
C = Cow Milk G = Goat Milk M = Meat

Table 4.2-D

Maximum Individual Organ Dose at Receptor Location -- mrem
From Gaseous Release Period: October-December 1998

Receptor: Direction: Distance[1]: Pathway[2]:	Bound NNE 0.10 km DI	Cow/Goat WSW 3.97 km DIVCG[3]	Garden SE 0.82 km DIV[3]	Cow/Meat W 5.77 km DIVCM[3]	Resident ESE 0.80 km DI	Meat S 3.80 km DIVM[3]
Age Class: Adult						
Bone	2.23E-03	2.53E-05	6.13E-04	2.17E-05	6.92E-05	2.01E-05
GI-LLI	6.15E-02	1.51E-04	3.03E-03	1.56E-04	1.13E-03	8.06E-05
Kidney	6.16E-02	1.52E-04	2.95E-03	1.56E-04	1.13E-03	7.81E-05
Liver	6.14E-02	1.50E-04	2.94E-03	1.54E-04	1.13E-03	7.78E-05
Lung	6.22E-02	1.46E-04	2.94E-03	1.53E-04	1.14E-03	7.77E-05
Thyroid	1.15E-01	1.20E-03	6.54E-03	7.69E-04	2.03E-03	2.15E-04
Total Body	6.12E-02	1.49E-04	2.95E-03	1.55E-04	1.13E-03	7.87E-05
Age Class: Teen						
Bone	2.39E-03	4.03E-05	9.01E-04	3.25E-05	7.19E-05	2.83E-05
GI-LLI	6.19E-02	1.79E-04	3.35E-03	1.72E-04	1.14E-03	8.52E-05
Kidney	6.22E-02	1.84E-04	3.26E-03	1.74E-04	1.14E-03	8.26E-05
Liver	6.19E-02	1.80E-04	3.25E-03	1.71E-04	1.14E-03	8.23E-05
Lung	6.33E-02	1.74E-04	3.26E-03	1.69E-04	1.16E-03	8.24E-05
Thyroid	1.32E-01	1.78E-03	6.57E-03	1.06E-03	2.32E-03	2.02E-04
Total Body	6.16E-02	1.78E-04	3.27E-03	1.71E-04	1.13E-03	8.35E-05
Age Class: Child						
Bone	2.60E-03	9.32E-05	2.06E-03	7.34E-05	7.54E-05	6.23E-05
GI-LLI	5.48E-02	2.59E-04	4.53E-03	2.41E-04	1.01E-03	1.14E-04
Kidney	5.52E-02	2.72E-04	4.48E-03	2.46E-04	1.02E-03	1.13E-04
Liver	5.50E-02	2.66E-04	4.47E-03	2.43E-04	1.02E-03	1.12E-04
Lung	5.62E-02	2.56E-04	4.47E-03	2.38E-04	1.04E-03	1.12E-04
Thyroid	1.43E-01	3.41E-03	9.34E-03	1.96E-03	2.49E-03	2.90E-04
Total Body	5.48E-02	2.64E-04	4.52E-03	2.43E-04	1.01E-03	1.15E-04
Age Class: Infant						
Bone	2.39E-03	8.89E-05	5.21E-05	3.67E-05	7.18E-05	1.35E-06
GI-LLI	3.22E-02	2.08E-04	4.58E-04	1.04E-04	6.08E-04	1.10E-05
Kidney	3.26E-02	2.33E-04	4.63E-04	1.17E-04	6.14E-04	1.12E-05
Liver	3.25E-02	2.31E-04	4.62E-04	1.15E-04	6.13E-04	1.11E-05
Lung	3.37E-02	2.06E-04	4.77E-04	1.03E-04	6.32E-04	1.16E-05
Thyroid	1.13E-01	7.60E-03	1.49E-03	3.91E-03	1.97E-03	3.78E-05
Total Body	3.23E-02	2.18E-04	4.59E-04	1.08E-04	6.09E-04	1.11E-05

[1] Distances are measured with respect to the reactor vent

[2] Pathway designations are as follows:

D = Deposition (Ground Plane) I = Inhalation V = Vegetable Garden
C = Cow Milk G = Goat Milk M = Meat

[3] Doses are conservative since it is unlikely for vegetables to be grown outside or for animals to be fed on pasture during winter months.

Table 4.2-E

Maximum Individual Organ Dose at Receptor Location -- mrem
From Gaseous Release Period: January-December 1998

Receptor:	Bound	Cow/Goat	Garden	Cow/Meat	Resident	Meat
Direction:	N	WSW	SE	W	ESE	S
Distance[1]:	0.08 km	3.97 km	0.82 km	5.77 km	0.80 km	3.80 km
Pathway[2]:	DI	DIVCG	DIV	DIVCM	DI	DIVM
Age Class: Adult						
Bone	1.14E-02	2.90E-04	1.94E-03	1.25E-04	2.78E-04	1.22E-04
GI-LLI	3.32E-01	1.39E-03	1.14E-02	7.91E-04	4.40E-03	3.49E-04
Kidney	3.32E-01	1.39E-03	1.11E-02	7.84E-04	4.40E-03	3.32E-04
Liver	3.31E-01	1.37E-03	1.11E-02	7.78E-04	4.39E-03	3.31E-04
Lung	3.37E-01	1.34E-03	1.11E-02	7.71E-04	4.46E-03	3.31E-04
Thyroid	5.17E-01	1.07E-02	1.90E-02	3.56E-03	6.61E-03	9.60E-04
Total Body	3.31E-01	1.37E-03	1.12E-02	7.80E-04	4.38E-03	3.37E-04
Age Class: Teen						
Bone	1.21E-02	4.60E-04	2.83E-03	1.84E-04	2.86E-04	1.70E-04
GI-LLI	3.34E-01	1.65E-03	1.26E-02	8.72E-04	4.43E-03	3.68E-04
Kidney	3.35E-01	1.68E-03	1.23E-02	8.72E-04	4.43E-03	3.51E-04
Liver	3.34E-01	1.65E-03	1.23E-02	8.63E-04	4.42E-03	3.50E-04
Lung	3.43E-01	1.60E-03	1.23E-02	8.52E-04	4.54E-03	3.51E-04
Thyroid	5.76E-01	1.59E-02	1.96E-02	4.90E-03	7.32E-03	8.94E-04
Total Body	3.33E-01	1.64E-03	1.23E-02	8.63E-04	4.41E-03	3.58E-04
Age Class: Child						
Bone	1.30E-02	1.06E-03	6.39E-03	4.11E-04	2.98E-04	3.70E-04
GI-LLI	2.96E-01	2.38E-03	1.71E-02	1.21E-03	3.93E-03	4.88E-04
Kidney	2.97E-01	2.48E-03	1.69E-02	1.24E-03	3.95E-03	4.77E-04
Liver	2.96E-01	2.43E-03	1.69E-02	1.22E-03	3.94E-03	4.77E-04
Lung	3.05E-01	2.34E-03	1.69E-02	1.20E-03	4.04E-03	4.76E-04
Thyroid	5.97E-01	3.04E-02	2.76E-02	9.00E-03	7.55E-03	1.28E-03
Total Body	2.96E-01	2.42E-03	1.70E-02	1.23E-03	3.93E-03	4.94E-04
Age Class: Infant						
Bone	1.21E-02	9.84E-04	2.26E-04	1.97E-04	2.86E-04	9.17E-06
GI-LLI	1.74E-01	1.90E-03	1.76E-03	5.23E-04	2.37E-03	4.98E-05
Kidney	1.75E-01	2.13E-03	1.77E-03	5.83E-04	2.38E-03	5.02E-05
Liver	1.75E-01	2.11E-03	1.77E-03	5.76E-04	2.38E-03	5.01E-05
Lung	1.82E-01	1.89E-03	1.84E-03	5.22E-04	2.47E-03	5.35E-05
Thyroid	4.51E-01	6.76E-02	4.23E-03	1.78E-02	5.70E-03	1.49E-04
Total Body	1.74E-01	1.99E-03	1.76E-03	5.45E-04	2.37E-03	4.98E-05

[1] Distances are measured with respect to the reactor vent

[2] Pathway designations are as follows:

D = Deposition (Ground Plane) I = Inhalation V = Vegetable Garden
C = Cow Milk G = Goat Milk M = Meat

4.3 Doses From Liquid Effluent Releases

Liquid effluent release data presented in Tables 2.3-A and 2.3-B were used as input to the Duke Engineering "YODA" computer programs to calculate radiation doses. The maximum individual doses resulting from radionuclides released in liquid effluents are presented in Tables 4.3-A through 4.3-E. These tables cover the individual calendar quarters and the total calendar year, respectively.

Tables 4.3-A through 4.3-E summarize the maximum total body and organ doses for the adult, teen, and child age classes resulting from the major liquid exposure pathways. NRC Regulatory Guide 1.109 does not recognize the infant age class as being exposed to the liquid effluent pathways. Therefore, doses for this age class are not included in any of the tables.

It should be noted that doses calculated for the entire year may not equal the sum of the doses for the individual quarters. Doses from liquid effluents are based on the concentration (activity divided by volume) of radionuclides released in the effluent, as prescribed by the NRC in Regulatory Guide 1.109. If a larger proportion of activity is released with a relatively smaller volume of dilution water during a given quarter, the resulting concentration for that quarter will be higher than concentrations from other quarters. This will result in a proportionally higher dose for that quarter. However, when that quarter's activity values are included in the annual sum, and divided by the total annual dilution flow, the resulting dose contribution will be smaller. In such a situation, the annual dose will actually be less than the sum of the individual quarterly doses.

Radioactivity released in liquid effluents from PNPS during 1998 resulted in a maximum total body dose (teen age class) of 0.00023 mrem. The maximum organ dose (child age class, bone) was 0.00093 mrem.

Table 4.3-A

Maximum Individual Organ Doses By Exposure Pathway -- mrem
From Liquid Release Period: January-March 1998

Exposure Pathway	Saltwater Fish	Saltwater Shellfish	Shoreline Deposits	Swimming/ Boating*	Total
Age Class: Adult					
Bone	6.08E-05	1.69E-04	4.25E-06	5.49E-09	2.32E-04
GI-LLI	3.62E-05	9.81E-05	4.25E-06	5.49E-09	1.36E-04
Kidney	1.57E-06	4.50E-07	4.25E-06	5.49E-09	4.15E-06
Liver	4.55E-05	1.18E-04	4.25E-06	5.49E-09	1.66E-04
Lung	2.28E-05	6.44E-05	4.25E-06	5.49E-09	8.93E-05
Thyroid	2.68E-08	1.19E-08	4.25E-06	5.49E-09	2.17E-06
Total Body	1.26E-05	3.14E-05	4.25E-06	5.49E-09	4.61E-05
Age Class: Teen					
Bone	6.36E-05	1.54E-04	1.19E-05	5.49E-09	2.29E-04
GI-LLI	2.76E-05	6.63E-05	1.19E-05	5.49E-09	1.06E-04
Kidney	1.60E-06	3.99E-07	1.19E-05	5.49E-09	1.39E-05
Liver	4.86E-05	1.11E-04	1.19E-05	5.49E-09	1.71E-04
Lung	2.79E-05	6.88E-05	1.19E-05	5.49E-09	1.09E-04
Thyroid	2.06E-08	7.99E-09	1.19E-05	5.49E-09	1.19E-05
Total Body	1.24E-05	2.90E-05	1.19E-05	5.49E-09	5.33E-05
Age Class: Child					
Bone	8.32E-05	2.34E-04	2.48E-06	3.06E-09	3.20E-04
GI-LLI	1.08E-05	3.06E-05	2.48E-06	3.06E-09	4.39E-05
Kidney	1.31E-06	3.78E-07	2.48E-06	3.06E-09	4.17E-06
Liver	4.70E-05	1.26E-04	2.48E-06	3.06E-09	1.75E-04
Lung	2.44E-05	6.98E-05	2.48E-06	3.06E-09	9.67E-05
Thyroid	1.70E-08	7.65E-09	2.48E-06	3.06E-09	2.50E-06
Total Body	1.49E-05	4.26E-05	2.48E-06	3.06E-09	6.00E-05

* These doses are conservative since the same usage factor was applied for each quarter. In reality, it is unlikely that anyone would be swimming or boating during these months. However, the resulting dose is considerably lower than those from other pathways and does not contribute much to the total dose.

Table 4.3-B

Maximum Individual Organ Doses By Exposure Pathway -- mrem
From Liquid Release Period: April-June 1998

Exposure Pathway	Saltwater Fish	Saltwater Shellfish	Shoreline Deposits	Swimming/ Boating	Total
Age Class: Adult					
Bone	1.15E-04	2.57E-04	9.91E-06	2.19E-08	3.82E-04
GI-LLI	9.98E-05	2.32E-04	9.91E-06	2.19E-08	3.42E-04
Kidney	1.81E-05	5.23E-06	9.91E-06	2.19E-08	3.33E-05
Liver	1.13E-04	1.91E-04	9.91E-06	2.19E-08	3.14E-04
Lung	3.84E-05	9.45E-05	9.91E-06	2.19E-08	1.43E-04
Thyroid	1.39E-06	6.16E-07	9.91E-06	2.19E-08	1.19E-05
Total Body	4.76E-05	6.36E-05	9.91E-06	2.19E-08	1.21E-04
Age Class: Teen					
Bone	1.21E-04	2.33E-04	5.54E-05	2.19E-08	4.09E-04
GI-LLI	7.26E-05	1.51E-04	5.54E-05	2.19E-08	2.79E-04
Kidney	1.84E-05	4.58E-06	5.54E-05	2.19E-08	7.84E-05
Liver	1.19E-04	1.78E-04	5.54E-05	2.19E-08	3.52E-04
Lung	4.62E-05	1.01E-04	5.54E-05	2.19E-08	2.03E-04
Thyroid	1.07E-06	4.14E-07	5.54E-05	2.19E-08	5.69E-05
Total Body	3.65E-05	5.51E-05	5.54E-05	2.19E-08	1.47E-04
Age Class: Child					
Bone	1.56E-04	3.49E-04	1.16E-05	1.22E-08	5.17E-04
GI-LLI	2.73E-05	6.69E-05	1.16E-05	1.22E-08	1.06E-04
Kidney	1.55E-05	4.46E-06	1.16E-05	1.22E-08	3.15E-05
Liver	1.10E-04	1.99E-04	1.16E-05	1.22E-08	3.21E-04
Lung	3.98E-05	1.02E-04	1.16E-05	1.22E-08	1.53E-04
Thyroid	8.83E-07	3.97E-07	1.16E-05	1.22E-08	1.29E-05
Total Body	3.18E-05	7.46E-05	1.16E-05	1.22E-08	1.18E-04

Table 4.3-C

Maximum Individual Organ Doses By Exposure Pathway -- mrem
From Liquid Release Period: July-September 1998

Exposure Pathway	Saltwater Fish	Saltwater Shellfish	Shoreline Deposits	Swimming/ Boating	Total
Age Class: Adult					
Bone	1.26E-05	2.47E-05	1.61E-06	3.24E-09	3.89E-05
GI-LLI	7.87E-06	2.34E-05	1.61E-06	3.24E-09	3.29E-05
Kidney	2.39E-06	6.48E-07	1.61E-06	3.24E-09	4.65E-06
Liver	1.20E-05	1.63E-05	1.61E-06	3.24E-09	2.99E-05
Lung	3.41E-06	7.79E-06	1.61E-06	3.24E-09	1.28E-05
Thyroid	1.09E-08	4.81E-09	1.61E-06	3.24E-09	1.63E-06
Total Body	6.14E-06	7.02E-06	1.61E-06	3.24E-09	1.48E-05
Age Class: Teen					
Bone	1.31E-05	2.19E-05	9.00E-06	3.24E-09	4.40E-05
GI-LLI	5.74E-06	1.50E-05	9.00E-06	3.24E-09	2.97E-05
Kidney	2.48E-06	5.88E-07	9.00E-06	3.24E-09	1.21E-05
Liver	1.26E-05	1.52E-05	9.00E-06	3.24E-09	3.68E-05
Lung	4.16E-06	8.33E-06	9.00E-06	3.24E-09	2.15E-05
Thyroid	8.35E-09	3.23E-09	9.00E-06	3.24E-09	9.01E-06
Total Body	4.28E-06	5.81E-06	9.00E-06	3.24E-09	1.91E-05
Age Class: Child					
Bone	1.66E-05	3.20E-05	1.89E-06	1.80E-09	5.05E-05
GI-LLI	2.13E-06	6.49E-06	1.89E-06	1.80E-09	1.05E-05
Kidney	2.13E-06	5.86E-07	1.89E-06	1.80E-09	4.60E-06
Liver	1.18E-05	1.70E-05	1.89E-06	1.80E-09	3.07E-05
Lung	3.58E-06	8.43E-06	1.89E-06	1.80E-09	1.39E-05
Thyroid	6.89E-09	3.10E-09	1.89E-06	1.80E-09	1.90E-06
Total Body	3.18E-06	7.43E-06	1.89E-06	1.80E-09	1.25E-06

Table 4.3-D

Maximum Individual Organ Doses By Exposure Pathway -- mrem
From Liquid Release Period: October-December 1998

Exposure Pathway	Saltwater Fish	Saltwater Shellfish	Shoreline Deposits	Swimming/ Boating*	Total
Age Class: Adult					
Bone	8.54E-06	2.08E-05	4.41E-07	8.44E-10	2.98E-05
GI-LLI	4.00E-06	1.16E-05	4.41E-07	8.44E-10	1.60E-05
Kidney	7.37E-07	2.00E-07	4.41E-07	8.44E-10	1.38E-06
Liver	6.95E-06	1.43E-05	4.41E-07	8.44E-10	2.17E-05
Lung	2.88E-06	7.61E-06	4.41E-07	8.44E-10	1.09E-05
Thyroid	7.34E-09	3.25E-09	4.41E-07	8.44E-10	4.53E-07
Total Body	2.62E-06	4.15E-06	4.41E-07	8.44E-10	7.21E-06
Age Class: Teen					
Bone	8.93E-06	1.89E-05	2.46E-06	8.44E-10	3.03E-05
GI-LLI	3.08E-06	7.81E-06	2.46E-06	8.44E-10	1.34E-05
Kidney	7.65E-07	1.82E-07	2.46E-06	8.44E-10	3.41E-06
Liver	7.39E-06	1.34E-05	2.46E-06	8.44E-10	2.33E-05
Lung	3.52E-06	8.14E-06	2.46E-06	8.44E-10	1.41E-05
Thyroid	5.65E-09	2.19E-09	2.46E-06	8.44E-10	2.47E-06
Total Body	2.10E-06	3.68E-06	2.46E-06	8.44E-10	8.24E-06
Age Class: Child					
Bone	1.16E-05	2.85E-05	5.14E-07	4.71E-10	4.06E-05
GI-LLI	1.23E-06	3.61E-06	5.14E-07	4.71E-10	5.35E-06
Kidney	6.59E-07	1.81E-07	5.14E-07	4.71E-10	1.35E-06
Liver	7.06E-06	1.52E-05	5.14E-07	4.71E-10	2.28E-05
Lung	3.06E-06	8.25E-06	5.14E-07	4.71E-10	1.18E-05
Thyroid	4.66E-09	2.10E-09	5.14E-07	4.71E-10	5.21E-07
Total Body	2.01E-06	5.20E-06	5.14E-07	4.71E-10	7.72E-06

* These doses are conservative since the same usage factor was applied for each quarter. In reality, it is unlikely that anyone would be swimming or boating during these months. However, the resulting dose is considerably lower than those from other pathways and does not contribute much to the total dose.

Table 4.3-E

Maximum Individual Organ Doses By Exposure Pathway -- mrem
From Liquid Release Period: January-December 1998

Exposure Pathway	Saltwater Fish	Saltwater Shellfish	Shoreline Deposits	Swimming/ Boating	Total
Age Class:	Adult				
Bone	1.98E-04	4.73E-04	1.42E-05	3.17E-08	6.85E-04
GI-LLI	1.49E-04	3.67E-04	1.42E-05	3.17E-08	5.30E-04
Kidney	2.30E-05	6.58E-06	1.42E-05	3.17E-08	4.39E-05
Liver	1.79E-04	3.42E-04	1.42E-05	3.17E-08	5.35E-04
Lung	6.78E-05	1.75E-04	1.42E-05	3.17E-08	2.57E-04
Thyroid	1.45E-06	6.42E-07	1.42E-05	3.17E-08	1.64E-05
Total Body	6.94E-05	1.07E-04	1.42E-05	3.17E-08	1.91E-04
Age Class:	Teen				
Bone	2.07E-04	4.30E-04	7.93E-05	3.17E-08	7.16E-04
GI-LLI	1.10E-04	2.41E-04	7.93E-05	3.17E-08	4.30E-04
Kidney	2.34E-05	5.80E-06	7.93E-05	3.17E-08	1.09E-04
Liver	1.88E-04	3.19E-04	7.93E-05	3.17E-08	5.86E-04
Lung	8.21E-05	1.87E-04	7.93E-05	3.17E-08	3.48E-04
Thyroid	1.11E-06	4.32E-07	7.93E-05	3.17E-08	8.09E-05
Total Body	5.56E-05	9.41E-05	7.93E-05	3.17E-08	2.29E-04
Age Class:	Child				
Bone	2.68E-04	6.47E-04	1.65E-05	1.77E-08	9.32E-04
GI-LLI	4.17E-05	1.08E-04	1.65E-05	1.77E-08	1.66E-04
Kidney	1.98E-05	5.65E-06	1.65E-05	1.77E-08	4.20E-05
Liver	1.77E-04	3.58E-04	1.65E-05	1.77E-08	5.52E-04
Lung	7.12E-06	1.89E-04	1.65E-05	1.77E-08	2.77E-04
Thyroid	9.21E-07	4.14E-07	1.65E-05	1.77E-08	1.79E-05
Total Body	5.22E-05	1.30E-04	1.65E-05	1.77E-08	1.99E-04

5.0 POPULATION AND AVERAGE INDIVIDUAL DOSES

Neither the PNPS Technical Specifications nor the ODCM contain limits related to population doses. However, NRC Regulatory Guide 1.21 (Reference 1) recommends calculation of population and average individual doses to the total body as part of the overall assessment of radiological impact on man.

The population dose is the collective sum of doses received by the entire population residing within 50 miles of PNPS. For example, the average individual receives about 300 to 400 mrem (0.3 to 0.4 rem) per year from cosmic radiation and naturally-occurring radionuclides in the air, soil, water, and food. Assuming each person in the population of 4.18 million people living within 50 miles of PNPS received a dose of 350 mrem (0.35 rem) from such natural radiation exposure, the population total body dose would be estimated to be:

0.35 rem/person * 4.18 million people = 1.46 million person-rem

Total body doses to the entire population within 50 miles of Pilgrim Station resulting from radionuclides in effluents released offsite were calculated using the population distribution based on 1980 census data.

These cumulative population doses were also calculated using methods presented in the PNPS ODCM, NRC Regulatory Guide 1.109, NRC Regulatory Guide 1.111, and the PNPS Appendix I Evaluation. Population doses were calculated separately for gaseous and liquid effluents, and are presented in Tables 5.1-A and 5.2-A , respectively. Unlike the ODCM effluent controls addressing doses to maximum exposed individuals resulting from the three types of releases addressed in Section 4 of this report, population doses for gaseous effluents combine the dose contributions from noble gases along with those from radioactive particulates, iodines, and tritium. Also, in the case of the population doses, average consumption and use factors for various pathways from Table E-4 of the PNPS ODCM were assumed, rather than the maximum use factors assumed for the maximum exposed individual.

Information related to liquid and gaseous effluent releases, as summarized in Section 2 of this report, were used as input to computer programs to calculate the resulting total body doses. The Duke Engineering "YODA"-series of computer programs was used to compile the dose contributions to the total body in each age class from major exposure pathways.

In addition to the population total body doses, doses to an average individual in the population were calculated. These average total body doses were estimated by dividing the total population dose (person-rem) by the total population of 4.18 million people within 50 miles of PNPS. The average individual doses, in mrem, are presented for gaseous and liquid effluents in Tables 5.1-B and 5.2-C, respectively.

5.1 Doses From Gaseous Effluent Releases

Population total body doses (person-rem) resulting from releases of radionuclides in gaseous effluents are presented in Table 5.1-A. These population doses represent the collective sum of doses received by the entire population living within 50 mile of PNPS. This table includes the doses for the four calendar quarters and entire year resulting from the various gaseous exposure pathways. The corresponding average individual total body doses (mrem) are presented in Table 5.1-B.

Radioactivity released in gaseous effluents from PNPS during 1998 resulted in a cumulative population total body dose of 0.58 person-rem. The corresponding average individual total body dose was 0.00014 mrem.

Again, it should be noted that the calculated doses for the entire year may be different from the sum of the individual four quarters. This difference is due to the methods and equations used to calculate dose from gaseous effluents, as prescribed by the NRC in Regulatory Guide 1.109. A more detailed discussion of the reasons for the differences can be found in Sections 4.1 and 4.2, in the discussion of maximum individual doses from gaseous effluent releases.

Table 5.1-A

Population Doses From Gaseous Effluent Releases During 1998

Exposure Pathway	Population Total Body Dose : person-rem				
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Dec
Noble Gas	6.85E-02	1.84E-01	1.58E-01	1.30E-01	5.32E-01
Ground Deposition	3.16E-04	4.94E-04	7.62E-05	1.49E-04	9.27E-04
Inhalation	6.72E-03	1.54E-02	8.38E-03	8.29E-03	3.90E-02
Vegetables	6.11E-04*	1.39E-03	7.59E-04	6.02E-04*	3.39E-03
Milk	4.48E-04*	9.97E-04	5.77E-04	4.64E-04*	2.51E-03
Meat	2.71E-05*	5.79E-05	3.28E-05	2.58E-05*	1.45E-04
Total	7.66E-02	2.02E-01	1.68E-01	1.40E-01	5.78E-01

Table 5.1-B

Average Individual Doses From Gaseous Effluent Releases During 1998

Exposure Pathway	Average Individual Total Body Dose : mrem				
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Dec
Noble Gas	1.64E-05	4.40E-05	3.78E-05	3.11E-05	1.27E-04
Ground Deposition	7.56E-08	1.18E-07	1.82E-08	3.56E-08	2.22E-07
Inhalation	1.61E-06	3.68E-06	2.00E-06	1.98E-06	9.33E-06
Vegetables	1.46E-07*	3.32E-07	1.81E-07	1.44E-07*	8.11E-07
Milk	1.07E-07*	2.38E-07	1.38E-07	1.11E-07*	6.00E-07
Meat	6.48E-09*	1.38E-08	7.84E-09	6.17E-09*	3.47E-08
Total	1.83E-05	4.84E-05	4.01E-05	3.34E-05	1.38E-04

*Dose estimates are conservative since vegetables are not grown outside during winter months and animals are generally not fed on pasture during winter months.

5.2 Doses from Liquid Effluent Releases

Population total body doses (person-rem) resulting from releases of radionuclides in liquid effluents are presented in Table 5.2-A. These population doses represent the collective sum of doses received by the entire population living within 50 mile of PNPS. This table includes the doses for the four calendar quarters and entire year resulting from the various liquid exposure pathways. The corresponding average individual total body doses (mrem) are presented in Table 5.2-B.

Radioactivity released in liquid effluents from PNPS during 1998 resulted in a cumulative population total body dose of 0.0025 person-rem. The corresponding average individual total body dose was 0.00000000059 mrem.

Again, it should be noted that the calculated doses for the entire year may be different from the sum of the individual four quarters. This difference is due to the methods and equations used to calculate dose from liquid effluents, as prescribed by the NRC in Regulatory Guide 1.109. A more detailed discussion of the reasons for the differences can be found in Section 4.3, in the discussion of maximum individual doses from liquid effluent releases.

Table 5.2-A

Population Doses From Liquid Effluent Releases During 1998

Exposure Pathway	Population Total Body Dose : person-rem				
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Dec
Fish	2.35E-04	7.77E-04	9.57E-05	4.38E-05	1.16E-03
Shellfish	3.60E-04	6.98E-04	7.49E-05	4.64E-05	1.18E-03
Shoreline	2.40E-05*	9.75E-05	1.49E-05	3.93E-06*	1.41E-04
Swimming/Boating	5.50E-08*	2.19E-07	3.24E-08	8.43E-09*	3.17E-07
Total	6.19E-04	1.57E-03	1.86E-04	9.41E-05	2.48E-03

Table 5.2-A

Average Individual Doses From Liquid Effluent Releases During 1998

Exposure Pathway	Average Individual Total Body Dose : mrem				
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Dec
Fish	5.63E-08	1.86E-07	2.29E-08	1.05E-08	2.77E-07
Shellfish	8.61E-08	1.67E-07	1.79E-08	1.11E-08	2.83E-07
Shoreline	5.73E-09*	2.33E-08	3.56E-09	9.39E-10*	3.38E-08
Swimming/Boating	1.31E-11*	5.24E-11	7.74E-12	2.02E-12*	7.58E-11
Total	1.48E-07	3.76E-07	4.44E-08	2.25E-08	5.94E-07

* Doses are conservative since swimming and beach activity during these months is very limited.

6.0 OFFSITE AMBIENT RADIATION MEASUREMENTS

The PNPS ODCM does not contain control limits related specifically to offsite ambient radiation exposure. However, Regulatory Guide 1.21 (Reference 1) recommends calculation of ambient radiation exposure as part of the overall assessment of radiological impact on man.

Thermoluminescent dosimeters (TLDs) are located at 83 sites beyond the boundary of the PNPS restricted/protected area. A number of these TLDs are located within the site boundary, on Boston Edison property in close proximity to the station proper. The TLDs are collected on a quarterly basis and used to calculate the ambient radiation exposure in milliRoentgen (mR) over the exposure period. These TLDs are grouped into four zones of increasing distance from the station. Average exposure values for each of these zones were calculated for each calendar quarter and the total year. The average exposure values (mR) for the four zones are presented in Table 6.0.

In addition to responding to ambient radiation exposure, TLDs will also record radiation resulting from noble gases (plume and immersion exposure), particulate materials deposited on the ground, cosmic rays from outer space, and from naturally-occurring radioactivity in the soil and air. Typically, the exposure from cosmic rays and other natural radioactivity components is about 40 to 70 mR/year. As calculated in Sections 4.1 and 4.2 of this report, the ambient radiation component of doses from PNPS effluent emissions are below 1 mrem/yr and would not be discernible above the natural radiation exposure levels.

The major source of ambient radiation exposure from PNPS results from high energy gamma rays emitted from nitrogen-16 (N-16) contained in steam flowing through the turbine. Although the N-16 is enclosed in the process lines and turbine and is not released into the environment, the ambient radiation exposure and sky shine from this contained source accounts for the majority of the radiation dose, especially in close proximity to the station. Other sources of ambient radiation exposure include radiation emitted from contained radioactive materials and/or radwaste at the facility. Despite these sources of ambient radiation exposure at PNPS, increases in exposure from ambient radiation are typically not observable above background radiation levels at locations beyond Boston Edison controlled property.

The average exposure values presented in Table 6.0 appear to indicate an elevation in ambient exposures in Zone 1, those TLDs within 2 miles of PNPS. Most of this apparent elevation is due to increases in exposure levels measured at TLD locations on Boston Edison property in close proximity to the station proper. For example, the annual exposure at TLD location OA, located at the Overlook Area near the PNPS Health Club (I&S Building), was 606 mR for the entire year. This location is immediately adjacent to the station proper and overlooks the turbine building, therefore receiving the highest direct ambient and sky shine exposure. When the near-site TLDs (those located within 0.6 km of the Reactor Building) are removed from the calculation of averages, the mean annual exposure in Zone 1 falls from 97.6 $\pm$ 89.8 mR/yr to 63.7 $\pm$ 7.5 mR/yr. Such a corrected dose is not statistically different from the Zone 4 average of 61.8 $\pm$ 6.7 mR/yr.

Although the annual exposure at TLD location OA was 544 mR above the average Zone 4 exposure rate, this area is not continuously occupied by members of the general public. When adjusted for such occupancy, a hypothetical member of the public who was at this location for 40 hours per year would only receive an incremental dose of 2.5 mrem over natural background radiation levels. At the nearest residence 0.80 kilometers(0.5 miles) southeast of the PNPS Reactor Building, the annual exposure was calculated as being 60.9 $\pm$ 6.5 mR, which compares quite well to the Zone 4 annual average of 61.8 $\pm$ 6.7 mR.

It must be emphasized that the projected ambient exposures discussed on the previous page are calculated to occur to a maximum-exposed hypothetical individual. Even though conservative assumptions are made in the projection of these dose consequences, all of the projected doses are well below the NRC dose limit of 100 mrem/yr specified in 10CFR20.1301, as well as the EPA dose limit of 25 mrem/yr specified in 40CFR190. Both of these limits are to be applied to real members of the general public, so the fact that the dose to the hypothetical maximum-exposed individual is within the limits ensures that any dose received by a real member of the public would be smaller and well within any applicable limit.

In 1994, Boston Edison contracted with the Plymouth Athletic Club to provide health club services in the old training facility (I&S Building) overlooking the plant. This site is immediately adjacent to the protected area boundary near monitoring location OA and receives appreciable amounts of direct ambient and sky shine exposure from the turbine building. Although the personnel assigned to this facility are contractors of Boston Edison Company, and some have received Level 1 general employee training, they are considered to be members of the public. Due to their extended presence in the facility (2000 hr) during 1998, these personnel represent the most conservative case in regards to ambient radiation exposure to a member of the public. Their annual incremental radiation dose above background during 1998 is estimated as being about 43 mrem, based on the average exposure measured by three TLDs in the building.

The exposures measured by these three TLDs located in the health club would also include any increase in ambient radiation resulting from noble gases and/or particulate activity deposited on the ground from gaseous releases. However, they would not indicate any internal dose received by these contractor personnel from inhalation of small amounts of PNPS-related radioactivity contained in the air. An environmental air sampler located immediately adjacent to the health club did not indicate any PNPS-related activity during 1998. Dose calculations performed in the same manner as those outlined in Section 4.2 yielded a projected total body dose to the maximum-exposed contractor (2000 hr/yr exposure) of about 0.005 mrem, resulting from inhalation.

Again, it must be emphasized that this exposure was received by personnel who are contractors of Boston Edison Company, working in a facility on property under the ownership and control of Boston Edison. Since this exposure was received within the owner-controlled area, it is not used for comparison to the annual dose limit of 25 mrem/yr specified in 40CFR190. This regulation expressly applies to areas at or beyond the owner-controlled property, and is not applicable in this situation. As stated earlier, TLDs at and beyond the site boundary do not indicate elevated ambient radiation levels resulting from the operation of Pilgrim Station.

Although some of the TLDs in close proximity to PNPS indicate increases in exposure levels from ambient radiation, such increases are localized to areas under Boston Edison control. For members of the general public who are not employed or contracted with Boston Edison and are accessing Boston Edison controlled areas (e.g., Shorefront Recreation Area, Health Club, parking lots, etc.), such increases in dose from ambient radiation exposure are estimated as being less than 3 mrem/year.

Table 6.0

Average TLD Exposures By Distance Zone During 1998

Exposure Period	Average Exposure ± Standard Deviation: mR/period			
	Zone 1* 0-3 km	Zone 2 3-8 km	Zone 3 8-15 km	Zone 4 >15 km
Jan-Mar	24.3 ± 23.3	15.5 ± 2.7	15.3 ± 1.7	15.8 ± 1.7
Apr-Jun	23.6 ± 22.2	14.1 ± 2.9	13.8 ± 2.1	14.2 ± 1.4
Jul-Sep	24.7 ± 22.2	15.7 ± 3.3	15.1 ± 1.8	16.2 ± 2.0
Oct-Dec	25.0 ± 23.0	15.2 ± 2.8	15.2 ± 1.6	15.6 ± 1.4
Jan-Dec	97.6 ± 89.8**	60.4 ± 11.8	59.5 ± 7.2	61.8 ± 6.7

* Zone 1 extends from the PNPS restricted/protected area boundary outward to 3 kilometers (2 miles), and includes several TLDs located within the site boundary.

** When corrected for TLDs located within the site boundary, the Zone 1 annual average is calculated to be 63.7 ± 7.5 mR/yr.

7.0 PERCENT OF ODCM EFFLUENT CONTROL LIMITS

The PNPS ODCM contains dose and concentration limits for radioactive effluents. In addition, the effluent controls specified ensure that radioactive releases are maintained as low as reasonably achievable. The percentage of the PNPS ODCM Control limit values were determined from doses calculated in Section 4, the effluent releases summarized in Section 2, and the ODCM Control limits/objectives listed in Tables 7.1 and 7.2.

The percent of applicable control limit values are provided to supplement the information provided in the Section 2 of this report. The format for the percent of applicable limits is modified from that prescribed in Regulatory Guide 1.21 (Reference 1) to accommodate the Radioactive Effluents Technical Specifications (RETS) which became effective March 01, 1986. The percentages have been grouped according to whether the releases were via liquid or gaseous effluent pathways.

7.1 Gaseous Effluent Releases

Dose-based effluent controls related to exposures arising from gaseous effluent releases are presented in Table 7.1. The maximum quarterly air doses and annual whole body doses listed in Table 4.1 were used to calculate the percentage values shown in Table 7.1. All doses resulting from noble gas exposure were a small percentage of the applicable effluent control.

Organ dose limits for the maximum-exposed individual from radioactive particulates, iodines, and tritium from the PNPS ODCM are also shown in Table 7.1. The maximum quarterly and annual organ doses from Tables 4.2-A through 4.2-E were used to calculate the percentages shown in Table 7.1. The resulting organ doses from Pilgrim Station's gaseous releases during 1998 were a small percentage of the corresponding effluent control.

Table 7.1

Percent of ODCM Effluent Control Limits
for Gaseous Effluent Releases During 1998

A. Instantaneous Dose Rate Limit - Noble Gases
PNPS ODCM Control 3.3.1.a
Limit: 500 mrem/yr Total Body Dose

Period	Value - mrem/yr	Fraction of Limit
January-December	8.81E-02	1.76E-02%

B. Instantaneous Dose Rate Limit - Noble Gases
PNPS ODCM Control 3.3.1.a
Limit: 3000 mrem/yr Skin Dose

Period	Value - mrem/yr	Fraction of Limit
January-December	1.27E-01	4.23E-03%

C. Instantaneous Dose Rate Limit - Particulates, Iodines, & Tritium
PNPS ODCM Control 3.3.1.b
Limit: 1500 mrem/yr Organ Dose

Period	Value - mrem/yr	Fraction of Limit
January-December	5.97E-01	3.98E-02%

D. Quarterly Dose Objective - Noble Gas Gamma Air Dose
PNPS ODCM Control 3.3.2.a
Objective: 5 mrad Gamma Air Dose

Period	Value - mrad	Fraction of Limit
January-March	1.82E-02	3.64E-01%
April-June	3.29E-02	6.58E-01%
July-September	7.92E-02	1.58E+00%
October-December	5.82E-02	1.16E+00%

E. Annual Dose Objective - Noble Gas Gamma Air Dose
PNPS ODCM Control 3.3.2.b
Objective: 10 mrad Gamma Air Dose

Period	Value - mrad/yr	Fraction of Limit
January-December	1.31E-01	1.31E+00%

Table 7.1 (continued)

Percent of ODCM Effluent Control Limits
for Gaseous Effluent Releases During 1998

F. Quarterly Dose Objective - Noble Gas Beta Air Dose
PNPS ODCM Control 3.3.2.a
Objective: 10 mrad Beta Air Dose

Period	Value - mrad	Fraction of Limit
January-March	4.10E-03	4.10E-02%
April-June	3.57E-03	3.57E-02%
July-September	1.46E-01	1.46E+00%
October-December	2.78E-03	2.78E-02%

G. Annual Dose Objective - Noble Gas Gamma Air Dose
PNPS ODCM Control 3.3.2.b
Objective: 20 mrad Beta Air Dose

Period	Value - mrad/yr	Fraction of Limit
January-December	9.72E-02	4.86E-01%

H. Quarterly Dose Objective - Particulates, Iodines, & Tritium
PNPS ODCM Control 3.3.3.a
Objective: 7.5 mrem Organ Dose

Period	Value - mrem	Fraction of Limit
January-March	8.60E-02	1.15E+00%
April-June	1.74E-01	2.32E+00%
July-September	2.32E-01	3.09E+00%
October-December	1.43E-01	1.91E+00%

I. Annual Dose Objective - Particulates, Iodines, & Tritium
PNPS ODCM Control 3.3.3.b
Objective: 15 mrem Organ Dose

Period	Value - mrem/yr	Fraction of Limit
January-December	5.97E-01	3.98E+00%

7.2 Liquid Effluent Releases

Liquid effluent concentration limits and dose objectives from the PNPS ODCM are shown in Table 7.2. The quarterly average concentrations from Table 2.3-A were used to calculate the percent concentration limits. The maximum quarterly and annual whole body and organ doses from Tables 4.3-A through 4.3-E were used to calculate the percentages shown in Table 7.2. The resulting concentration and doses from Pilgrim Station's liquid releases during 1998 were a very small percentage of the corresponding effluent control.

Table 7.2

Percent of ODCM Effluent Control Limits
for Liquid Effluent Releases During 1998

A. Fission and Activation Product Effluent Concentration Limit
PNPS ODCM Control 3.2.1
Limit: 10CFR20 Appendix B, Table 2, Column 2 Value

Period	Value - µCi/mL	Fraction of Limit
January-March	2.10E-09	2.81E-02%
April-June	2.79E-09	1.13E-01%
July-September	6.21E-10	3.45E-02%
October-December	6.79E-10	2.47E-02%

B. Tritium Average Concentration Limit
PNPS ODCM Control 3.2.1
Limit: 1.0E-03 µCi/mL

Period	Value - µCi/mL	Fraction of Limit
January-March	5.79E-08	5.79E-03%
April-June	1.43E-06	1.43E-01%
July-September	2.06E-08	2.06E-03%
October-December	3.35E-08	3.35E-03%

C. Dissolved and Entrained Noble Gases Concentration Limit
PNPS ODCM Control 3.2.1
Limit: 2.0E-04 µCi/mL

Period	Value - µCi/mL	Fraction of Limit
January-March	NDA	--
April-June	NDA	--
July-September	NDA	--
October-December	NDA	--

Table 7.2 (continued)

Percent of ODCM Effluent Control Limits
for Liquid Effluent Releases During 1998

D. Quarterly Total Body Dose Objective
PNPS ODCM Control 3.2.2.a
Objective: 1.5 mrem Total Body Dose

Period	Value - mrem	Fraction of Limit
January-March	6.00E-05	4.00E-03%
April-June	1.47E-04	9.80E-03%
July-September	1.91E-05	1.27E-03%
October-December	8.24E-06	5.49E-04%

E. Annual Total Body Dose Objective
PNPS ODCM Control 3.2.2.b
Objective: 3 mrem Total Body Dose

Period	Value - mrem	Fraction of Limit
January-December	2.29E-04	7.63E-03%

F. Quarterly Organ Dose Objective
PNPS ODCM Control 3.2.2.a
Objective: 5 mrem Organ Dose

Period	Value - mrem	Fraction of Limit
January-March	3.20E-04	6.40E-03%
April-June	5.17E-04	1.03E-02%
July-September	5.05E-05	1.01E-03%
October-December	4.06E-05	8.12E-04%

G. Annual Organ Dose Objective
PNPS ODCM Control 3.2.2.b
Objective: 10 mrem Organ Dose

Period	Value - mrem	Fraction of Limit
January-December	9.32E-04	9.32E-03%

8.0 RADIOACTIVE WASTE DISPOSAL DATA

Radioactive wastes which were shipped offsite for processing and disposal during the reporting period are described in Table 8.0, in the standard NRC Regulatory Guide 1.21 format.

The total quantity of radioactivity in Curies and the total volume in cubic meters are summarized in Table 8.0 for the following waste categories:

- Spent resins, filter sludges, and evaporator bottoms;
- Dry compressible wastes, contaminated equipment, etc.;
- Irradiated components, control rods, etc.; and,
- Other.

During the reporting period, a volume of 62 cubic meters of spent resins, filter sludges, etc., containing 495 Curies of radioactivity, was shipped from PNPS for processing and disposal. This category of waste resulted in a final disposal volume of 1.2 cubic meters. Dry compressible wastes and contaminated equipment shipped during the period totaled 990 cubic meters and contained 0.76 Curies of radioactivity. Following processing and volume reduction, the disposal volume of these wastes was 97 cubic meters. No irradiated components were shipped during the reporting period. No shipments of irradiated fuel were made during the reporting period.

Estimates of major radionuclides, those comprising greater than 1% of the total activity in each waste category shipped, are listed in Table 8.0. Seven shipments to Memphis, TN (Hake, Inc.), 8 shipments to Oak Ridge, TN (GTS Duratek), and 6 shipments to Oak Ridge, TN (Molten Metal Technology) were made during the reporting period.

Table 8.0
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Solid Waste and Irradiated Fuel Shipments
January-June 1998

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

1. Estimate of volume and activity content by type of waste

Type of waste	Jan-Jun 1998		
	Volume - m^3	Curies	Total Error
a. Spent resins, filters, filter sludges, evaporator bottoms, etc.	2.37E+01	5.50E+01	± 25%
b. Dry compressible waste, contaminated equipment, etc.	1.06E+02	2.41E-02	± 25%
c. Irradiated components, control rods, etc.	None	None	N/A
d. Other (describe)	None	None	N/A

2. Estimate of major nuclide composition by type of waste[1]

Type of waste	Radionuclide	Abundance	Total Error
a. Spent resins, filters, filter sludges, evaporator bottoms, etc.	Mn-54	1.92E+00%	± 25%
	Fe-55	2.66E+01%	± 25%
	Co-60	4.29E+01%	± 25%
	Ni-63	2.12E+00%	± 25%
	Cs-137	2.56E+01%	± 25%
b. Dry compressible waste, contaminated equipment, etc.	Mn-54	5.91E+00%	± 25%
	Fe-55	7.90E+01%	± 25%
	Co-60	1.21E+01%	± 25%
	Cs-137	1.65E+00%	± 25%
c. Irradiated components, control rods, etc.	None	None	N/A
d. Other (describe)	None	None	N/A

[1] *"Major" is defined as any radionuclide comprising >1% of the total activity in the waste category.*

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
2	Tractor-trailer	Hake Associates,[2] Memphis, TN
5	Tractor-trailer	Molten Metal Technology,[2] Oak Ridge, TN

[2] *This processor provides volume reduction services for dry compressible waste, contaminated equipment, etc. Remaining radioactive wastes will be shipped to either Chem Nuclear Systems, Inc. in Barnwell, SC, or Envirocare of Utah for final disposal.*

B. IRRADIATED FUEL SHIPMENTS & DISPOSITION

Number of Shipments	Mode of Transportation	Destination
None	N/A	N/A

Table 8.0 (continued)
Pilgrim Nuclear Power Station
Effluent and Waste Disposal Report
Solid Waste and Irradiated Fuel Shipments
July-December 1998

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

1. Estimate of volume and activity content by type of waste

Type of waste	Jul-Dec 1998		
	Volume - m^3	Curies	Total Error
a. Spent resins, filters, filter sludges, evaporator bottoms, etc.	3.79E+01	4.40E+02	± 25%
b. Dry compressible waste, contaminated equipment, etc.	8.80E+02	7.33E-01	± 25%
c. Irradiated components, control rods, etc.	None	None	N/A
d. Other (describe)	None	None	N/A

2. Estimate of major nuclide composition by type of waste[1]

Type of waste	Radionuclide	Abundance	Total Error
a. Spent resins, filters, filter sludges, evaporator bottoms, etc.	Mn-54	5.47E+00%	± 25%
	Fe-55	7.75E+01%	± 25%
	Co-60	1.40E+01%	± 25%
	Cs-137	2.37E+00%	± 25%
b. Dry compressible waste, contaminated equipment, etc.	Mn-54	6.08E+00%	± 25%
	Fe-55	7.59E+01%	± 25%
	Co-60	1.39E+01%	± 25%
	Cs-137	2.07E+00%	± 25%
c. Irradiated components, control rods, etc.	None	None	N/A
d. Other (describe)	None	None	N/A

[1] *"Major" is defined as any radionuclide comprising >1% of the total activity in the waste category.*

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
5	Tractor-trailer	Hake Associates,[2] Memphis, TN
8	Tractor-trailer	GTS Duratek,[2] Oak Ridge, TN
1	Tractor-trailer	Molten Metal Technology,[2] Oak Ridge, TN

[2] *This processor provides volume reduction services for dry compressible waste, contaminated equipment, etc. Remaining radioactive wastes will be shipped to either Chem Nuclear Systems, Inc. in Barnwell, SC, or Envirocare of Utah for final disposal.*

B. IRRADIATED FUEL SHIPMENTS & DISPOSITION

Number of Shipments	Mode of Transportation	Destination
None	N/A	N/A

9.0 OFFSITE DOSE CALCULATION MANUAL REVISIONS

The PNPS Offsite Dose Calculation Manual (ODCM) was revised in August 1998 to incorporate changes recommended by the NRC in Generic Letter 89-01. This changed relocated the effluent control and environmental monitoring programs from the Technical Specifications to the ODCM. A copy of the revised ODCM is included with this report as Appendix C.

10.0 REFERENCES

1. U.S. Nuclear Regulatory Commission, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water Cooled Nuclear Power Plants", Regulatory Guide 1.21, Revision 1, June 1974.

2. T.A. Messier memorandum REG 98-117 to K.J. Sejkora, "Documentation for Calculation of 1st and 2nd Quarter 1998 JFD Tables for Pilgrim Station", dated August 14, 1998.

3. T.A. Messier memorandum REG 99-035 to K.J. Sejkora, "Documentation for Calculation of 3rd and 4th Quarter 1998 JFD Tables for Pilgrim Station", dated April 7, 1999.

4. Boston Edison Company, "Pilgrim Nuclear Power Station Offsite Dose Calculation Manual", Revision 8, August 1998.

5. U.S. Nuclear Regulatory Commission, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50 Appendix I", Regulatory Guide 1.109, Revision 1, October 1977.

6. U.S. Nuclear Regulatory Commission, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors", Regulatory Guide 1.111, July 1977.

7. Boston Edison Company, "Pilgrim Station Unit 1 Appendix I Evaluation", April 1977.

8. DE&S Calculation No. BEC-089, "Dose Assessment for January-December 1998 Effluent Report", April 1999.

9. J.N. Hamawi, "AEOLUS", Yankee Atomic Electric Company, YAEC-1120, January 1977.

APPENDIX A

Meteorological Joint Frequency Distributions

TABLE	TABLE TITLE	PAGE
A-1	Distribution of Wind Directions and Speeds for the 33-ft Level of the 220-ft Tower	57
A-2	Distribution of Wind Directions and Speeds for the 220-ft Level of the 220-ft Tower	73

Table A-1
Distributions of Wind Directions and Speeds for the 33-ft Level of the 220-ft Tower

PILGRIM JAN98-MAR98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA — STABILITY CLASS A — CLASS FREQUENCY (PERCENT) = 8.70

SPEED(MPH)		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
		WIND DIRECTION FROM																	
CALM		0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
	(1)	.00	.55	.00	.00	.00	.00	.00	.00	.55	.00	.00	.00	.00	.00	.00	.00	.00	1.10
	(2)	.00	.05	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.10
C-3		0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	4
	(1)	.00	.55	.00	.00	.55	.00	.55	.00	.55	.00	.00	.00	.00	.00	.00	.00	.00	2.21
	(2)	.00	.05	.00	.00	.05	.00	.05	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.19
4-7		10	17	5	10	2	2	0	1	4	3	3	5	11	12	9	8	0	102
	(1)	5.52	9.39	2.76	5.52	1.10	1.10	.00	.55	2.21	1.66	1.66	2.76	6.08	6.63	4.97	4.42	.00	56.35
	(2)	.48	.82	.24	.48	.10	.10	.00	.05	.19	.14	.14	.24	.53	.58	.43	.38	.00	4.90
8-12		6	5	10	1	0	0	0	0	4	10	2	1	10	10	5	3	0	67
	(1)	3.31	2.76	5.52	.55	.00	.00	.00	.00	2.21	5.52	1.10	.55	5.52	5.52	2.76	1.66	.00	37.02
	(2)	.29	.24	.48	.05	.00	.00	.00	.00	.19	.48	.10	.05	.48	.48	.24	.14	.00	3.22
13-18		0	0	1	0	0	0	0	0	0	5	0	0	0	0	0	0	0	6
	(1)	.00	.00	.55	.00	.00	.00	.00	.00	.00	2.76	.00	.00	.00	.00	.00	.00	.00	3.31
	(2)	.00	.00	.05	.00	.00	.00	.00	.00	.00	.24	.00	.00	.00	.00	.00	.00	.00	.29
19-24		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS		16	24	16	11	3	2	1	1	10	18	5	6	21	22	14	11	0	181
	(1)	8.84	13.26	8.84	6.08	1.66	1.10	.55	.55	5.52	9.94	2.76	3.31	11.60	12.15	7.73	6.08	.00	100.00
	(2)	.77	1.15	.77	.53	.16	.10	.05	.05	.48	.86	.24	.29	1.01	1.06	.67	.53	.00	8.70

33.0 FT WIND DATA — STABILITY CLASS B — CLASS FREQUENCY (PERCENT) = 3.22

SPEED(MPH)		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
		WIND DIRECTION FROM																	
CALM		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3		0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	(1)	.00	.00	1.49	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.49
	(2)	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05
4-7		1	5	2	9	2	0	0	0	0	2	1	2	3	2	4	0	0	33
	(1)	1.49	7.46	2.99	13.43	2.99	.00	.00	.00	.00	2.99	1.49	2.99	4.48	2.99	5.97	.00	.00	49.25
	(2)	.05	.24	.10	.43	.10	.00	.00	.00	.00	.10	.05	.10	.14	.10	.19	.00	.00	1.59
8-12		0	3	2	1	1	0	0	0	4	10	3	0	1	3	0	0	0	28
	(1)	.00	4.48	2.99	1.49	1.49	.00	.00	.00	5.97	14.93	4.48	.00	1.49	4.48	.00	.00	.00	41.79
	(2)	.00	.14	.10	.05	.05	.00	.00	.00	.19	.48	.14	.00	.05	.14	.00	.00	.00	1.35
13-18		0	3	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	5
	(1)	.00	4.48	.00	.00	.00	.00	.00	.00	.00	1.49	.00	.00	1.49	.00	.00	.00	.00	7.46
	(2)	.00	.14	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.05	.00	.00	.00	.00	.24
19-24		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS		1	11	5	10	3	0	0	0	4	13	4	2	5	5	4	0	0	67
	(1)	1.49	16.42	7.46	14.93	4.48	.00	.00	.00	5.97	19.40	5.97	2.99	7.46	7.46	5.97	.00	.00	100.00
	(2)	.05	.53	.24	.48	.14	.00	.00	.00	.19	.62	.19	.10	.24	.24	.19	.00	.00	3.22

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM JAN98-MAR98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA — STABILITY CLASS C — CLASS FREQUENCY (PERCENT) = 2.98

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
(1)	.00	1.61	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.61	.00	.00	.00	3.23
(2)	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.10
4-7	0	3	2	1	5	0	0	0	1	1	1	6	2	3	4	0	0	29
(1)	.00	4.84	3.23	1.61	8.06	.00	.00	.00	1.61	1.61	1.61	9.68	3.23	4.84	6.45	.00	.00	46.77
(2)	.00	.14	.10	.05	.24	.00	.00	.00	.05	.05	.05	.29	.10	.14	.19	.00	.00	1.39
8-12	0	3	5	0	0	0	1	1	4	2	1	0	1	1	1	0	0	20
(1)	.00	4.84	8.06	.00	.00	.00	1.61	1.61	6.45	3.23	1.61	.00	1.61	1.61	1.61	.00	.00	32.26
(2)	.00	.14	.24	.00	.00	.00	.05	.05	.19	.10	.05	.00	.05	.05	.05	.00	.00	.96
13-18	0	4	5	0	0	0	0	0	0	1	0	0	1	0	0	0	0	11
(1)	.00	6.45	8.06	.00	.00	.00	.00	.00	.00	1.61	.00	.00	1.61	.00	.00	.00	.00	17.74
(2)	.00	.19	.24	.00	.00	.00	.00	.00	.00	.05	.00	.00	.05	.00	.00	.00	.00	.53
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	11	12	1	5	0	1	1	5	4	2	6	4	5	5	0	0	62
(1)	.00	17.74	19.35	1.61	8.06	.00	1.61	1.61	8.06	6.45	3.23	9.68	6.45	8.06	8.06	.00	.00	100.00
(2)	.00	.53	.58	.05	.24	.00	.05	.05	.24	.19	.10	.29	.19	.24	.24	.00	.00	2.98

33.0 FT WIND DATA — STABILITY CLASS D — CLASS FREQUENCY (PERCENT) = 32.34

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	2	2	3	2	1	8	5	1	0	0	1	2	1	4	1	0	33
(1)	.00	.30	.30	.45	.30	.15	1.19	.74	.15	.00	.00	.15	.30	.15	.59	.15	.00	4.90
(2)	.00	.10	.10	.14	.10	.05	.38	.24	.05	.00	.00	.05	.10	.05	.19	.05	.00	1.59
4-7	6	21	20	14	26	13	3	7	21	10	12	17	20	17	19	1	0	227
(1)	.89	3.12	2.97	2.08	3.86	1.93	.45	1.04	3.12	1.49	1.78	2.53	2.97	2.53	2.82	.15	.00	33.73
(2)	.29	1.01	.96	.67	1.25	.62	.14	.34	1.01	.48	.58	.82	.96	.82	.91	.05	.00	10.91
8-12	11	42	31	12	22	6	0	7	18	21	14	4	37	38	46	11	0	320
(1)	1.63	6.24	4.61	1.78	3.27	.89	.00	1.04	2.67	3.12	2.08	.59	5.50	5.65	6.84	1.63	.00	47.55
(2)	.53	2.02	1.49	.58	1.06	.29	.00	.34	.86	1.01	.67	.19	1.78	1.83	2.21	.53	.00	15.38
13-18	7	22	33	10	2	0	0	0	1	8	0	0	2	2	0	0	0	87
(1)	1.04	3.27	4.90	1.49	.30	.00	.00	.00	.15	1.19	.00	.00	.30	.30	.00	.00	.00	12.93
(2)	.34	1.06	1.59	.48	.10	.00	.00	.00	.05	.38	.00	.00	.10	.10	.00	.00	.00	4.18
19-24	0	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6
(1)	.00	.45	.30	.15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.89
(2)	.00	.14	.10	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.29
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	24	90	88	40	52	20	11	19	41	39	26	22	61	58	69	13	0	673
(1)	3.57	13.37	13.08	5.94	7.73	2.97	1.63	2.82	6.09	5.79	3.86	3.27	9.06	8.62	10.25	1.93	.00	100.00
(2)	1.15	4.32	4.23	1.92	2.50	.96	.53	.91	1.97	1.87	1.25	1.06	2.93	2.79	3.32	.62	.00	32.34

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

Table A-1 (continued)

PILGRIM JAN98-MAR98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA — STABILITY CLASS E — CLASS FREQUENCY (PERCENT) = 45.89

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.31	.00	.00	.10	.00	.00	.00	.00	.42
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.14	.00	.00	.05	.00	.00	.00	.00	.19
C-3	5	2	2	3	7	5	10	19	10	4	7	9	15	11	21	12	0	142
(1)	.52	.21	.21	.31	.73	.52	1.05	1.99	1.05	.42	.73	.94	1.57	1.15	2.20	1.26	.00	14.87
(2)	.24	.10	.10	.14	.34	.24	.48	.91	.48	.19	.34	.43	.72	.53	1.01	.58	.00	6.82
4-7	13	23	18	10	14	7	9	21	40	42	30	30	49	61	42	15	0	424
(1)	1.36	2.41	1.88	1.05	1.47	.73	.94	2.20	4.19	4.40	3.14	3.14	5.13	6.39	4.40	1.57	.00	44.40
(2)	.62	1.11	.86	.48	.67	.34	.43	1.01	1.92	2.02	1.44	1.44	2.35	2.93	2.02	.72	.00	20.37
8-12	19	14	11	11	12	4	4	8	20	58	10	16	15	13	32	23	0	270
(1)	1.99	1.47	1.15	1.15	1.26	.42	.42	.84	2.09	6.07	1.05	1.68	1.57	1.36	3.35	2.41	.00	28.27
(2)	.91	.67	.53	.53	.58	.19	.19	.38	.96	2.79	.48	.77	.72	.62	1.54	1.11	.00	12.97
13-18	4	19	21	6	4	4	0	15	10	14	0	0	4	0	0	1	0	102
(1)	.42	1.99	2.20	.63	.42	.42	.00	1.57	1.05	1.47	.00	.00	.42	.00	.00	.10	.00	10.68
(2)	.19	.91	1.01	.29	.19	.19	.00	.72	.48	.67	.00	.00	.19	.00	.00	.05	.00	4.90
19-24	0	6	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	13
(1)	.00	.63	.63	.10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.36
(2)	.00	.29	.29	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.62
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	41	64	58	31	37	20	23	63	80	121	47	55	84	85	95	51	0	955
(1)	4.29	6.70	6.07	3.25	3.87	2.09	2.41	6.60	8.38	12.67	4.92	5.76	8.80	8.90	9.95	5.34	.00	100.00
(2)	1.97	3.08	2.79	1.49	1.78	.96	1.11	3.03	3.84	5.81	2.26	2.64	4.04	4.08	4.57	2.45	.00	45.89

33.0 FT WIND DATA — STABILITY CLASS F — CLASS FREQUENCY (PERCENT) = 5.81

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	2	1	0	1	0	0	0	0	0	4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	1.65	.83	.00	.83	.00	.00	.00	.00	.00	3.31
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.10	.05	.00	.05	.00	.00	.00	.00	.00	.19
C-3	0	0	0	0	2	2	3	2	3	2	4	6	7	2	1	0	0	34
(1)	.00	.00	.00	.00	1.65	1.65	2.48	1.65	2.48	1.65	3.31	4.96	5.79	1.65	.83	.00	.00	28.10
(2)	.00	.00	.00	.00	.10	.10	.14	.10	.14	.10	.19	.29	.34	.10	.05	.00	.00	1.63
4-7	0	0	0	0	1	0	0	2	3	17	20	7	6	1	1	2	0	60
(1)	.00	.00	.00	.00	.83	.00	.00	1.65	2.48	14.05	16.53	5.79	4.96	.83	.83	1.65	.00	49.59
(2)	.00	.00	.00	.00	.05	.00	.00	.10	.14	.82	.96	.34	.29	.05	.05	.10	.00	2.88
8-12	2	0	0	0	0	0	0	0	1	12	7	0	0	0	0	0	0	22
(1)	1.65	.00	.00	.00	.00	.00	.00	.00	.83	9.92	5.79	.00	.00	.00	.00	.00	.00	18.18
(2)	.10	.00	.00	.00	.00	.00	.00	.00	.05	.58	.34	.00	.00	.00	.00	.00	.00	1.06
13-18	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.83	.00	.00	.00	.00	.00	.00	.00	.83
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.05
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	2	0	0	0	3	2	3	4	9	33	31	14	13	3	2	2	0	121
(1)	1.65	.00	.00	.00	2.48	1.65	2.48	3.31	7.44	27.27	25.62	11.57	10.74	2.48	1.65	1.65	.00	100.00
(2)	.10	.00	.00	.00	.14	.10	.14	.19	.43	1.59	1.49	.67	.62	.14	.10	.10	.00	5.81

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

Table A-1 (continued)

PILGRIM JAN98-MAR98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA STABILITY CLASS G CLASS FREQUENCY (PERCENT) = 1.06

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
	WIND DIRECTION FROM																	
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	1	0	0	1	1	0	1	1	1	0	0	0	6
(1)	.00	.00	.00	.00	.00	4.55	.00	.00	4.55	4.55	.00	4.55	4.55	4.55	.00	.00	.00	27.27
(2)	.00	.00	.00	.00	.00	.05	.00	.00	.05	.05	.00	.05	.05	.05	.00	.00	.00	.29
4-7	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	4.55	4.55	4.55	4.55	.00	.00	.00	.00	.00	18.18
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05	.05	.05	.00	.00	.00	.00	.00	.19
8-12	0	0	0	0	0	0	0	0	0	7	5	0	0	0	0	0	0	12
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	31.82	22.73	.00	.00	.00	.00	.00	.00	54.55
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.34	.24	.00	.00	.00	.00	.00	.00	.58
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	0	0	0	0	1	0	0	2	9	6	2	1	1	0	0	0	22
(1)	.00	.00	.00	.00	.00	4.55	.00	.00	9.09	40.91	27.27	9.09	4.55	4.55	.00	.00	.00	100.00
(2)	.00	.00	.00	.00	.00	.05	.00	.00	.10	.43	.29	.10	.05	.05	.00	.00	.00	1.06

33.0 FT WIND DATA STABILITY CLASS ALL CLASS FREQUENCY (PERCENT) = 100.00

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
	WIND DIRECTION FROM																	
CALM	0	1	0	0	0	0	0	0	3	4	0	1	1	0	0	0	0	10
(1)	.00	.05	.00	.00	.00	.00	.00	.00	.14	.19	.00	.05	.05	.00	.00	.00	.00	.48
(2)	.00	.05	.00	.00	.00	.00	.00	.00	.14	.19	.00	.05	.05	.00	.00	.00	.00	.48
C-3	5	6	5	6	12	9	22	26	16	7	11	17	25	16	26	13	0	222
(1)	.24	.29	.24	.29	.58	.43	1.06	1.25	.77	.34	.53	.82	1.20	.77	1.25	.62	.00	10.67
(2)	.24	.29	.24	.29	.58	.43	1.06	1.25	.77	.34	.53	.82	1.20	.77	1.25	.62	.00	10.67
4-7	30	69	47	44	50	22	12	31	70	76	68	68	91	96	79	26	0	879
(1)	1.44	3.32	2.26	2.11	2.40	1.06	.58	1.49	3.36	3.65	3.27	3.27	4.37	4.61	3.80	1.25	.00	42.24
(2)	1.44	3.32	2.26	2.11	2.40	1.06	.58	1.49	3.36	3.65	3.27	3.27	4.37	4.61	3.80	1.25	.00	42.24
8-12	38	67	59	25	35	10	5	16	51	120	42	21	64	65	84	37	0	739
(1)	1.83	3.22	2.84	1.20	1.68	.48	.24	.77	2.45	5.77	2.02	1.01	3.08	3.12	4.04	1.78	.00	35.51
(2)	1.83	3.22	2.84	1.20	1.68	.48	.24	.77	2.45	5.77	2.02	1.01	3.08	3.12	4.04	1.78	.00	35.51
13-18	11	48	60	16	6	4	0	15	11	30	0	0	8	2	0	1	0	212
(1)	.53	2.31	2.88	.77	.29	.19	.00	.72	.53	1.44	.00	.00	.38	.10	.00	.05	.00	10.19
(2)	.53	2.31	2.88	.77	.29	.19	.00	.72	.53	1.44	.00	.00	.38	.10	.00	.05	.00	10.19
19-24	0	9	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	19
(1)	.00	.43	.38	.10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.91
(2)	.00	.43	.38	.10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.91
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	84	200	179	93	103	45	39	88	151	237	121	107	189	179	189	77	0	2081
(1)	4.04	9.61	8.60	4.47	4.95	2.16	1.87	4.23	7.26	11.39	5.81	5.14	9.08	8.60	9.08	3.70	.00	100.00
(2)	4.04	9.61	8.60	4.47	4.95	2.16	1.87	4.23	7.26	11.39	5.81	5.14	9.08	8.60	9.08	3.70	.00	100.00

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

Table A-1 (continued)

PILGRIM APR98-JUN98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA — STABILITY CLASS A — CLASS FREQUENCY (PERCENT) = 15.59

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	1	0	1	0	1	1	1	2	0	0	1	0	0	0	1	0	9
(1)	.00	.32	.00	.32	.00	.32	.32	.32	.64	.00	.00	.32	.00	.00	.00	.32	.00	2.87
(2)	.00	.05	.00	.05	.00	.05	.05	.05	.10	.00	.00	.05	.00	.00	.00	.05	.00	.45
4-7	19	12	12	15	11	13	7	6	10	9	8	11	30	12	11	11	0	197
(1)	6.05	3.82	3.82	4.78	3.50	4.14	2.23	1.91	3.18	2.87	2.55	3.50	9.55	3.82	3.50	3.50	.00	62.74
(2)	.94	.60	.60	.74	.55	.65	.35	.30	.50	.45	.40	.55	1.49	.60	.55	.55	.00	9.78
8-12	6	12	10	1	0	0	0	1	18	22	5	1	18	3	0	4	0	101
(1)	1.91	3.82	3.18	.32	.00	.00	.00	.32	5.73	7.01	1.59	.32	5.73	.96	.00	1.27	.00	32.17
(2)	.30	.60	.50	.05	.00	.00	.00	.05	.89	1.09	.25	.05	.89	.15	.00	.20	.00	5.01
13-18	2	0	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	7
(1)	.64	.00	1.27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.32	.00	.00	.00	.00	2.23
(2)	.10	.00	.20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.35
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	27	25	26	17	11	14	8	8	30	31	13	13	49	15	11	16	0	314
(1)	8.60	7.96	8.28	5.41	3.50	4.46	2.55	2.55	9.55	9.87	4.14	4.14	15.61	4.78	3.50	5.10	.00	100.00
(2)	1.34	1.24	1.29	.84	.55	.70	.40	.40	1.49	1.54	.65	.65	2.43	.74	.55	.79	.00	15.59

33.0 FT WIND DATA — STABILITY CLASS B — CLASS FREQUENCY (PERCENT) = 3.57

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	1	0	1	1	0	0	0	0	0	0	1	1	0	5
(1)	.00	.00	.00	.00	1.39	.00	1.39	1.39	.00	.00	.00	.00	.00	.00	1.39	1.39	.00	6.94
(2)	.00	.00	.00	.00	.05	.00	.05	.05	.00	.00	.00	.00	.00	.00	.05	.05	.00	.25
4-7	0	1	2	10	3	3	5	1	2	1	4	3	5	3	1	1	0	45
(1)	.00	1.39	2.78	13.89	4.17	4.17	6.94	1.39	2.78	1.39	5.56	4.17	6.94	4.17	1.39	1.39	.00	62.50
(2)	.00	.05	.10	.50	.15	.15	.25	.05	.10	.05	.20	.15	.25	.15	.05	.05	.00	2.23
8-12	0	0	5	0	0	0	0	0	6	9	0	0	2	0	0	0	0	22
(1)	.00	.00	6.94	.00	.00	.00	.00	.00	8.33	12.50	.00	.00	2.78	.00	.00	.00	.00	30.56
(2)	.00	.00	.25	.00	.00	.00	.00	.00	.30	.45	.00	.00	.10	.00	.00	.00	.00	1.09
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	1	7	10	4	3	6	2	8	10	4	3	7	3	2	2	0	72
(1)	.00	1.39	9.72	13.89	5.56	4.17	8.33	2.78	11.11	13.89	5.56	4.17	9.72	4.17	2.78	2.78	.00	100.00
(2)	.00	.05	.35	.50	.20	.15	.30	.10	.40	.50	.20	.15	.35	.15	.10	.10	.00	3.57

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM APR98-JUN98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA — STABILITY CLASS C — CLASS FREQUENCY (PERCENT) = 3.23

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	1	1	1	1	0	0	2	0	0	1	1	0	0	1	0	9
(1)	.00	.00	1.54	1.54	1.54	1.54	.00	.00	3.08	.00	.00	1.54	1.54	.00	.00	1.54	.00	13.85
(2)	.00	.00	.05	.05	.05	.05	.00	.00	.10	.00	.00	.05	.05	.00	.00	.05	.00	.45
4-7	1	1	0	7	3	2	4	2	4	2	4	1	2	3	0	1	0	37
(1)	1.54	1.54	.00	10.77	4.62	3.08	6.15	3.08	6.15	3.08	6.15	1.54	3.08	4.62	.00	1.54	.00	56.92
(2)	.05	.05	.00	.35	.15	.10	.20	.10	.20	.10	.20	.05	.10	.15	.00	.05	.00	1.84
8-12	0	2	6	0	0	0	0	0	3	4	0	0	1	1	0	0	0	17
(1)	.00	3.08	9.23	.00	.00	.00	.00	.00	4.62	6.15	.00	.00	1.54	1.54	.00	.00	.00	26.15
(2)	.00	.10	.30	.00	.00	.00	.00	.00	.15	.20	.00	.00	.05	.05	.00	.00	.00	.84
13-18	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2
(1)	.00	.00	.00	1.54	.00	.00	.00	.00	.00	1.54	.00	.00	.00	.00	.00	.00	.00	3.08
(2)	.00	.00	.00	.05	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.10
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	1	3	7	9	4	3	4	2	9	7	4	2	4	4	0	2	0	65
(1)	1.54	4.62	10.77	13.85	6.15	4.62	6.15	3.08	13.85	10.77	6.15	3.08	6.15	6.15	.00	3.08	.00	100.00
(2)	.05	.15	.35	.45	.20	.15	.20	.10	.45	.35	.20	.10	.20	.20	.00	.10	.00	3.23

33.0 FT WIND DATA — STABILITY CLASS D — CLASS FREQUENCY (PERCENT) = 22.49

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	17	13	2	2	9	3	10	3	0	6	3	5	2	3	0	78
(1)	.00	.00	3.75	2.87	.44	.44	1.99	.66	2.21	.66	.00	1.32	.66	1.10	.44	.66	.00	17.22
(2)	.00	.00	.84	.65	.10	.10	.45	.15	.50	.15	.00	.30	.15	.25	.10	.15	.00	3.87
4-7	7	16	23	23	11	8	12	12	22	28	11	13	20	6	4	11	0	227
(1)	1.55	3.53	5.08	5.08	2.43	1.77	2.65	2.65	4.86	6.18	2.43	2.87	4.42	1.32	.88	2.43	.00	50.11
(2)	.35	.79	1.14	1.14	.55	.40	.60	.60	1.09	1.39	.55	.65	.99	.30	.20	.55	.00	11.27
8-12	4	17	17	4	3	0	1	0	12	36	4	2	8	4	2	0	0	114
(1)	.88	3.75	3.75	.88	.66	.00	.22	.00	2.65	7.95	.88	.44	1.77	.88	.44	.00	.00	25.17
(2)	.20	.84	.84	.20	.15	.00	.05	.00	.60	1.79	.20	.10	.40	.20	.10	.00	.00	5.66
13-18	2	2	19	4	0	0	0	0	0	0	0	0	0	0	0	0	0	27
(1)	.44	.44	4.19	.88	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	5.96
(2)	.10	.10	.94	.20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.34
19-24	0	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
(1)	.00	1.10	.44	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.55
(2)	.00	.25	.10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.35
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	13	40	78	44	16	10	22	15	44	67	15	21	31	15	8	14	0	453
(1)	2.87	8.83	17.22	9.71	3.53	2.21	4.86	3.31	9.71	14.79	3.31	4.64	6.84	3.31	1.77	3.09	.00	100.00
(2)	.65	1.99	3.87	2.18	.79	.50	1.09	.74	2.18	3.33	.74	1.04	1.54	.74	.40	.70	.00	22.49

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM APR98-JUN98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA STABILITY CLASS E CLASS FREQUENCY (PERCENT) = 42.40

	WIND DIRECTION FROM																
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	1	1	0	2	0	2	1	1	0	1	0	0	0	0	9
(1)	.00	.00	.00	.12	.12	.00	.23	.00	.23	.12	.12	.00	.12	.00	.00	.00	.00	1.05
(2)	.00	.00	.00	.05	.05	.00	.10	.00	.10	.05	.05	.00	.05	.00	.00	.00	.00	.45
C-3	6	8	13	23	20	26	26	14	21	13	8	16	13	17	19	10	0	253
(1)	.70	.94	1.52	2.69	2.34	3.04	3.04	1.64	2.46	1.52	.94	1.87	1.52	1.99	2.22	1.17	.00	29.63
(2)	.30	.40	.65	1.14	.99	1.29	1.29	.70	1.04	.65	.40	.79	.65	.84	.94	.50	.00	12.56
4-7	10	11	8	9	15	28	48	32	51	46	21	35	35	25	17	6	0	397
(1)	1.17	1.29	.94	1.05	1.76	3.28	5.62	3.75	5.97	5.39	2.46	4.10	4.10	2.93	1.99	.70	.00	46.49
(2)	.50	.55	.40	.45	.74	1.39	2.38	1.59	2.53	2.28	1.04	1.74	1.74	1.24	.84	.30	.00	19.71
8-12	2	15	15	4	2	3	3	1	18	56	34	12	2	0	3	2	0	172
(1)	.23	1.76	1.76	.47	.23	.35	.35	.12	2.11	6.56	3.98	1.41	.23	.00	.35	.23	.00	20.14
(2)	.10	.74	.74	.20	.10	.15	.15	.05	.89	2.78	1.69	.60	.10	.00	.15	.10	.00	8.54
13-18	0	0	1	6	1	0	0	0	1	7	3	0	0	0	0	0	0	19
(1)	.00	.00	.12	.70	.12	.00	.00	.00	.12	.82	.35	.00	.00	.00	.00	.00	.00	2.22
(2)	.00	.00	.05	.30	.05	.00	.00	.00	.05	.35	.15	.00	.00	.00	.00	.00	.00	.94
19-24	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4
(1)	.00	.00	.23	.23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.47
(2)	.00	.00	.10	.10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.20
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	18	34	39	45	39	57	79	47	93	123	67	63	51	42	39	18	0	854
(1)	2.11	3.98	4.57	5.27	4.57	6.67	9.25	5.50	10.89	14.40	7.85	7.38	5.97	4.92	4.57	2.11	.00	100.00
(2)	.89	1.69	1.94	2.23	1.94	2.83	3.92	2.33	4.62	6.11	3.33	3.13	2.53	2.09	1.94	.89	.00	42.40

33.0 FT WIND DATA STABILITY CLASS F CLASS FREQUENCY (PERCENT) = 9.38

	WIND DIRECTION FROM																
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	1	0	0	0	1	1	5	3	1	1	0	0	1	0	0	0	14
(1)	.00	.53	.00	.00	.00	.53	.53	2.65	1.59	.53	.53	.00	.00	.53	.00	.00	.00	7.41
(2)	.00	.05	.00	.00	.00	.05	.05	.25	.15	.05	.05	.00	.00	.05	.00	.00	.00	.70
C-3	0	0	5	2	3	2	4	10	6	7	4	8	6	7	7	3	0	74
(1)	.00	.00	2.65	1.06	1.59	1.06	2.12	5.29	3.17	3.70	2.12	4.23	3.17	3.70	3.70	1.59	.00	39.15
(2)	.00	.00	.25	.10	.15	.10	.20	.50	.30	.35	.20	.40	.30	.35	.35	.15	.00	3.67
4-7	0	1	0	5	2	5	2	3	1	10	11	21	6	0	2	3	0	72
(1)	.00	.53	.00	2.65	1.06	2.65	1.06	1.59	.53	5.29	5.82	11.11	3.17	.00	1.06	1.59	.00	38.10
(2)	.00	.05	.00	.25	.10	.25	.10	.15	.05	.50	.55	1.04	.30	.00	.10	.15	.00	3.57
8-12	0	1	0	0	0	0	0	0	0	13	13	0	0	0	0	0	0	27
(1)	.00	.53	.00	.00	.00	.00	.00	.00	.00	6.88	6.88	.00	.00	.00	.00	.00	.00	14.29
(2)	.00	.05	.00	.00	.00	.00	.00	.00	.00	.65	.65	.00	.00	.00	.00	.00	.00	1.34
13-18	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.06	.00	.00	.00	.00	.00	.00	.00	1.06
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.10	.00	.00	.00	.00	.00	.00	.00	.10
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	3	5	7	5	8	7	18	10	33	29	29	12	8	9	6	0	189
(1)	.00	1.59	2.65	3.70	2.65	4.23	3.70	9.52	5.29	17.46	15.34	15.34	6.35	4.23	4.76	3.17	.00	100.00
(2)	.00	.15	.25	.35	.25	.40	.35	.89	.50	1.64	1.44	1.44	.60	.40	.45	.30	.00	9.38

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

Table A-1 (continued)

PILGRIM APR98-JUN98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA — STABILITY CLASS G — CLASS FREQUENCY (PERCENT) = 3.33

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
(1)	.00	.00	.00	.00	1.49	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.49
(2)	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05
C-3	0	0	0	0	1	1	1	0	1	5	4	1	3	0	1	1	0	19
(1)	.00	.00	.00	.00	1.49	1.49	1.49	.00	1.49	7.46	5.97	1.49	4.48	.00	1.49	1.49	.00	28.36
(2)	.00	.00	.00	.00	.05	.05	.05	.00	.05	.25	.20	.05	.15	.00	.05	.05	.00	.94
4-7	0	0	0	1	1	0	0	0	1	5	20	2	0	0	0	1	0	31
(1)	.00	.00	.00	1.49	1.49	.00	.00	.00	1.49	7.46	29.85	2.99	.00	.00	.00	1.49	.00	46.27
(2)	.00	.00	.00	.05	.05	.00	.00	.00	.05	.25	.99	.10	.00	.00	.00	.05	.00	1.54
8-12	0	0	0	0	0	0	0	0	0	2	11	0	0	0	0	0	0	13
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	2.99	16.42	.00	.00	.00	.00	.00	.00	19.40
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.10	.55	.00	.00	.00	.00	.00	.00	.65
13-18	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	4.48	.00	.00	.00	.00	.00	.00	.00	4.48
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.15	.00	.00	.00	.00	.00	.00	.00	.15
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	0	0	1	3	1	1	0	2	15	35	3	3	0	1	2	0	67
(1)	.00	.00	.00	1.49	4.48	1.49	1.49	.00	2.99	22.39	52.24	4.48	4.48	.00	1.49	2.99	.00	100.00
(2)	.00	.00	.00	.05	.15	.05	.05	.00	.10	.74	1.74	.15	.15	.00	.05	.10	.00	3.33

33.0 FT WIND DATA — STABILITY CLASS ALL — CLASS FREQUENCY (PERCENT) = 100.00

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	1	0	1	2	1	3	5	5	2	2	0	1	1	0	0	0	24
(1)	.00	.05	.00	.05	.10	.05	.15	.25	.25	.10	.10	.00	.05	.05	.00	.00	.00	1.19
(2)	.00	.05	.00	.05	.10	.05	.15	.25	.25	.10	.10	.00	.05	.05	.00	.00	.00	1.19
C-3	6	9	36	40	28	33	42	29	42	28	16	33	26	29	30	20	0	447
(1)	.30	.45	1.79	1.99	1.39	1.64	2.09	1.44	2.09	1.39	.79	1.64	1.29	1.44	1.49	.99	.00	22.19
(2)	.30	.45	1.79	1.99	1.39	1.64	2.09	1.44	2.09	1.39	.79	1.64	1.29	1.44	1.49	.99	.00	22.19
4-7	37	42	45	70	46	59	78	56	91	101	79	86	98	49	35	34	0	1006
(1)	1.84	2.09	2.23	3.48	2.28	2.93	3.87	2.78	4.52	5.01	3.92	4.27	4.87	2.43	1.74	1.69	.00	49.95
(2)	1.84	2.09	2.23	3.48	2.28	2.93	3.87	2.78	4.52	5.01	3.92	4.27	4.87	2.43	1.74	1.69	.00	49.95
8-12	12	47	53	9	5	3	4	2	57	142	67	15	31	8	5	6	0	466
(1)	.60	2.33	2.63	.45	.25	.15	.20	.10	2.83	7.05	3.33	.74	1.54	.40	.25	.30	.00	23.14
(2)	.60	2.33	2.63	.45	.25	.15	.20	.10	2.83	7.05	3.33	.74	1.54	.40	.25	.30	.00	23.14
13-18	4	2	24	11	1	0	0	0	1	13	3	0	1	0	0	0	0	60
(1)	.20	.10	1.19	.55	.05	.00	.00	.00	.05	.65	.15	.00	.05	.00	.00	.00	.00	2.98
(2)	.20	.10	1.19	.55	.05	.00	.00	.00	.05	.65	.15	.00	.05	.00	.00	.00	.00	2.98
19-24	0	5	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	11
(1)	.00	.25	.20	.10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.55
(2)	.00	.25	.20	.10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.55
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	59	106	162	133	82	96	127	92	196	286	167	134	157	87	70	60	0	2014
(1)	2.93	5.26	8.04	6.60	4.07	4.77	6.31	4.57	9.73	14.20	8.29	6.65	7.80	4.32	3.48	2.98	.00	100.00
(2)	2.93	5.26	8.04	6.60	4.07	4.77	6.31	4.57	9.73	14.20	8.29	6.65	7.80	4.32	3.48	2.98	.00	100.00

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM JUL98-SEP98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA — STABILITY CLASS A — CLASS FREQUENCY (PERCENT) = 13.41

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
	WIND DIRECTION FROM																	
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	1	1	1	1	5	3	4	0	3	1	1	0	2	6	7	5	0	41
(1)	.34	.34	.34	.34	1.70	1.02	1.36	.00	1.02	.34	.34	.00	.68	2.04	2.38	1.70	.00	13.95
(2)	.05	.05	.05	.05	.23	.14	.18	.00	.14	.05	.05	.00	.09	.27	.33	.23	.00	1.87
4-7	8	22	8	20	14	5	1	2	13	21	16	4	25	19	6	14	0	198
(1)	2.72	7.48	2.72	6.80	4.76	1.70	.34	.68	4.42	7.14	5.44	1.36	8.50	6.46	2.04	4.76	.00	67.35
(2)	.36	1.00	.36	.91	.64	.23	.05	.09	.59	.96	.73	.18	1.14	.87	.27	.64	.00	9.03
8-12	1	0	0	3	0	0	0	0	5	42	4	0	0	0	0	0	0	55
(1)	.34	.00	.00	1.02	.00	.00	.00	.00	1.70	14.29	1.36	.00	.00	.00	.00	.00	.00	18.71
(2)	.05	.00	.00	.14	.00	.00	.00	.00	.23	1.92	.18	.00	.00	.00	.00	.00	.00	2.51
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	10	23	9	24	19	8	5	2	21	64	21	4	27	25	13	19	0	294
(1)	3.40	7.82	3.06	8.16	6.46	2.72	1.70	.68	7.14	21.77	7.14	1.36	9.18	8.50	4.42	6.46	.00	100.00
(2)	.46	1.05	.41	1.09	.87	.36	.23	.09	.96	2.92	.96	.18	1.23	1.14	.59	.87	.00	13.41

33.0 FT WIND DATA — STABILITY CLASS B — CLASS FREQUENCY (PERCENT) = 5.24

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
	WIND DIRECTION FROM																	
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	3	0	2	0	0	6	1	2	1	0	2	3	0	2	1	0	23
(1)	.00	2.61	.00	1.74	.00	.00	5.22	.87	1.74	.87	.00	1.74	2.61	.00	1.74	.87	.00	20.00
(2)	.00	.14	.00	.09	.00	.00	.27	.05	.09	.05	.00	.09	.14	.00	.09	.05	.00	1.05
4-7	0	2	1	9	7	1	1	1	4	20	7	4	6	3	1	2	0	69
(1)	.00	1.74	.87	7.83	6.09	.87	.87	.87	3.48	17.39	6.09	3.48	5.22	2.61	.87	1.74	.00	60.00
(2)	.00	.09	.05	.41	.32	.05	.05	.05	.18	.91	.32	.18	.27	.14	.05	.09	.00	3.15
8-12	0	0	0	0	0	0	0	0	2	19	2	0	0	0	0	0	0	23
(1)	.00	.00	.00	.00	.00	.00	.00	.00	1.74	16.52	1.74	.00	.00	.00	.00	.00	.00	20.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.09	.87	.09	.00	.00	.00	.00	.00	.00	1.05
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	5	1	11	7	1	7	2	8	40	9	6	9	3	3	3	0	115
(1)	.00	4.35	.87	9.57	6.09	.87	6.09	1.74	6.96	34.78	7.83	5.22	7.83	2.61	2.61	2.61	.00	100.00
(2)	.00	.23	.05	.50	.32	.05	.32	.09	.36	1.82	.41	.27	.41	.14	.14	.14	.00	5.24

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

Table A-1 (continued)

PILGRIM JUL98-SEP98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA — STABILITY CLASS C — CLASS FREQUENCY (PERCENT) = 4.38

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	1	1	1	3	3	1	4	0	4	0	0	1	2	0	1	1	0	23
(1)	1.04	1.04	1.04	3.13	3.13	1.04	4.17	.00	4.17	.00	.00	1.04	2.08	.00	1.04	1.04	.00	23.96
(2)	.05	.05	.05	.14	.14	.05	.18	.00	.18	.00	.00	.05	.09	.00	.05	.05	.00	1.05
4-7	0	0	1	5	5	2	0	1	5	17	7	3	5	1	1	2	0	55
(1)	.00	.00	1.04	5.21	5.21	2.08	.00	1.04	5.21	17.71	7.29	3.13	5.21	1.04	1.04	2.08	.00	57.29
(2)	.00	.00	.05	.23	.23	.09	.00	.05	.23	.78	.32	.14	.23	.05	.05	.09	.00	2.51
8-12	0	0	0	1	0	0	0	0	2	11	4	0	0	0	0	0	0	18
(1)	.00	.00	.00	1.04	.00	.00	.00	.00	2.08	11.46	4.17	.00	.00	.00	.00	.00	.00	18.75
(2)	.00	.00	.00	.05	.00	.00	.00	.00	.09	.50	.18	.00	.00	.00	.00	.00	.00	.82
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	1	1	2	9	8	3	4	1	11	28	11	4	7	1	2	3	0	96
(1)	1.04	1.04	2.08	9.38	8.33	3.13	4.17	1.04	11.46	29.17	11.46	4.17	7.29	1.04	2.08	3.13	.00	100.00
(2)	.05	.05	.09	.41	.36	.14	.18	.05	.50	1.28	.50	.18	.32	.05	.09	.14	.00	4.38

33.0 FT WIND DATA — STABILITY CLASS D — CLASS FREQUENCY (PERCENT) = 20.29

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	1	12	18	23	7	12	10	8	7	7	4	5	4	7	7	0	132
(1)	.00	.22	2.70	4.04	5.17	1.57	2.70	2.25	1.80	1.57	1.57	.90	1.12	.90	1.57	1.57	.00	29.66
(2)	.00	.05	.55	.82	1.05	.32	.55	.46	.36	.32	.32	.18	.23	.18	.32	.32	.00	6.02
4-7	0	0	3	24	16	7	2	2	44	82	14	14	17	6	8	2	0	241
(1)	.00	.00	.67	5.39	3.60	1.57	.45	.45	9.89	18.43	3.15	3.15	3.82	1.35	1.80	.45	.00	54.16
(2)	.00	.00	.14	1.09	.73	.32	.09	.09	2.01	3.74	.64	.64	.78	.27	.36	.09	.00	10.99
8-12	0	1	0	1	0	0	0	0	3	57	9	1	0	0	0	0	0	72
(1)	.00	.22	.00	.22	.00	.00	.00	.00	.67	12.81	2.02	.22	.00	.00	.00	.00	.00	16.18
(2)	.00	.05	.00	.05	.00	.00	.00	.00	.14	2.60	.41	.05	.00	.00	.00	.00	.00	3.28
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	2	15	43	39	14	14	12	55	146	30	19	22	10	15	9	0	445
(1)	.00	.45	3.37	9.66	8.76	3.15	3.15	2.70	12.36	32.81	6.74	4.27	4.94	2.25	3.37	2.02	.00	100.00
(2)	.00	.09	.68	1.96	1.78	.64	.64	.55	2.51	6.66	1.37	.87	1.00	.46	.68	.41	.00	20.29

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM JUL98-SEP98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA STABILITY CLASS E CLASS FREQUENCY (PERCENT) = 37.35

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	5
(1)	.00	.00	.12	.00	.00	.00	.12	.12	.00	.00	.00	.12	.12	.00	.00	.00	.00	.61
(2)	.00	.00	.05	.00	.00	.00	.05	.05	.00	.00	.00	.05	.05	.00	.00	.00	.00	.23
C-3	0	5	6	14	16	12	15	20	33	15	16	12	26	32	11	9	0	242
(1)	.00	.61	.73	1.71	1.95	1.47	1.83	2.44	4.03	1.83	1.95	1.47	3.17	3.91	1.34	1.10	.00	29.55
(2)	.00	.23	.27	.64	.73	.55	.68	.91	1.50	.68	.73	.55	1.19	1.46	.50	.41	.00	11.04
4-7	3	4	12	14	8	1	3	0	68	158	60	68	25	11	11	4	0	450
(1)	.37	.49	1.47	1.71	.98	.12	.37	.00	8.30	19.29	7.33	8.30	3.05	1.34	1.34	.49	.00	54.95
(2)	.14	.18	.55	.64	.36	.05	.14	.00	3.10	7.20	2.74	3.10	1.14	.50	.50	.18	.00	20.52
8-12	0	3	2	0	0	0	0	0	2	99	16	0	0	0	0	0	0	122
(1)	.00	.37	.24	.00	.00	.00	.00	.00	.24	12.09	1.95	.00	.00	.00	.00	.00	.00	14.90
(2)	.00	.14	.09	.00	.00	.00	.00	.00	.09	4.51	.73	.00	.00	.00	.00	.00	.00	5.56
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	3	12	21	28	24	13	19	21	103	272	92	81	52	43	22	13	0	819
(1)	.37	1.47	2.56	3.42	2.93	1.59	2.32	2.56	12.58	33.21	11.23	9.89	6.35	5.25	2.69	1.59	.00	100.00
(2)	.14	.55	.96	1.28	1.09	.59	.87	.96	4.70	12.40	4.20	3.69	2.37	1.96	1.00	.59	.00	37.35

33.0 FT WIND DATA STABILITY CLASS F CLASS FREQUENCY (PERCENT) = 15.82

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	1	0	0	1	1	1	1	2	0	0	0	0	7
(1)	.00	.00	.00	.00	.00	.29	.00	.00	.29	.29	.29	.29	.58	.00	.00	.00	.00	2.02
(2)	.00	.00	.00	.00	.00	.05	.00	.00	.05	.05	.05	.05	.09	.00	.00	.00	.00	.32
C-3	0	2	0	0	3	1	5	4	10	11	18	33	24	12	2	2	0	127
(1)	.00	.58	.00	.00	.86	.29	1.44	1.15	2.88	3.17	5.19	9.51	6.92	3.46	.58	.58	.00	36.60
(2)	.00	.09	.00	.00	.14	.05	.23	.18	.46	.50	.82	1.50	1.09	.55	.09	.09	.00	5.79
4-7	0	0	0	0	0	1	0	2	7	57	79	21	3	2	0	0	0	172
(1)	.00	.00	.00	.00	.00	.29	.00	.58	2.02	16.43	22.77	6.05	.86	.58	.00	.00	.00	49.57
(2)	.00	.00	.00	.00	.00	.05	.00	.09	.32	2.60	3.60	.96	.14	.09	.00	.00	.00	7.84
8-12	0	0	0	0	0	0	0	0	0	15	26	0	0	0	0	0	0	41
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	4.32	7.49	.00	.00	.00	.00	.00	.00	11.82
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.68	1.19	.00	.00	.00	.00	.00	.00	1.87
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	2	0	0	3	2	5	6	18	84	124	55	29	14	2	2	0	347
(1)	.00	.58	.00	.00	.86	.86	1.44	1.73	5.19	24.21	35.73	15.85	8.36	4.03	.58	.58	.00	100.00
(2)	.00	.09	.00	.00	.14	.14	.23	.27	.82	3.83	5.65	2.51	1.32	.64	.09	.09	.00	15.82

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

Table A-1 (continued)

PILGRIM JUL98-SEP98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA — STABILITY CLASS G — CLASS FREQUENCY (PERCENT) = 3.51

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.30	.00	.00	1.30	.00	.00	.00	2.60
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.05	.00	.00	.00	.09
C-3	0	0	0	0	0	0	0	0	1	2	12	15	6	0	0	0	0	36
(1)	.00	.00	.00	.00	.00	.00	.00	.00	1.30	2.60	15.58	19.48	7.79	.00	.00	.00	.00	46.75
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.05	.09	.55	.68	.27	.00	.00	.00	.00	1.64
4-7	0	0	0	0	0	0	0	0	0	1	33	1	0	0	0	0	0	35
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.30	42.86	1.30	.00	.00	.00	.00	.00	45.45
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	1.50	.05	.00	.00	.00	.00	.00	1.60
8-12	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.30	3.90	.00	.00	.00	.00	.00	.00	5.19
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.14	.00	.00	.00	.00	.00	.00	.18
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	0	0	0	0	0	0	0	1	4	49	16	6	1	0	0	0	77
(1)	.00	.00	.00	.00	.00	.00	.00	.00	1.30	5.19	63.64	20.78	7.79	1.30	.00	.00	.00	100.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.05	.18	2.23	.73	.27	.05	.00	.00	.00	3.51

33.0 FT WIND DATA — STABILITY CLASS ALL — CLASS FREQUENCY (PERCENT) = 100.00

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	1	0	0	1	1	1	1	1	2	2	3	1	0	0	0	14
(1)	.00	.00	.05	.00	.00	.05	.05	.05	.05	.05	.09	.09	.14	.05	.00	.00	.00	.64
(2)	.00	.00	.05	.00	.00	.05	.05	.05	.05	.05	.09	.09	.14	.05	.00	.00	.00	.64
C-3	2	13	20	38	50	24	46	35	61	37	54	67	68	54	30	25	0	624
(1)	.09	.59	.91	1.73	2.28	1.09	2.10	1.60	2.78	1.69	2.46	3.06	3.10	2.46	1.37	1.14	.00	28.45
(2)	.09	.59	.91	1.73	2.28	1.09	2.10	1.60	2.78	1.69	2.46	3.06	3.10	2.46	1.37	1.14	.00	28.45
4-7	11	28	25	72	50	17	7	8	141	356	216	115	81	42	27	24	0	1220
(1)	.50	1.28	1.14	3.28	2.28	.78	.32	.36	6.43	16.23	9.85	5.24	3.69	1.92	1.23	1.09	.00	55.63
(2)	.50	1.28	1.14	3.28	2.28	.78	.32	.36	6.43	16.23	9.85	5.24	3.69	1.92	1.23	1.09	.00	55.63
8-12	1	4	2	5	0	0	0	0	14	244	64	1	0	0	0	0	0	335
(1)	.05	.18	.09	.23	.00	.00	.00	.00	.64	11.13	2.92	.05	.00	.00	.00	.00	.00	15.28
(2)	.05	.18	.09	.23	.00	.00	.00	.00	.64	11.13	2.92	.05	.00	.00	.00	.00	.00	15.28
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	14	45	48	115	100	42	54	44	217	638	336	185	152	97	57	49	0	2193
(1)	.64	2.05	2.19	5.24	4.56	1.92	2.46	2.01	9.90	29.09	15.32	8.44	6.93	4.42	2.60	2.23	.00	100.00
(2)	.64	2.05	2.19	5.24	4.56	1.92	2.46	2.01	9.90	29.09	15.32	8.44	6.93	4.42	2.60	2.23	.00	100.00

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM OCT98-DEC98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA — STABILITY CLASS A — CLASS FREQUENCY (PERCENT) = 11.54

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
	WIND DIRECTION FROM																	
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	2	2	1	0	0	0	0	0	0	1	2	2	1	3	1	0	15
(1)	.00	.79	.79	.40	.00	.00	.00	.00	.00	.00	.40	.79	.79	.40	1.19	.40	.00	5.95
(2)	.00	.09	.09	.05	.00	.00	.00	.00	.00	.00	.05	.09	.09	.05	.14	.05	.00	.69
4-7	11	15	9	3	9	2	1	2	8	4	1	7	39	28	21	13	0	173
(1)	4.37	5.95	3.57	1.19	3.57	.79	.40	.79	3.17	1.59	.40	2.78	15.48	11.11	8.33	5.16	.00	68.65
(2)	.50	.69	.41	.14	.41	.09	.05	.09	.37	.18	.05	.32	1.79	1.28	.96	.60	.00	7.92
8-12	0	0	0	0	0	0	0	0	4	15	4	9	19	4	0	6	0	61
(1)	.00	.00	.00	.00	.00	.00	.00	.00	1.59	5.95	1.59	3.57	7.54	1.59	.00	2.38	.00	24.21
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.18	.69	.18	.41	.87	.18	.00	.27	.00	2.79
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.19	.00	.00	.00	1.19
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.14	.00	.00	.00	.14
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	11	17	11	4	9	2	1	2	12	19	6	18	60	36	24	20	0	252
(1)	4.37	6.75	4.37	1.59	3.57	.79	.40	.79	4.76	7.54	2.38	7.14	23.81	14.29	9.52	7.94	.00	100.00
(2)	.50	.78	.50	.18	.41	.09	.05	.09	.55	.87	.27	.82	2.75	1.65	1.10	.92	.00	11.54

33.0 FT WIND DATA — STABILITY CLASS B — CLASS FREQUENCY (PERCENT) = 2.79

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
	WIND DIRECTION FROM																	
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	1	0	0	0	1	1	1	1	0	1	0	0	2	1	0	9
(1)	.00	.00	1.64	.00	.00	.00	1.64	1.64	1.64	1.64	.00	1.64	.00	.00	3.28	1.64	.00	14.75
(2)	.00	.00	.05	.00	.00	.00	.05	.05	.05	.05	.00	.05	.00	.00	.09	.05	.00	.41
4-7	0	2	0	1	2	2	3	0	1	0	0	10	7	4	1	1	0	34
(1)	.00	3.28	.00	1.64	3.28	3.28	4.92	.00	1.64	.00	.00	16.39	11.48	6.56	1.64	1.64	.00	55.74
(2)	.00	.09	.00	.05	.09	.09	.14	.00	.05	.00	.00	.46	.32	.18	.05	.05	.00	1.56
8-12	0	0	0	0	0	0	0	0	1	5	2	1	2	4	1	2	0	18
(1)	.00	.00	.00	.00	.00	.00	.00	.00	1.64	8.20	3.28	1.64	3.28	6.56	1.64	3.28	.00	29.51
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.05	.23	.09	.05	.09	.18	.05	.09	.00	.82
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	2	1	1	2	2	4	1	3	6	2	12	9	8	4	4	0	61
(1)	.00	3.28	1.64	1.64	3.28	3.28	6.56	1.64	4.92	9.84	3.28	19.67	14.75	13.11	6.56	6.56	.00	100.00
(2)	.00	.09	.05	.05	.09	.09	.18	.05	.14	.27	.09	.55	.41	.37	.18	.18	.00	2.79

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

Table A-1 (continued)

PILGRIM OCT98-DEC98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA — STABILITY CLASS C — CLASS FREQUENCY (PERCENT) = 3.11

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	2	0	0	0	1	0	0	1	0	0	0	0	2	1	0	0	7
(1)	.00	2.94	.00	.00	.00	1.47	.00	.00	1.47	.00	.00	.00	.00	2.94	1.47	.00	.00	10.29
(2)	.00	.09	.00	.00	.00	.05	.00	.00	.05	.00	.00	.00	.00	.09	.05	.00	.00	.32
4-7	1	1	3	2	1	3	4	0	1	2	3	6	8	3	0	0	0	38
(1)	1.47	1.47	4.41	2.94	1.47	4.41	5.88	.00	1.47	2.94	4.41	8.82	11.76	4.41	.00	.00	.00	55.88
(2)	.05	.05	.14	.09	.05	.14	.18	.00	.05	.09	.14	.27	.37	.14	.00	.00	.00	1.74
8-12	0	2	0	0	1	0	0	1	0	4	7	1	3	1	1	2	0	23
(1)	.00	2.94	.00	.00	1.47	.00	.00	1.47	.00	5.88	10.29	1.47	4.41	1.47	1.47	2.94	.00	33.82
(2)	.00	.09	.00	.00	.05	.00	.00	.05	.00	.18	.32	.05	.14	.05	.05	.09	.00	1.05
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	1	5	3	2	2	4	4	1	2	6	10	7	11	6	2	2	0	68
(1)	1.47	7.35	4.41	2.94	2.94	5.88	5.88	1.47	2.94	8.82	14.71	10.29	16.18	8.82	2.94	2.94	.00	100.00
(2)	.05	.23	.14	.09	.09	.18	.18	.05	.09	.27	.46	.32	.50	.27	.09	.09	.00	3.11

33.0 FT WIND DATA — STABILITY CLASS D — CLASS FREQUENCY (PERCENT) = 32.83

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	2	2	3	6	5	11	4	7	5	3	2	3	4	2	0	0	59
(1)	.00	.28	.28	.42	.84	.70	1.53	.56	.98	.70	.42	.28	.42	.56	.28	.00	.00	8.23
(2)	.00	.09	.09	.14	.27	.23	.50	.18	.32	.23	.14	.09	.14	.18	.09	.00	.00	2.70
4-7	6	18	19	5	22	21	31	9	17	27	21	41	45	39	40	13	0	374
(1)	.84	2.51	2.65	.70	3.07	2.93	4.32	1.26	2.37	3.77	2.93	5.72	6.28	5.44	5.58	1.81	.00	52.16
(2)	.27	.82	.87	.23	1.01	.96	1.42	.41	.78	1.24	.96	1.88	2.06	1.79	1.83	.60	.00	17.12
8-12	8	25	11	12	20	3	7	0	10	56	11	14	23	38	20	8	0	266
(1)	1.12	3.49	1.53	1.67	2.79	.42	.98	.00	1.39	7.81	1.53	1.95	3.21	5.30	2.79	1.12	.00	37.10
(2)	.37	1.14	.50	.55	.92	.14	.32	.00	.46	2.56	.50	.64	1.05	1.74	.92	.37	.00	12.18
13-18	0	0	0	0	0	0	0	1	2	2	0	0	8	5	0	0	0	18
(1)	.00	.00	.00	.00	.00	.00	.00	.14	.28	.28	.00	.00	1.12	.70	.00	.00	.00	2.51
(2)	.00	.00	.00	.00	.00	.00	.00	.05	.09	.09	.00	.00	.37	.23	.00	.00	.00	.82
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	14	45	32	20	48	29	49	14	36	90	35	57	79	86	62	21	0	717
(1)	1.95	6.28	4.46	2.79	6.69	4.04	6.83	1.95	5.02	12.55	4.88	7.95	11.02	11.99	8.65	2.93	.00	100.00
(2)	.64	2.06	1.47	.92	2.20	1.33	2.24	.64	1.65	4.12	1.60	2.61	3.62	3.94	2.84	.96	.00	32.83

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM OCT98-DEC98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA — STABILITY CLASS E — CLASS FREQUENCY (PERCENT) = 40.80

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	4	0	4	3	5	14	18	23	24	17	5	14	26	20	18	3	0	198
(1)	.45	.00	.45	.34	.56	1.57	2.02	2.58	2.69	1.91	.56	1.57	2.92	2.24	2.02	.34	.00	22.22
(2)	.18	.00	.18	.14	.23	.64	.82	1.05	1.10	.78	.23	.64	1.19	.92	.82	.14	.00	9.07
4-7	5	9	5	6	13	7	18	14	24	35	73	166	80	24	21	8	0	508
(1)	.56	1.01	.56	.67	1.46	.79	2.02	1.57	2.69	3.93	8.19	18.63	8.98	2.69	2.36	.90	.00	57.01
(2)	.23	.41	.23	.27	.60	.32	.82	.64	1.10	1.60	3.34	7.60	3.66	1.10	.96	.37	.00	23.26
8-12	7	6	0	0	0	4	3	3	10	34	43	27	28	3	8	0	0	176
(1)	.79	.67	.00	.00	.00	.45	.34	.34	1.12	3.82	4.83	3.03	3.14	.34	.90	.00	.00	19.75
(2)	.32	.27	.00	.00	.00	.18	.14	.14	.46	1.56	1.97	1.24	1.28	.14	.37	.00	.00	8.06
13-18	0	0	0	0	0	0	0	0	6	3	0	0	0	0	0	0	0	9
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.67	.34	.00	.00	.00	.00	.00	.00	.00	1.01
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.27	.14	.00	.00	.00	.00	.00	.00	.00	.41
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	16	15	9	9	18	25	39	40	64	89	121	207	134	47	47	11	0	891
(1)	1.80	1.68	1.01	1.01	2.02	2.81	4.38	4.49	7.18	9.99	13.58	23.23	15.04	5.27	5.27	1.23	.00	100.00
(2)	.73	.69	.41	.41	.82	1.14	1.79	1.83	2.93	4.08	5.54	9.48	6.14	2.15	2.15	.50	.00	40.80

33.0 FT WIND DATA — STABILITY CLASS F — CLASS FREQUENCY (PERCENT) = 7.65

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2
(1)	.00	.00	.00	.00	.60	.00	.00	.60	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.20
(2)	.00	.00	.00	.00	.05	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09
C-3	0	0	0	0	1	3	1	3	9	17	6	16	8	4	1	0	0	69
(1)	.00	.00	.00	.00	.60	1.80	.60	1.80	5.39	10.18	3.59	9.58	4.79	2.40	.60	.00	.00	41.32
(2)	.00	.00	.00	.00	.05	.14	.05	.14	.41	.78	.27	.73	.37	.18	.05	.00	.00	3.16
4-7	0	0	0	0	0	0	1	2	4	10	51	16	3	0	0	0	0	87
(1)	.00	.00	.00	.00	.00	.00	.60	1.20	2.40	5.99	30.54	9.58	1.80	.00	.00	.00	.00	52.10
(2)	.00	.00	.00	.00	.00	.00	.05	.09	.18	.46	2.34	.73	.14	.00	.00	.00	.00	3.98
8-12	0	0	0	0	0	0	0	0	0	1	8	0	0	0	0	0	0	9
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.60	4.79	.00	.00	.00	.00	.00	.00	5.39
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.37	.00	.00	.00	.00	.00	.00	.41
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	0	0	0	2	3	2	6	13	28	65	32	11	4	1	0	0	167
(1)	.00	.00	.00	.00	1.20	1.80	1.20	3.59	7.78	16.77	38.92	19.16	6.59	2.40	.60	.00	.00	100.00
(2)	.00	.00	.00	.00	.09	.14	.09	.27	.60	1.28	2.98	1.47	.50	.18	.05	.00	.00	7.65

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM OCT98-DEC98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

33.0 FT WIND DATA STABILITY CLASS G CLASS FREQUENCY (PERCENT) = 1.28

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	0	0	0	0	3	7	5	1	0	0	0	0	16
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	10.71	25.00	17.86	3.57	.00	.00	.00	.00	57.14
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.14	.32	.23	.05	.00	.00	.00	.00	.73
4-7	0	0	0	0	0	0	0	0	0	2	5	1	0	0	0	0	0	8
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	7.14	17.86	3.57	.00	.00	.00	.00	.00	28.57
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09	.23	.05	.00	.00	.00	.00	.00	.37
8-12	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	14.29	.00	.00	.00	.00	.00	.00	.00	14.29
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.18	.00	.00	.00	.00	.00	.00	.00	.18
13-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	0	0	0	0	0	0	0	0	9	12	6	1	0	0	0	0	28
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	32.14	42.86	21.43	3.57	.00	.00	.00	.00	100.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.41	.55	.27	.05	.00	.00	.00	.00	1.28

33.0 FT WIND DATA STABILITY CLASS ALL CLASS FREQUENCY (PERCENT) = 100.00

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2
(1)	.00	.00	.00	.00	.05	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09
(2)	.00	.00	.00	.00	.05	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09
C-3	4	6	9	7	12	23	31	31	42	43	22	40	40	31	27	5	0	373
(1)	.18	.27	.41	.32	.55	1.05	1.42	1.42	1.92	1.97	1.01	1.83	1.83	1.42	1.24	.23	.00	17.08
(2)	.18	.27	.41	.32	.55	1.05	1.42	1.42	1.92	1.97	1.01	1.83	1.83	1.42	1.24	.23	.00	17.08
4-7	23	45	36	17	47	35	58	27	55	80	154	247	182	98	83	35	0	1222
(1)	1.05	2.06	1.65	.78	2.15	1.60	2.66	1.24	2.52	3.66	7.05	11.31	8.33	4.49	3.80	1.60	.00	55.95
(2)	1.05	2.06	1.65	.78	2.15	1.60	2.66	1.24	2.52	3.66	7.05	11.31	8.33	4.49	3.80	1.60	.00	55.95
8-12	15	33	11	12	21	7	10	4	25	119	75	52	75	50	30	18	0	557
(1)	.69	1.51	.50	.55	.96	.32	.46	.18	1.14	5.45	3.43	2.38	3.43	2.29	1.37	.82	.00	25.50
(2)	.69	1.51	.50	.55	.96	.32	.46	.18	1.14	5.45	3.43	2.38	3.43	2.29	1.37	.82	.00	25.50
13-18	0	0	0	0	0	0	0	1	8	5	0	0	8	8	0	0	0	30
(1)	.00	.00	.00	.00	.00	.00	.00	.05	.37	.23	.00	.00	.37	.37	.00	.00	.00	1.37
(2)	.00	.00	.00	.00	.00	.00	.00	.05	.37	.23	.00	.00	.37	.37	.00	.00	.00	1.37
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	42	84	56	36	81	65	99	64	130	247	251	339	305	187	140	58	0	2184
(1)	1.92	3.85	2.56	1.65	3.71	2.98	4.53	2.93	5.95	11.31	11.49	15.52	13.97	8.56	6.41	2.66	.00	100.00
(2)	1.92	3.85	2.56	1.65	3.71	2.98	4.53	2.93	5.95	11.31	11.49	15.52	13.97	8.56	6.41	2.66	.00	100.00

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

Table A-2
Distributions of Wind Directions and Speeds for the 220-ft Level of the 220-ft Tower

PILGRIM JAN98-MAR98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA — STABILITY CLASS A — CLASS FREQUENCY (PERCENT) = 8.44

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
(1)	.00	.60	.00	.00	.00	.00	.00	.60	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.20
(2)	.00	.05	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.10
C-3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
(1)	.00	.60	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.60
(2)	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05
4-7	3	3	1	2	0	1	0	0	1	0	0	0	1	0	1	7	0	20
(1)	1.80	1.80	.60	1.20	.00	.60	.00	.00	.60	.00	.00	.00	.60	.00	.60	4.19	.00	11.98
(2)	.15	.15	.05	.10	.00	.05	.00	.00	.05	.00	.00	.00	.05	.00	.05	.35	.00	1.01
8-12	2	4	1	4	3	3	0	0	1	0	5	3	4	4	6	6	0	46
(1)	1.20	2.40	.60	2.40	1.80	1.80	.00	.00	.60	.00	2.99	1.80	2.40	2.40	3.59	3.59	.00	27.54
(2)	.10	.20	.05	.20	.15	.15	.00	.00	.05	.00	.25	.15	.20	.20	.30	.30	.00	2.33
13-18	4	7	1	0	1	0	0	0	5	10	3	2	2	10	4	10	0	59
(1)	2.40	4.19	.60	.00	.60	.00	.00	.00	2.99	5.99	1.80	1.20	1.20	5.99	2.40	5.99	.00	35.33
(2)	.20	.35	.05	.00	.05	.00	.00	.00	.25	.51	.15	.10	.10	.51	.20	.51	.00	2.98
19-24	1	1	5	1	1	0	0	0	0	4	0	0	0	5	6	5	0	29
(1)	.60	.60	2.99	.60	.60	.00	.00	.00	.00	2.40	.00	.00	.00	2.99	3.59	2.99	.00	17.37
(2)	.05	.05	.25	.05	.05	.00	.00	.00	.00	.20	.00	.00	.00	.25	.30	.25	.00	1.47
GT 24	3	0	2	0	0	0	0	0	0	1	0	0	1	3	0	0	0	10
(1)	1.80	.00	1.20	.00	.00	.00	.00	.00	.00	.60	.00	.00	.60	1.80	.00	.00	.00	5.99
(2)	.15	.00	.10	.00	.00	.00	.00	.00	.00	.05	.00	.00	.05	.15	.00	.00	.00	.51
ALL SPEEDS	13	17	10	7	5	4	0	1	7	15	8	5	8	22	17	28	0	167
(1)	7.78	10.18	5.99	4.19	2.99	2.40	.00	.60	4.19	8.98	4.79	2.99	4.79	13.17	10.18	16.77	.00	100.00
(2)	.66	.86	.51	.35	.25	.20	.00	.05	.35	.76	.40	.25	.40	1.11	.86	1.42	.00	8.44

220.0 FT WIND DATA — STABILITY CLASS B — CLASS FREQUENCY (PERCENT) = 3.13

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4-7	1	0	2	0	1	0	0	0	0	1	0	0	1	1	0	0	0	7
(1)	1.61	.00	3.23	.00	1.61	.00	.00	.00	.00	1.61	.00	.00	1.61	1.61	.00	.00	.00	11.29
(2)	.05	.00	.10	.00	.05	.00	.00	.00	.00	.05	.00	.00	.05	.05	.00	.00	.00	.35
8-12	1	3	0	3	2	0	0	0	0	3	1	0	2	0	2	0	0	17
(1)	1.61	4.84	.00	4.84	3.23	.00	.00	.00	.00	4.84	1.61	.00	3.23	.00	3.23	.00	.00	27.42
(2)	.05	.15	.00	.15	.10	.00	.00	.00	.00	.15	.05	.00	.10	.00	.10	.00	.00	.86
13-18	0	0	1	2	2	0	0	0	2	3	5	2	2	1	2	1	0	23
(1)	.00	.00	1.61	3.23	3.23	.00	.00	.00	3.23	4.84	8.06	3.23	3.23	1.61	3.23	1.61	.00	37.10
(2)	.00	.00	.05	.10	.10	.00	.00	.00	.10	.15	.25	.10	.10	.05	.10	.05	.00	1.16
19-24	1	2	1	0	0	0	0	0	1	3	0	0	0	0	0	0	0	8
(1)	1.61	3.23	1.61	.00	.00	.00	.00	.00	1.61	4.84	.00	.00	.00	.00	.00	.00	.00	12.90
(2)	.05	.10	.05	.00	.00	.00	.00	.00	.05	.15	.00	.00	.00	.00	.00	.00	.00	.40
GT 24	0	3	1	0	0	0	0	0	0	0	0	0	0	2	1	0	0	7
(1)	.00	4.84	1.61	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	3.23	1.61	.00	.00	11.29
(2)	.00	.15	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.10	.05	.00	.00	.35
ALL SPEEDS	3	8	5	5	5	0	0	0	3	10	6	2	5	4	5	1	0	62
(1)	4.84	12.90	8.06	8.06	8.06	.00	.00	.00	4.84	16.13	9.68	3.23	8.06	6.45	8.06	1.61	.00	100.00
(2)	.15	.40	.25	.25	.25	.00	.00	.00	.15	.51	.30	.10	.25	.20	.25	.05	.00	3.13

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM JAN98-MAR98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA STABILITY CLASS C CLASS FREQUENCY (PERCENT) = 3.03

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4-7	0	0	1	0	0	0	0	0	1	0	0	0	1	1	2	0	0	6
(1)	.00	.00	1.67	.00	.00	.00	.00	.00	1.67	.00	.00	.00	1.67	1.67	3.33	.00	.00	10.00
(2)	.00	.00	.05	.00	.00	.00	.00	.00	.05	.00	.00	.00	.05	.05	.10	.00	.00	.30
8-12	1	2	1	1	3	0	0	0	1	0	1	3	2	3	1	0	0	19
(1)	1.67	3.33	1.67	1.67	5.00	.00	.00	.00	1.67	.00	1.67	5.00	3.33	5.00	1.67	.00	.00	31.67
(2)	.05	.10	.05	.05	.15	.00	.00	.00	.05	.00	.05	.15	.10	.15	.05	.00	.00	.96
13-18	0	1	0	1	1	0	0	1	3	2	0	2	1	0	2	0	0	14
(1)	.00	1.67	.00	1.67	1.67	.00	.00	1.67	5.00	3.33	.00	3.33	1.67	.00	3.33	.00	.00	23.33
(2)	.00	.05	.00	.05	.05	.00	.00	.05	.15	.10	.00	.10	.05	.00	.10	.00	.00	.71
19-24	1	4	0	0	0	0	1	0	1	0	0	0	0	2	0	0	0	9
(1)	1.67	6.67	.00	.00	.00	.00	1.67	.00	1.67	.00	.00	.00	.00	3.33	.00	.00	.00	15.00
(2)	.05	.20	.00	.00	.00	.00	.05	.00	.05	.00	.00	.00	.00	.10	.00	.00	.00	.46
GT 24	0	5	5	1	0	0	0	0	0	0	0	0	0	0	1	0	0	12
(1)	.00	8.33	8.33	1.67	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.67	.00	.00	20.00
(2)	.00	.25	.25	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.61
ALL SPEEDS	2	12	7	3	4	0	1	1	6	2	1	5	4	6	6	0	0	60
(1)	3.33	20.00	11.67	5.00	6.67	.00	1.67	1.67	10.00	3.33	1.67	8.33	6.67	10.00	10.00	.00	.00	100.00
(2)	.10	.61	.35	.15	.20	.00	.05	.05	.30	.10	.05	.25	.20	.30	.30	.00	.00	3.03

220.0 FT WIND DATA STABILITY CLASS D CLASS FREQUENCY (PERCENT) = 31.80

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	1	2	0	0	0	1	0	0	0	1	0	1	1	0	0	0	7
(1)	.00	.16	.32	.00	.00	.00	.16	.00	.00	.00	.16	.00	.16	.16	.00	.00	.00	1.11
(2)	.00	.05	.10	.00	.00	.00	.05	.00	.00	.00	.05	.00	.05	.05	.00	.00	.00	.35
4-7	0	1	3	3	11	6	1	5	5	2	2	2	3	5	4	2	0	55
(1)	.00	.16	.48	.48	1.75	.95	.16	.79	.79	.32	.32	.32	.48	.79	.64	.32	.00	8.74
(2)	.00	.05	.15	.15	.56	.30	.05	.25	.25	.10	.10	.10	.15	.25	.20	.10	.00	2.78
8-12	9	8	6	6	6	17	4	4	7	10	10	1	10	3	4	1	0	106
(1)	1.43	1.27	.95	.95	.95	2.70	.64	.64	1.11	1.59	1.59	.16	1.59	.48	.64	.16	.00	16.85
(2)	.46	.40	.30	.30	.30	.86	.20	.20	.35	.51	.51	.05	.51	.15	.20	.05	.00	5.36
13-18	5	29	13	6	15	3	0	4	9	18	8	5	8	17	16	1	0	157
(1)	.79	4.61	2.07	.95	2.38	.48	.00	.64	1.43	2.86	1.27	.79	1.27	2.70	2.54	.16	.00	24.96
(2)	.25	1.47	.66	.30	.76	.15	.00	.20	.46	.91	.40	.25	.40	.86	.81	.05	.00	7.94
19-24	10	23	7	5	12	3	2	3	11	4	11	2	3	14	28	8	0	146
(1)	1.59	3.66	1.11	.79	1.91	.48	.32	.48	1.75	.64	1.75	.32	.48	2.23	4.45	1.27	.00	23.21
(2)	.51	1.16	.35	.25	.61	.15	.10	.15	.56	.20	.56	.10	.15	.71	1.42	.40	.00	7.38
GT 24	15	32	21	15	6	2	0	0	1	6	1	0	5	16	33	5	0	158
(1)	2.38	5.09	3.34	2.38	.95	.32	.00	.00	.16	.95	.16	.00	.79	2.54	5.25	.79	.00	25.12
(2)	.76	1.62	1.06	.76	.30	.10	.00	.00	.05	.30	.05	.00	.25	.81	1.67	.25	.00	7.99
ALL SPEEDS	39	94	52	35	50	31	8	16	33	40	33	10	30	56	85	17	0	629
(1)	6.20	14.94	8.27	5.56	7.95	4.93	1.27	2.54	5.25	6.36	5.25	1.59	4.77	8.90	13.51	2.70	.00	100.00
(2)	1.97	4.75	2.63	1.77	2.53	1.57	.40	.81	1.67	2.02	1.67	.51	1.52	2.83	4.30	.86	.00	31.80

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM JAN98-MAR98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA — STABILITY CLASS E — CLASS FREQUENCY (PERCENT) = 46.71

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	1	1	1	3	1	0	0	1	1	2	1	0	1	3	0	0	16
(1)	.00	.11	.11	.11	.32	.11	.00	.00	.11	.11	.22	.11	.00	.11	.32	.00	.00	1.73
(2)	.00	.05	.05	.05	.15	.05	.00	.00	.05	.05	.10	.05	.00	.05	.15	.00	.00	.81
4-7	2	7	2	2	8	5	6	3	5	3	1	5	4	5	7	5	0	70
(1)	.22	.76	.22	.22	.87	.54	.65	.32	.54	.32	.11	.54	.43	.54	.76	.54	.00	7.58
(2)	.10	.35	.10	.10	.40	.25	.30	.15	.25	.15	.05	.25	.20	.25	.35	.25	.00	3.54
8-12	9	17	9	2	7	8	11	8	8	11	16	7	13	20	22	20	0	188
(1)	.97	1.84	.97	.22	.76	.87	1.19	.87	.87	1.19	1.73	.76	1.41	2.16	2.38	2.16	.00	20.35
(2)	.46	.86	.46	.10	.35	.40	.56	.40	.40	.56	.81	.35	.66	1.01	1.11	1.01	.00	9.50
13-18	10	10	8	16	5	1	4	13	13	41	40	13	20	29	43	26	0	292
(1)	1.08	1.08	.87	1.73	.54	.11	.43	1.41	1.41	4.44	4.33	1.41	2.16	3.14	4.65	2.81	.00	31.60
(2)	.51	.51	.40	.81	.25	.05	.20	.66	.66	2.07	2.02	.66	1.01	1.47	2.17	1.31	.00	14.76
19-24	21	7	3	10	4	6	0	3	10	31	15	13	10	21	12	14	0	180
(1)	2.27	.76	.32	1.08	.43	.65	.00	.32	1.08	3.35	1.62	1.41	1.08	2.27	1.30	1.52	.00	19.48
(2)	1.06	.35	.15	.51	.20	.30	.00	.15	.51	1.57	.76	.66	.51	1.06	.61	.71	.00	9.10
GT 24	17	19	22	13	4	6	3	8	3	20	0	0	4	5	33	21	0	178
(1)	1.84	2.06	2.38	1.41	.43	.65	.32	.87	.32	2.16	.00	.00	.43	.54	3.57	2.27	.00	19.26
(2)	.86	.96	1.11	.66	.20	.30	.15	.40	.15	1.01	.00	.00	.20	.25	1.67	1.06	.00	9.00
ALL SPEEDS	59	61	45	44	31	27	24	35	40	107	74	39	51	81	120	86	0	924
(1)	6.39	6.60	4.87	4.76	3.35	2.92	2.60	3.79	4.33	11.58	8.01	4.22	5.52	8.77	12.99	9.31	.00	100.00
(2)	2.98	3.08	2.28	2.22	1.57	1.37	1.21	1.77	2.02	5.41	3.74	1.97	2.58	4.10	6.07	4.35	.00	46.71

220.0 FT WIND DATA — STABILITY CLASS F — CLASS FREQUENCY (PERCENT) = 6.02

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	0	2	0	0	0	1	0	1	0	0	0	0	4
(1)	.00	.00	.00	.00	.00	.00	1.68	.00	.00	.00	.84	.00	.84	.00	.00	.00	.00	3.36
(2)	.00	.00	.00	.00	.00	.00	.10	.00	.00	.00	.05	.00	.05	.00	.00	.00	.00	.20
4-7	2	2	0	1	3	0	1	1	1	1	1	1	3	2	3	4	0	26
(1)	1.68	1.68	.00	.84	2.52	.00	.84	.84	.84	.84	.84	.84	2.52	1.68	2.52	3.36	.00	21.85
(2)	.10	.10	.00	.05	.15	.00	.05	.05	.05	.05	.05	.05	.15	.10	.15	.20	.00	1.31
8-12	0	0	0	0	0	0	2	0	2	1	3	2	1	8	2	2	0	23
(1)	.00	.00	.00	.00	.00	.00	1.68	.00	1.68	.84	2.52	1.68	.84	6.72	1.68	1.68	.00	19.33
(2)	.00	.00	.00	.00	.00	.00	.10	.00	.10	.05	.15	.10	.05	.40	.10	.10	.00	1.16
13-18	0	0	0	0	1	0	0	0	3	3	11	2	3	3	2	3	0	31
(1)	.00	.00	.00	.00	.84	.00	.00	.00	2.52	2.52	9.24	1.68	2.52	2.52	1.68	2.52	.00	26.05
(2)	.00	.00	.00	.00	.05	.00	.00	.00	.15	.15	.56	.10	.15	.15	.10	.15	.00	1.57
19-24	1	0	0	0	0	0	0	0	1	2	21	2	1	1	0	0	0	29
(1)	.84	.00	.00	.00	.00	.00	.00	.00	.84	1.68	17.65	1.68	.84	.84	.00	.00	.00	24.37
(2)	.05	.00	.00	.00	.00	.00	.00	.00	.05	.10	1.06	.10	.05	.05	.00	.00	.00	1.47
GT 24	1	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	6
(1)	.84	.00	.00	.00	.00	.00	.00	.00	.00	1.68	2.52	.00	.00	.00	.00	.00	.00	5.04
(2)	.05	.00	.00	.00	.00	.00	.00	.00	.00	.10	.15	.00	.00	.00	.00	.00	.00	.30
ALL SPEEDS	4	2	0	1	4	0	5	1	7	9	40	7	9	14	7	9	0	119
(1)	3.36	1.68	.00	.84	3.36	.00	4.20	.84	5.88	7.56	33.61	5.88	7.56	11.76	5.88	7.56	.00	100.00
(2)	.20	.10	.00	.05	.20	.00	.25	.05	.35	.46	2.02	.35	.46	.71	.35	.46	.00	6.02

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

Table A-2 (continued)

PILGRIM JAN98-MAR98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA — STABILITY CLASS G — CLASS FREQUENCY (PERCENT) = .86

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	5.88	.00	5.88
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	00	.00	.00	.00	.05	.00	.05
13-18	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	0	0	6
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	11.76	11.76	5.88	5.88	.00	.00	35.29
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.10	.10	.05	.05	.00	.00	.30
19-24	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	17.65	.00	.00	.00	.00	.00	.00	17.65
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.15	.00	.00	.00	.00	.00	.00	.15
GT 24	0	0	0	0	0	0	0	0	0	1	6	0	0	0	0	0	0	7
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	5.88	35.29	.00	.00	.00	.00	.00	.00	41.18
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.30	.00	.00	.00	.00	.00	.00	.35
ALL SPEEDS	0	0	0	0	0	0	0	0	0	1	9	2	2	1	1	1	0	17
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	5.88	52.94	11.76	11.76	5.88	5.88	5.88	.00	100.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.46	.10	.10	.05	.05	.05	.00	.86

220.0 FT WIND DATA — STABILITY CLASS ALL — CLASS FREQUENCY (PERCENT) = 100.00

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
(1)	.00	.05	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.10
(2)	.00	.05	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.10
C-3	0	3	3	1	3	1	3	0	1	1	4	1	2	2	3	0	0	28
(1)	.00	.15	.15	.05	.15	.05	.15	.00	.05	.05	.20	.05	.10	.10	.15	.00	.00	1.42
(2)	.00	.15	.15	.05	.15	.05	.15	.00	.05	.05	.20	.05	.10	.10	.15	.00	.00	1.42
4-7	8	13	9	8	23	12	8	9	13	7	4	8	13	14	17	18	0	184
(1)	.40	.66	.46	.40	1.16	.61	.40	.46	.66	.35	.20	.40	.66	.71	.86	.91	.00	9.30
(2)	.40	.66	.46	.40	1.16	.61	.40	.46	.66	.35	.20	.40	.66	.71	.86	.91	.00	9.30
8-12	22	34	17	16	21	28	17	12	19	25	36	16	32	38	37	30	0	400
(1)	1.11	1.72	.86	.81	1.06	1.42	.86	.61	.96	1.26	1.82	.81	1.62	1.92	1.87	1.52	.00	20.22
(2)	1.11	1.72	.86	.81	1.06	1.42	.86	.61	.96	1.26	1.82	.81	1.62	1.92	1.87	1.52	.00	20.22
13-18	19	47	23	25	25	4	4	18	35	77	67	28	38	61	70	41	0	582
(1)	.96	2.38	1.16	1.26	1.26	.20	.20	.91	1.77	3.89	3.39	1.42	1.92	3.08	3.54	2.07	.00	29.42
(2)	.96	2.38	1.16	1.26	1.26	.20	.20	.91	1.77	3.89	3.39	1.42	1.92	3.08	3.54	2.07	.00	29.42
19-24	35	37	16	16	17	9	3	6	24	44	50	17	14	43	46	27	0	404
(1)	1.77	1.87	.81	.81	.86	.46	.15	.30	1.21	2.22	2.53	.86	.71	2.17	2.33	1.37	.00	20.42
(2)	1.77	1.87	.81	.81	.86	.46	.15	.30	1.21	2.22	2.53	.86	.71	2.17	2.33	1.37	.00	20.42
GT 24	36	59	51	29	10	8	3	8	4	30	10	0	10	26	68	26	0	378
(1)	1.82	2.98	2.58	1.47	.51	.40	.15	.40	.20	1.52	.51	.00	.51	1.31	3.44	1.31	.00	19.11
(2)	1.82	2.98	2.58	1.47	.51	.40	.15	.40	.20	1.52	.51	.00	.51	1.31	3.44	1.31	.00	19.11
ALL SPEEDS	120	194	119	95	99	62	38	54	96	184	171	70	109	184	241	142	0	1970
(1)	6.07	9.81	6.02	4.80	5.01	3.13	1.92	2.73	4.85	9.30	8.65	3.54	5.51	9.30	12.18	7.18	.00	100.00
(2)	6.07	9.81	6.02	4.80	5.01	3.13	1.92	2.73	4.85	9.30	8.65	3.54	5.51	9.30	12.18	7.18	.00	100.00

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM APR98-JUN98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA STABILITY CLASS A CLASS FREQUENCY (PERCENT) = 14.51

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4-7	0	2	7	2	2	0	0	0	0	0	0	3	0	0	0	2	0	18
(1)	.00	.81	2.82	.81	.81	.00	.00	.00	.00	.00	.00	1.21	.00	.00	.00	.81	.00	7.26
(2)	.00	.12	.41	.12	.12	.00	.00	.00	.00	.00	.00	.18	.00	.00	.00	.12	.00	1.05
8-12	13	4	2	4	6	8	9	2	8	6	4	5	7	3	2	3	0	86
(1)	5.24	1.61	.81	1.61	2.42	3.23	3.63	.81	3.23	2.42	1.61	2.02	2.82	1.21	.81	1.21	.00	34.68
(2)	.76	.23	.12	.23	.35	.47	.53	.12	.47	.35	.23	.29	.41	.18	.12	.18	.00	5.03
13-18	6	11	0	0	0	3	4	1	13	9	4	5	14	4	2	6	0	82
(1)	2.42	4.44	.00	.00	.00	1.21	1.61	.40	5.24	3.63	1.61	2.02	5.65	1.61	.81	2.42	.00	33.06
(2)	.35	.64	.00	.00	.00	.18	.23	.06	.76	.53	.23	.29	.82	.23	.12	.35	.00	4.80
19-24	2	8	3	0	0	0	2	1	2	5	2	0	3	3	0	5	0	36
(1)	.81	3.23	1.21	.00	.00	.00	.81	.40	.81	2.02	.81	.00	1.21	1.21	.00	2.02	.00	14.52
(2)	.12	.47	.18	.00	.00	.00	.12	.06	.12	.29	.12	.00	.18	.18	.00	.29	.00	2.11
GT 24	2	1	5	0	0	0	0	0	1	0	0	0	7	6	0	4	0	26
(1)	.81	.40	2.02	.00	.00	.00	.00	.00	.40	.00	.00	.00	2.82	2.42	.00	1.61	.00	10.48
(2)	.12	.06	.29	.00	.00	.00	.00	.00	.06	.00	.00	.00	.41	.35	.00	.23	.00	1.52
ALL SPEEDS	23	26	17	6	8	11	15	4	24	20	10	13	31	16	4	20	0	248
(1)	9.27	10.48	6.85	2.42	3.23	4.44	6.05	1.61	9.68	8.06	4.03	5.24	12.50	6.45	1.61	8.06	.00	100.00
(2)	1.35	1.52	.99	.35	.47	.64	.88	.23	1.40	1.17	.59	.76	1.81	.94	.23	1.17	.00	14.51

220.0 FT WIND DATA STABILITY CLASS B CLASS FREQUENCY (PERCENT) = 3.86

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4-7	0	1	3	2	1	1	0	1	0	1	0	0	0	0	1	0	0	11
(1)	.00	1.52	4.55	3.03	1.52	1.52	.00	1.52	.00	1.52	.00	.00	.00	.00	1.52	.00	.00	16.67
(2)	.00	.06	.18	.12	.06	.06	.00	.06	.00	.06	.00	.00	.00	.00	.06	.00	.00	.64
8-12	0	1	0	1	1	3	0	3	0	1	1	0	1	0	2	1	0	15
(1)	.00	1.52	.00	1.52	1.52	4.55	.00	4.55	.00	1.52	1.52	.00	1.52	.00	3.03	1.52	.00	22.73
(2)	.00	.06	.00	.06	.06	.18	.00	.18	.00	.06	.06	.00	.06	.00	.12	.06	.00	.88
13-18	1	0	0	0	0	3	4	1	5	4	0	1	3	2	0	1	0	25
(1)	1.52	.00	.00	.00	.00	4.55	6.06	1.52	7.58	6.06	.00	1.52	4.55	3.03	.00	1.52	.00	37.88
(2)	.06	.00	.00	.00	.00	.18	.23	.06	.29	.23	.00	.06	.18	.12	.00	.06	.00	1.46
19-24	0	0	3	0	0	0	0	0	1	2	0	0	3	0	0	1	0	10
(1)	.00	.00	4.55	.00	.00	.00	.00	.00	1.52	3.03	.00	.00	4.55	.00	.00	1.52	.00	15.15
(2)	.00	.00	.18	.00	.00	.00	.00	.00	.06	.12	.00	.00	.18	.00	.00	.06	.00	.59
GT 24	1	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	5
(1)	1.52	.00	1.52	1.52	.00	.00	.00	.00	.00	1.52	.00	.00	1.52	.00	.00	.00	.00	7.58
(2)	.06	.00	.06	.06	.00	.00	.00	.00	.00	.06	.00	.00	.06	.00	.00	.00	.00	.29
ALL SPEEDS	2	2	7	4	2	7	4	5	6	9	1	1	8	2	3	3	0	66
(1)	3.03	3.03	10.61	6.06	3.03	10.61	6.06	7.58	9.09	13.64	1.52	1.52	12.12	3.03	4.55	4.55	.00	100.00
(2)	.12	.12	.41	.23	.12	.41	.23	.29	.35	.53	.06	.06	.47	.12	.18	.18	.00	3.86

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM APR98-JUN98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA STABILITY CLASS C CLASS FREQUENCY (PERCENT) = 3.28

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	2
(1)	.00	.00	.00	.00	1.79	.00	.00	.00	.00	.00	.00	1.79	.00	.00	.00	.00	.00	3.57
(2)	.00	.00	.00	.00	.06	.00	.00	.00	.00	.00	.00	.06	.00	.00	.00	.00	.00	.12
4-7	0	0	0	2	1	3	0	1	1	2	0	1	1	0	0	1	0	13
(1)	.00	.00	.00	3.57	1.79	5.36	.00	1.79	1.79	3.57	.00	1.79	1.79	.00	.00	1.79	.00	23.21
(2)	.00	.00	.00	.12	.06	.18	.00	.06	.06	.12	.00	.06	.06	.00	.00	.06	.00	.76
8-12	1	0	0	1	1	0	2	0	1	2	2	1	0	0	0	1	0	12
(1)	1.79	.00	.00	1.79	1.79	.00	3.57	.00	1.79	3.57	3.57	1.79	.00	.00	.00	1.79	.00	21.43
(2)	.06	.00	.00	.06	.06	.00	.12	.00	.06	.12	.12	.06	.00	.00	.00	.06	.00	.70
13-18	0	2	0	0	1	0	4	2	4	2	0	0	0	1	0	0	0	16
(1)	.00	3.57	.00	.00	1.79	.00	7.14	3.57	7.14	3.57	.00	.00	.00	1.79	.00	.00	.00	28.57
(2)	.00	.12	.00	.00	.06	.00	.23	.12	.23	.12	.00	.00	.00	.06	.00	.00	.00	.94
19-24	0	0	3	3	0	0	0	0	0	1	0	0	1	2	0	0	0	10
(1)	.00	.00	5.36	5.36	.00	.00	.00	.00	.00	1.79	.00	.00	1.79	3.57	.00	.00	.00	17.86
(2)	.00	.00	.18	.18	.00	.00	.00	.00	.00	.06	.00	.00	.06	.12	.00	.00	.00	.59
GT 24	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	3
(1)	1.79	.00	.00	1.79	.00	.00	.00	.00	.00	1.79	.00	.00	.00	.00	.00	.00	.00	5.36
(2)	.06	.00	.00	.06	.00	.00	.00	.00	.00	.06	.00	.00	.00	.00	.00	.00	.00	.18
ALL SPEEDS	2	2	3	7	4	3	6	3	6	8	2	3	2	3	0	2	0	56
(1)	3.57	3.57	5.36	12.50	7.14	5.36	10.71	5.36	10.71	14.29	3.57	5.36	3.57	5.36	.00	3.57	.00	100.00
(2)	.12	.12	.18	.41	.23	.18	.35	.18	.35	.47	.12	.18	.12	.18	.00	.12	.00	3.28

220.0 FT WIND DATA STABILITY CLASS D CLASS FREQUENCY (PERCENT) = 22.53

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	2	3	1	2	2	1	1	1	1	0	0	2	1	0	0	0	17
(1)	.00	.52	.78	.26	.52	.52	.26	.26	.26	.26	.00	.00	.52	.26	.00	.00	.00	4.42
(2)	.00	.12	.18	.06	.12	.12	.06	.06	.06	.06	.00	.00	.12	.06	.00	.00	.00	.99
4-7	2	4	16	12	3	2	1	4	4	2	0	0	3	0	1	1	0	55
(1)	.52	1.04	4.16	3.12	.78	.52	.26	1.04	1.04	.52	.00	.00	.78	.00	.26	.26	.00	14.29
(2)	.12	.23	.94	.70	.18	.12	.06	.23	.23	.12	.00	.00	.18	.00	.06	.06	.00	3.22
8-12	8	7	1	6	5	4	11	8	7	16	5	2	7	1	4	3	0	95
(1)	2.08	1.82	.26	1.56	1.30	1.04	2.86	2.08	1.82	4.16	1.30	.52	1.82	.26	1.04	.78	.00	24.68
(2)	.47	.41	.06	.35	.29	.23	.64	.47	.41	.94	.29	.12	.41	.06	.23	.18	.00	5.56
13-18	2	10	5	2	5	1	10	6	9	9	10	4	4	10	2	6	0	95
(1)	.52	2.60	1.30	.52	1.30	.26	2.60	1.56	2.34	2.34	2.60	1.04	1.04	2.60	.52	1.56	.00	24.68
(2)	.12	.59	.29	.12	.29	.06	.59	.35	.53	.53	.59	.23	.23	.59	.12	.35	.00	5.56
19-24	1	6	3	3	0	0	0	2	2	17	2	0	5	5	3	5	0	54
(1)	.26	1.56	.78	.78	.00	.00	.00	.52	.52	4.42	.52	.00	1.30	1.30	.78	1.30	.00	14.03
(2)	.06	.35	.18	.18	.00	.00	.00	.12	.12	.99	.12	.00	.29	.29	.18	.29	.00	3.16
GT 24	9	12	27	7	1	0	0	0	2	4	0	0	4	2	1	0	0	69
(1)	2.34	3.12	7.01	1.82	.26	.00	.00	.00	.52	1.04	.00	.00	1.04	.52	.26	.00	.00	17.92
(2)	.53	.70	1.58	.41	.06	.00	.00	.00	.12	.23	.00	.00	.23	.12	.06	.00	.00	4.04
ALL SPEEDS	22	41	55	31	16	9	23	21	25	49	17	6	25	19	11	15	0	385
(1)	5.71	10.65	14.29	8.05	4.16	2.34	5.97	5.45	6.49	12.73	4.42	1.56	6.49	4.94	2.86	3.90	.00	100.00
(2)	1.29	2.40	3.22	1.81	.94	.53	1.35	1.23	1.46	2.87	.99	.35	1.46	1.11	.64	.88	.00	22.53

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM APR98-JUN98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA STABILITY CLASS E CLASS FREQUENCY (PERCENT) = 44.94

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
	WIND DIRECTION FROM																	
CALM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.13	.00	.00	.13	.00	.00	.00	.00	.00	.26
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.06	.00	.00	.06	.00	.00	.00	.00	.00	.12
C-3	1	1	1	5	4	6	3	4	4	1	1	0	3	4	1	2	0	41
(1)	.13	.13	.13	.65	.52	.78	.39	.52	.52	.13	.13	.00	.39	.52	.13	.26	.00	5.34
(2)	.06	.06	.06	.29	.23	.35	.18	.23	.23	.06	.06	.00	.18	.23	.06	.12	.00	2.40
4-7	1	9	14	8	18	11	13	8	13	11	1	2	4	6	9	13	0	139
(1)	.13	1.17	1.82	1.04	2.34	1.43	1.69	1.04	1.69	1.43	.13	.26	.52	.52	1.17	1.69	.00	18.10
(2)	.06	.53	.82	.47	1.05	.64	.76	.47	.76	.64	.06	.12	.23	.23	.53	.76	.00	8.13
8-12	11	4	4	3	14	10	25	24	23	14	9	4	9	5	11	7	0	177
(1)	1.43	.52	.52	.39	1.82	1.30	3.26	3.13	2.99	1.82	1.17	.52	1.17	.65	1.43	.91	.00	23.05
(2)	.64	.23	.23	.18	.82	.59	1.46	1.40	1.35	.82	.53	.23	.53	.29	.64	.41	.00	10.36
13-18	3	2	4	1	5	7	32	18	25	26	13	8	11	15	24	7	0	201
(1)	.39	.26	.52	.13	.65	.91	4.17	2.34	3.26	3.39	1.69	1.04	1.43	1.95	3.13	.91	.00	26.17
(2)	.18	.12	.23	.06	.29	.41	1.87	1.05	1.46	1.52	.76	.47	.64	.88	1.40	.41	.00	11.76
19-24	2	7	4	1	3	2	14	3	7	45	26	16	14	5	3	2	0	154
(1)	.26	.91	.52	.13	.39	.26	1.82	.39	.91	5.86	3.39	2.08	1.82	.65	.39	.26	.00	20.05
(2)	.12	.41	.23	.06	.18	.12	.82	.18	.41	2.63	1.52	.94	.82	.29	.18	.12	.00	9.01
GT 24	5	4	11	12	2	2	2	0	1	8	0	0	0	1	3	3	0	54
(1)	.65	.52	1.43	1.56	.26	.26	.26	.00	.13	1.04	.00	.00	.00	.13	.39	.39	.00	7.03
(2)	.29	.23	.64	.70	.12	.12	.12	.00	.06	.47	.00	.00	.00	.06	.18	.18	.00	3.16
ALL SPEEDS	23	27	38	30	46	38	89	57	74	105	50	31	41	34	51	34	0	768
(1)	2.99	3.52	4.95	3.91	5.99	4.95	11.59	7.42	9.64	13.67	6.51	4.04	5.34	4.43	6.64	4.43	.00	100.00
(2)	1.35	1.58	2.22	1.76	2.69	2.22	5.21	3.34	4.33	6.14	2.93	1.81	2.40	1.99	2.98	1.99	.00	44.94

220.0 FT WIND DATA STABILITY CLASS F CLASS FREQUENCY (PERCENT) = 8.48

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
	WIND DIRECTION FROM																	
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	1	1	1	1	0	2	2	3	0	0	1	0	0	0	0	12
(1)	.00	.00	.69	.69	.69	.69	.00	1.38	1.38	2.07	.00	.00	.69	.00	.00	.00	.00	8.28
(2)	.00	.00	.06	.06	.06	.06	.00	.12	.12	.18	.00	.00	.06	.00	.00	.00	.00	.70
4-7	1	1	6	2	0	2	3	4	6	5	4	0	1	1	3	5	0	44
(1)	.69	.69	4.14	1.38	.00	1.38	2.07	2.76	4.14	3.45	2.76	.00	.69	.69	2.07	3.45	.00	30.34
(2)	.06	.06	.35	.12	.00	.12	.18	.23	.35	.29	.23	.00	.06	.06	.18	.29	.00	2.57
8-12	1	0	3	1	1	1	6	2	1	1	0	1	1	3	2	1	0	25
(1)	.69	.00	2.07	.69	.69	.69	4.14	1.38	.69	.69	.00	.69	.69	2.07	1.38	.69	.00	17.24
(2)	.06	.00	.18	.06	.06	.06	.35	.12	.06	.06	.00	.06	.06	.18	.12	.06	.00	1.46
13-18	0	2	0	0	1	0	9	2	2	3	5	7	8	7	0	1	0	47
(1)	.00	1.38	.00	.00	.69	.00	6.21	1.38	1.38	2.07	3.45	4.83	5.52	4.83	.00	.69	.00	32.41
(2)	.00	.12	.00	.00	.06	.00	.53	.12	.12	.18	.29	.41	.47	.41	.00	.06	.00	2.75
19-24	0	0	0	1	0	0	0	0	0	2	5	2	2	0	0	1	0	13
(1)	.00	.00	.00	.69	.00	.00	.00	.00	.00	1.38	3.45	1.38	1.38	.00	.00	.69	.00	8.97
(2)	.00	.00	.00	.06	.00	.00	.00	.00	.00	.12	.29	.12	.12	.00	.00	.06	.00	.76
GT 24	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	2.76	.00	.00	.00	.00	.00	.00	2.76
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.23	.00	.00	.00	.00	.00	.00	.23
ALL SPEEDS	2	3	10	5	3	4	18	10	11	14	18	10	13	11	5	8	0	145
(1)	1.38	2.07	6.90	3.45	2.07	2.76	12.41	6.90	7.59	9.66	12.41	6.90	8.97	7.59	3.45	5.52	.00	100.00
(2)	.12	.18	.59	.29	.18	.23	1.05	.59	.64	.82	1.05	.59	.76	.64	.29	.47	.00	8.48

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM APR98-JUN98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA STABILITY CLASS G CLASS FREQUENCY (PERCENT) = 2.40

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	4.88	.00	.00	.00	.00	.00	.00	4.88
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.12	.00	.00	.00	.00	.00	.00	.12
4-7	0	0	0	0	0	0	2	0	0	0	1	1	1	0	1	0	0	6
(1)	.00	.00	.00	.00	.00	.00	4.88	.00	.00	.00	2.44	2.44	2.44	.00	2.44	.00	.00	14.63
(2)	.00	.00	.00	.00	.00	.00	.12	.00	.00	.00	.06	.06	.06	.00	.06	.00	.00	.35
8-12	0	0	1	0	0	1	1	1	1	1	3	0	1	3	0	0	0	13
(1)	.00	.00	2.44	.00	.00	2.44	2.44	2.44	2.44	2.44	7.32	.00	2.44	7.32	.00	.00	.00	31.71
(2)	.00	.00	.06	.00	.00	.06	.06	.06	.06	.06	.18	.00	.06	.18	.00	.00	.00	.76
13-18	0	0	0	0	0	0	1	0	0	0	3	2	7	1	0	0	0	14
(1)	.00	.00	.00	.00	.00	.00	2.44	.00	.00	.00	7.32	4.88	17.07	2.44	.00	.00	.00	34.15
(2)	.00	.00	.00	.00	.00	.00	.06	.00	.00	.00	.18	.12	.41	.06	.00	.00	.00	.82
19-24	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	5
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	9.76	2.44	.00	.00	.00	.00	.00	12.20
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.23	.06	.00	.00	.00	.00	.00	.29
GT 24	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	2.44	.00	.00	.00	.00	.00	.00	2.44
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.06	.00	.00	.00	.00	.00	.00	.06
ALL SPEEDS	0	0	1	0	0	1	4	1	1	1	14	4	9	4	1	0	0	41
(1)	.00	.00	2.44	.00	.00	2.44	9.76	2.44	2.44	2.44	34.15	9.76	21.95	9.76	2.44	.00	.00	100.00
(2)	.00	.00	.06	.00	.00	.06	.23	.06	.06	.06	.82	.23	.53	.23	.06	.00	.00	2.40

220.0 FT WIND DATA STABILITY CLASS ALL CLASS FREQUENCY (PERCENT) = 100.00

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.06	.00	.00	.06	.00	.00	.00	.00	.00	.12
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.06	.00	.00	.06	.00	.00	.00	.00	.00	.12
C-3	1	3	5	7	8	9	4	7	7	5	3	1	6	5	1	2	0	74
(1)	.06	.18	.29	.41	.47	.53	.23	.41	.41	.29	.18	.06	.35	.29	.06	.12	.00	4.33
(2)	.06	.18	.29	.41	.47	.53	.23	.41	.41	.29	.18	.06	.35	.29	.06	.12	.00	4.33
4-7	4	17	46	28	25	19	19	18	24	21	6	7	10	5	15	22	0	286
(1)	.23	.99	2.69	1.64	1.46	1.11	1.11	1.05	1.40	1.23	.35	.41	.59	.29	.88	1.29	.00	16.73
(2)	.23	.99	2.69	1.64	1.46	1.11	1.11	1.05	1.40	1.23	.35	.41	.59	.29	.88	1.29	.00	16.73
8-12	34	16	11	16	28	27	54	40	41	41	24	13	26	15	21	16	0	423
(1)	1.99	.94	.64	.94	1.64	1.58	3.16	2.34	2.40	2.40	1.40	.76	1.52	.88	1.23	.94	.00	24.75
(2)	1.99	.94	.64	.94	1.64	1.58	3.16	2.34	2.40	2.40	1.40	.76	1.52	.88	1.23	.94	.00	24.75
13-18	12	27	9	3	12	14	64	30	58	53	35	27	47	40	28	21	0	480
(1)	.70	1.58	.53	.18	.70	.82	3.74	1.76	3.39	3.10	2.05	1.58	2.75	2.34	1.64	1.23	.00	28.09
(2)	.70	1.58	.53	.18	.70	.82	3.74	1.76	3.39	3.10	2.05	1.58	2.75	2.34	1.64	1.23	.00	28.09
19-24	5	21	16	8	3	2	16	6	12	72	39	19	28	15	6	14	0	282
(1)	.29	1.23	.94	.47	.18	.12	.94	.35	.70	4.21	2.28	1.11	1.64	.88	.35	.82	.00	16.50
(2)	.29	1.23	.94	.47	.18	.12	.94	.35	.70	4.21	2.28	1.11	1.64	.88	.35	.82	.00	16.50
GT 24	18	17	44	21	3	2	2	0	4	14	5	0	12	9	4	7	0	162
(1)	1.05	.99	2.57	1.23	.18	.12	.12	.00	.23	.82	.29	.00	.70	.53	.23	.41	.00	9.48
(2)	1.05	.99	2.57	1.23	.18	.12	.12	.00	.23	.82	.29	.00	.70	.53	.23	.41	.00	9.48
ALL SPEEDS	74	101	131	83	79	73	159	101	147	206	112	68	129	89	75	82	0	1709
(1)	4.33	5.91	7.67	4.86	4.62	4.27	9.30	5.91	8.60	12.05	6.55	3.98	7.55	5.21	4.39	4.80	.00	100.00
(2)	4.33	5.91	7.67	4.86	4.62	4.27	9.30	5.91	8.60	12.05	6.55	3.98	7.55	5.21	4.39	4.80	.00	100.00

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM JUL98-SEP98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA — STABILITY CLASS A — CLASS FREQUENCY (PERCENT) = 13.41

	WIND DIRECTION FROM																
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	2
(1)	.00	.00	.00	.00	.00	.34	.00	.00	.00	.00	.34	.00	.00	.00	.00	.00	.00	.68
(2)	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.09
4-7	3	6	3	6	10	7	1	0	4	1	2	1	5	4	9	8	0	70
(1)	1.02	2.04	1.02	2.04	3.40	2.38	.34	.00	1.36	.34	.68	.34	1.70	1.36	3.06	2.72	.00	23.81
(2)	.14	.27	.14	.27	.46	.32	.05	.00	.18	.05	.09	.05	.23	.18	.41	.36	.00	3.19
8-12	6	2	1	4	7	7	7	2	14	6	8	5	12	7	7	6	0	101
(1)	2.04	.68	.34	1.36	2.38	2.38	2.38	.68	4.76	2.04	2.72	1.70	4.08	2.38	2.38	2.04	.00	34.35
(2)	.27	.09	.05	.18	.32	.32	.32	.09	.64	.27	.36	.23	.55	.32	.32	.27	.00	4.61
13-18	4	3	0	3	1	0	0	0	14	33	12	1	10	5	1	6	0	93
(1)	1.36	1.02	.00	1.02	.34	.00	.00	.00	4.76	11.22	4.08	.34	3.40	1.70	.34	2.04	.00	31.63
(2)	.18	.14	.00	.14	.05	.00	.00	.00	.64	1.50	.55	.05	.46	.23	.05	.27	.00	4.24
19-24	2	0	0	0	0	0	0	0	1	8	1	0	0	8	1	2	0	23
(1)	.68	.00	.00	.00	.00	.00	.00	.00	.34	2.72	.34	.00	.00	2.72	.34	.68	.00	7.82
(2)	.09	.00	.00	.00	.00	.00	.00	.00	.05	.36	.05	.00	.00	.36	.05	.09	.00	1.05
GT 24	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	5
(1)	.34	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.68	.00	.68	.00	1.70
(2)	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09	.00	.09	.00	.23
ALL SPEEDS	16	11	4	13	18	15	8	2	33	48	24	7	27	26	18	24	0	294
(1)	5.44	3.74	1.36	4.42	6.12	5.10	2.72	.68	11.22	16.33	8.16	2.38	9.18	8.84	6.12	8.16	.00	100.00
(2)	.73	.50	.18	.59	.82	.68	.36	.09	1.50	2.19	1.09	.32	1.23	1.19	.82	1.09	.00	13.41

220.0 FT WIND DATA — STABILITY CLASS B — CLASS FREQUENCY (PERCENT) = 5.24

	WIND DIRECTION FROM																
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4-7	0	4	4	4	6	0	0	1	1	1	1	1	1	1	3	1	0	29
(1)	.00	3.48	3.48	3.48	5.22	.00	.00	.87	.87	.87	.87	.87	.87	.87	2.61	.87	.00	25.22
(2)	.00	.18	.18	.18	.27	.00	.00	.05	.05	.05	.05	.05	.05	.05	.14	.05	.00	1.32
8-12	0	1	0	1	2	2	8	1	5	7	1	1	3	1	1	1	0	35
(1)	.00	.87	.00	.87	1.74	1.74	6 96	.87	4.35	6.09	.87	.87	2.61	.87	.87	.87	.00	30.43
(2)	.00	.05	.00	.05	.09	.09	36	.05	.23	.32	.05	.05	.14	.05	.05	.05	.00	1.60
13-18	0	0	0	0	0	0	0	0	6	20	7	4	3	1	0	1	0	42
(1)	.00	.00	.00	.00	.00	.00	.00	.00	5.22	17.39	6.09	3.48	2.61	.87	.00	.87	.00	36.52
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.27	.91	.32	.18	.14	.05	.00	.05	.00	1.92
19-24	0	0	0	0	0	0	0	0	0	5	1	0	0	2	0	0	0	8
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	4.35	.87	.00	.00	1.74	.00	.00	.00	6.96
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.23	.05	.00	.00	.09	.00	.00	.00	.36
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.87	.00	.87
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.05
ALL SPEEDS	0	5	4	5	8	2	8	2	12	33	10	6	7	5	4	4	0	115
(1)	.00	4.35	3.48	4.35	6.96	1.74	6.96	1.74	10.43	28.70	8.70	5.22	6.09	4.35	3.48	3.48	.00	100.00
(2)	.00	.23	.18	.23	.36	.09	.36	.09	.55	1.50	.46	.27	.32	.23	.18	.18	.00	5.24

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM JUL98-SEP98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA STABILITY CLASS C CLASS FREQUENCY (PERCENT) = 4.38

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4-7	1	2	2	1	5	0	1	0	4	2	1	1	1	1	1	0	0	23
(1)	1.04	2.08	2.08	1.04	5.21	.00	1.04	.00	4.17	2.08	1.04	1.04	1.04	1.04	1.04	.00	.00	23.96
(2)	.05	.09	.09	.05	.23	.00	.05	.00	.18	.09	.05	.05	.05	.05	.05	.00	.00	1.05
8-12	0	0	0	1	1	5	5	0	4	8	4	1	4	3	0	1	0	37
(1)	.00	.00	.00	1.04	1.04	5.21	5.21	.00	4.17	8.33	4.17	1.04	4.17	3.13	.00	1.04	.00	38.54
(2)	.00	.00	.00	.05	.05	.23	.23	.00	.18	.36	.18	.05	.18	.14	.00	.05	.00	1.69
13-18	0	0	0	0	0	0	1	0	3	13	7	3	1	0	0	0	0	28
(1)	.00	.00	.00	.00	.00	.00	1.04	.00	3.13	13.54	7.29	3.13	1.04	.00	.00	.00	.00	29.17
(2)	.00	.00	.00	.00	.00	.00	.05	.00	.14	.59	.32	.14	.05	.00	.00	.00	.00	1.28
19-24	0	0	0	1	0	0	0	0	1	4	0	0	0	0	1	0	0	7
(1)	.00	.00	.00	1.04	.00	.00	.00	.00	1.04	4.17	.00	.00	.00	.00	1.04	.00	.00	7.29
(2)	.00	.00	.00	.05	.00	.00	.00	.00	.05	.18	.00	.00	.00	.00	.05	.00	.00	.32
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.04	.00	.00	.00	1.04
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.05
ALL SPEEDS	1	2	2	3	6	5	7	0	12	27	12	5	6	5	2	1	0	96
(1)	1.04	2.08	2.08	3.13	6.25	5.21	7.29	.00	12.50	28.12	12.50	5.21	6.25	5.21	2.08	1.04	.00	100.00
(2)	.05	.09	.09	.14	.27	.23	.32	.00	.55	1.23	.55	.23	.27	.23	.09	.05	.00	4.38

220.0 FT WIND DATA STABILITY CLASS D CLASS FREQUENCY (PERCENT) = 20.29

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	1	3	3	3	1	1	1	3	0	2	0	0	0	0	1	0	19
(1)	.00	.22	.67	.67	.67	.22	.22	.22	.67	.00	.45	.00	.00	.00	.00	.22	.00	4.27
(2)	.00	.05	.14	.14	.14	.05	.05	.05	.14	.00	.09	.00	.00	.00	.00	.05	.00	.87
4-7	2	3	8	9	18	21	9	2	2	0	5	3	4	2	1	6	0	95
(1)	.45	.67	1.80	2.02	4.04	4.72	2.02	.45	.45	.00	1.12	.67	.90	.45	.22	1.35	.00	21.35
(2)	.09	.14	.36	.41	.82	.96	.41	.09	.09	.00	.23	.16	.18	.09	.05	.27	.00	4.33
8-12	2	1	1	0	3	22	12	6	16	31	3	0	10	4	1	4	0	116
(1)	.45	.22	.22	.00	.67	4.94	2.70	1.35	3.60	6.97	.67	.00	2.25	.90	.22	.90	.00	26.07
(2)	.09	.05	.05	.00	.14	1.00	.55	.27	.73	1.41	.14	.00	.46	.18	.05	.18	.00	5.29
13-18	0	0	0	0	0	1	1	1	29	81	16	7	12	1	1	3	0	153
(1)	.00	.00	.00	.00	.00	.22	.22	.22	6.52	18.20	3.60	1.57	2.70	.22	.22	.67	.00	34.38
(2)	.00	.00	.00	.00	.00	.05	.05	.05	1.32	3.69	.73	.32	.55	.05	.05	.14	.00	6.98
19-24	0	0	0	2	0	0	0	0	1	32	6	0	6	3	8	1	0	59
(1)	.00	.00	.00	.45	.00	.00	.00	.00	.22	7.19	1.35	.00	1.35	.67	1.80	.22	.00	13.26
(2)	.00	.00	.00	.09	.00	.00	.00	.00	.05	1.46	.27	.00	.27	.14	.36	.05	.00	2.69
GT 24	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3
(1)	.45	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.22	.00	.00	.00	.00	.67
(2)	.09	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.14
ALL SPEEDS	6	5	12	14	24	45	23	10	51	144	32	10	33	10	11	15	0	445
(1)	1.35	1.12	2.70	3.15	5.39	10.11	5.17	2.25	11.46	32.36	7.19	2.25	7.42	2.25	2.47	3.37	.00	100.00
(2)	.27	.23	.55	.64	1.09	2.05	1.05	.46	2.33	6.57	1.46	.46	1.50	.46	.50	.68	.00	20.29

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM JUL98-SEP98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA STABILITY CLASS E CLASS FREQUENCY (PERCENT) = 37.35

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	5	4	2	0	0	2	1	2	2	0	1	0	0	0	0	19
(1)	.00	.00	.61	.49	.24	.00	.00	.24	.12	.24	.24	.00	.12	.00	.00	.00	.00	2.32
(2)	.00	.00	.23	.18	.09	.00	.00	.09	.05	.09	.09	.00	.05	.00	.00	.00	.00	.87
4-7	2	1	3	7	7	10	8	3	2	4	4	6	3	2	1	7	0	70
(1)	.24	.12	.37	.85	.85	1.22	.98	.37	.24	.49	.49	.73	.37	.24	.12	.85	.00	8.55
(2)	.09	.05	.14	.32	.32	.46	.36	.14	.09	.18	.18	.27	.14	.09	.05	.32	.00	3.19
8-12	0	1	4	5	8	9	12	8	27	29	15	8	7	9	14	17	0	173
(1)	.00	.12	.49	.61	.98	1.10	1.47	.98	3.30	3.54	1.83	.98	.85	1.10	1.71	2.08	.00	21.12
(2)	.00	.05	.18	.23	.36	.41	.55	.36	1.23	1.32	.68	.36	.32	.41	.64	.78	.00	7.89
13-18	2	2	3	1	2	1	6	4	30	122	57	20	37	21	12	7	0	327
(1)	.24	.24	.37	.12	.24	.12	.73	.49	3.66	14.90	6.96	2.44	4.52	2.56	1.47	.85	.00	39.93
(2)	.09	.09	.14	.05	.09	.05	.27	.18	1.37	5.56	2.60	.91	1.69	.96	.55	.32	.00	14.91
19-24	1	1	4	2	0	0	0	0	8	126	20	5	15	14	8	4	0	208
(1)	.12	.12	.49	.24	.00	.00	.00	.00	.98	15.38	2.44	.61	1.83	1.71	.98	.49	.00	25.40
(2)	.05	.05	.19	.09	.00	.00	.00	.00	.36	5.75	.91	.23	.68	.64	.36	.18	.00	9.48
GT 24	5	3	1	0	2	0	0	0	2	0	1	0	3	0	1	4	0	22
(1)	.61	.37	.12	.00	.24	.00	.00	.00	.24	.00	.12	.00	.37	.00	.12	.49	.00	2.69
(2)	.23	.14	.05	.00	.09	.00	.00	.00	.09	.00	.05	.00	.14	.00	.05	.18	.00	1.00
ALL SPEEDS	10	8	20	19	21	20	26	17	70	283	99	39	66	46	36	39	0	819
(1)	1.22	.98	2.44	2.32	2.56	2.44	3.17	2.08	8.55	34.55	12.09	4.76	8.06	5.62	4.40	4.76	.00	100.00
(2)	.46	.36	.91	.87	.96	.91	1.19	.78	3.19	12.90	4.51	1.78	3.01	2.10	1.64	1.78	.00	37.35

220.0 FT WIND DATA STABILITY CLASS F CLASS FREQUENCY (PERCENT) = 15.82

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	1	1	1	3	0	2	0	2	0	0	1	1	0	0	12
(1)	.00	.00	.00	.29	.29	.29	.86	.00	.58	.00	.58	.00	.00	.29	.29	.00	.00	3.46
(2)	.00	.00	.00	.05	.05	.05	.14	.00	.09	.00	.09	.00	.00	.05	.05	.00	.00	.55
4-7	0	1	0	1	0	6	3	1	4	4	7	2	5	1	1	2	0	38
(1)	.00	.29	.00	.29	.00	1.73	.86	.29	1.15	1.15	2.02	.58	1.44	.29	.29	.58	.00	10.95
(2)	.00	.05	.00	.05	.00	.27	.14	.05	.18	.18	.32	.09	.23	.05	.05	.09	.00	1.73
8-12	1	0	0	0	1	1	1	9	7	5	8	12	7	15	22	6	0	95
(1)	.29	.00	.00	.00	.29	.29	.29	2.59	2.02	1.44	2.31	3.46	2.02	4.32	6.34	1.73	.00	27.38
(2)	.05	.00	.00	.00	.05	.05	.05	.41	.32	.23	.36	.55	.32	.68	1.00	.27	.00	4.33
13-18	0	0	0	0	0	0	2	7	6	26	34	22	27	11	7	1	0	143
(1)	.00	.00	.00	.00	.00	.00	.58	2.02	1.73	7.49	9.80	6.34	7.78	3.17	2.02	.29	.00	41.21
(2)	.00	.00	.00	.00	.00	.00	.09	.32	.27	1.19	1.55	1.00	1.23	.50	.32	.05	.00	6.52
19-24	0	0	0	0	0	1	0	1	0	19	30	3	0	2	2	1	0	59
(1)	.00	.00	.00	.00	.00	.29	.00	.29	.00	5.48	8.65	.86	.00	.58	.58	.29	.00	17.00
(2)	.00	.00	.00	.00	.00	.05	.00	.05	.00	.87	1.37	.14	.00	.09	.09	.05	.00	2.69
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	1	1	0	2	2	9	9	18	19	54	81	39	39	30	33	10	0	347
(1)	.29	.29	.00	.58	.58	2.59	2.59	5.19	5.48	15.56	23.34	11.24	11.24	8.65	9.51	2.88	.00	100.00
(2)	.05	.05	.00	.09	.09	.41	.41	.82	.87	2.46	3.69	1.78	1.78	1.37	1.50	.46	.00	15.82

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

Table A-2 (continued)

PILGRIM JUL98-SEP98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA — STABILITY CLASS G — CLASS FREQUENCY (PERCENT) = 3.51

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.30	.00	.00	.00	.00	.00	1.30
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.05
C-3	0	0	0	0	0	0	1	1	1	1	0	3	0	0	0	2	0	9
(1)	.00	.00	.00	.00	.00	.00	1.30	1.30	1.30	1.30	.00	3.90	.00	.00	.00	2.60	.00	11.69
(2)	.00	.00	.00	.00	.00	.00	.05	.05	.05	.05	.00	.14	.00	.00	.00	.09	.00	.41
4-7	0	3	1	2	0	2	0	1	2	2	3	2	3	1	1	1	0	24
(1)	.00	3.90	1.30	2.60	.00	2.60	.00	1.30	2.60	2.60	3.90	2.60	3.90	1.30	1.30	1.30	.00	31.17
(2)	.00	.14	.05	.09	.00	.09	.00	.05	.09	.09	.14	.09	.14	.05	.05	.05	.00	1.09
8-12	0	0	0	0	0	0	0	0	1	3	4	2	2	9	1	0	0	22
(1)	.00	.00	.00	.00	.00	.00	.00	.00	1.30	3.90	5.19	2.60	2.60	11.69	1.30	.00	.00	28.57
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.05	.14	.18	.09	.09	.41	.05	.00	.00	1.00
13-18	0	0	0	0	0	0	0	0	0	0	8	2	3	1	0	0	0	14
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	10.39	2.60	3.90	1.30	.00	.00	.00	18.18
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.36	.09	.14	.05	.00	.00	.00	.64
19-24	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	7
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	9.09	.00	.00	.00	.00	.00	.00	9.09
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.32	.00	.00	.00	.00	.00	.00	.32
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	3	1	2	0	2	1	2	4	6	22	10	8	11	2	3	0	77
(1)	.00	3.90	1.30	2.60	.00	2.60	1.30	2.60	5.19	7.79	28.57	12.99	10.39	14.29	2.60	3.90	.00	100.00
(2)	.00	.14	.05	.09	.00	.09	.05	.09	.18	.27	1.00	.46	.36	.50	.09	.14	.00	3.51

220.0 FT WIND DATA — STABILITY CLASS ALL — CLASS FREQUENCY (PERCENT) = 100.00

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.05
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.05
C-3	0	1	8	8	6	3	5	4	7	3	7	3	1	1	1	3	0	61
(1)	.00	.05	.36	.36	.27	.14	.23	.18	.32	.14	.32	.14	.05	.05	.05	.14	.00	2.78
(2)	.00	.05	.36	.36	.27	.14	.23	.18	.32	.14	.32	.14	.05	.05	.05	.14	.00	2.78
4-7	8	20	21	30	46	46	22	8	19	14	23	16	22	12	17	25	0	349
(1)	.36	.91	.96	1.37	2.10	2.10	1.00	.36	.87	.64	1.05	.73	1.00	.55	.78	1.14	.00	15.91
(2)	.36	.91	.96	1.37	2.10	2.10	1.00	.36	.87	.64	1.05	.73	1.00	.55	.78	1.14	.00	15.91
8-12	9	5	6	11	22	46	45	26	74	89	43	29	45	48	46	35	0	579
(1)	.41	.23	.27	.50	1.00	2.10	2.05	1.19	3.37	4.06	1.96	1.32	2.05	2.19	2.10	1.60	.00	26.40
(2)	.41	.23	.27	.50	1.00	2.10	2.05	1.19	3.37	4.06	1.96	1.32	2.05	2.19	2.10	1.60	.00	26.40
13-18	6	5	3	4	3	2	10	12	88	295	141	59	93	40	21	18	0	800
(1)	.27	.23	.14	.18	.14	.09	.46	.55	4.01	13.45	6.43	2.69	4.24	1.82	.96	.82	.00	36.48
(2)	.27	.23	.14	.18	.14	.09	.46	.55	4.01	13.45	6.43	2.69	4.24	1.82	.96	.82	.00	36.48
19-24	3	1	4	5	0	1	0	1	11	194	65	8	21	29	20	8	0	371
(1)	.14	.05	.18	.23	.00	.05	.00	.05	.50	8.85	2.96	.36	.96	1.32	.91	.36	.00	16.92
(2)	.14	.05	.18	.23	.00	.05	.00	.05	.50	8.85	2.96	.36	.96	1.32	.91	.36	.00	16.92
GT 24	8	3	1	0	2	0	0	0	2	0	1	0	4	3	1	7	0	32
(1)	.36	.14	.05	.00	.09	.00	.00	.00	.09	.00	.05	.00	.18	.14	.05	.32	.00	1.46
(2)	.36	.14	.05	.00	.09	.00	.00	.00	.09	.00	.05	.00	.18	.14	.05	.32	.00	1.46
ALL SPEEDS	34	35	43	58	79	98	82	51	201	595	280	116	186	133	106	96	0	2193
(1)	1.55	1.60	1.96	2.64	3.60	4.47	3.74	2.33	9.17	27.13	12.77	5.29	8.48	6.06	4.83	4.38	.00	100.00
(2)	1.55	1.60	1.96	2.64	3.60	4.47	3.74	2.33	9.17	27.13	12.77	5.29	8.48	6.06	4.83	4.38	.00	100.00

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM OCT98-DEC98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA STABILITY CLASS A CLASS FREQUENCY (PERCENT) = 11.54

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
(1)	.00	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.40
(2)	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05
4-7	0	6	3	2	2	2	0	0	1	0	0	0	3	4	4	2	0	29
(1)	.00	2.38	1.19	.79	.79	.79	.00	.00	.40	.00	.00	.00	1.19	1.59	1.59	.79	.00	11.51
(2)	.00	.27	.14	.09	.09	.09	.00	.00	.05	.00	.00	.00	.14	.18	.18	.09	.00	1.33
8-12	4	2	0	0	7	1	1	1	6	1	0	3	13	13	8	2	0	62
(1)	1.59	.79	.00	.00	2.78	.40	.40	.40	2.38	.40	.00	1.19	5.16	5.16	3.17	.79	.00	24.60
(2)	.18	.09	.00	.00	.32	.05	.05	.05	.27	.05	.00	.14	.60	.60	.37	.09	.00	2.84
13-18	6	0	5	0	2	1	1	1	4	7	3	5	18	16	7	12	0	88
(1)	2.38	.00	1.98	.00	.79	.40	.40	.40	1.59	2.78	1.19	1.98	7.14	6.35	2.78	4.76	.00	34.92
(2)	.27	.00	.23	.00	.09	.05	.05	.05	.18	.32	.14	.23	.82	.73	.32	.55	.00	4.03
19-24	0	0	0	0	0	0	1	0	0	6	6	1	18	10	2	6	0	50
(1)	.00	.00	.00	.00	.00	.00	.40	.00	.00	2.38	2.38	.40	7.14	3.97	.79	2.38	.00	19.84
(2)	.00	.00	.00	.00	.00	.00	.05	.00	.00	.27	.27	.05	.82	.46	.09	.27	.00	2.29
GT 24	0	0	0	0	0	0	0	0	0	0	1	0	0	13	3	5	0	22
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.40	.00	.00	5.16	1.19	1.98	.00	8.73
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.60	.14	.23	.00	1.01
ALL SPEEDS	10	9	8	2	11	4	3	2	11	14	10	9	52	56	24	27	0	252
(1)	3.97	3.57	3.17	.79	4.37	1.59	1.19	.79	4.37	5.56	3.97	3.57	20.63	22.22	9.52	10.71	.00	100.00
(2)	.46	.41	.37	.09	.50	.18	.14	.09	.50	.64	.46	.41	2.38	2.56	1.10	1.24	.00	11.54

220.0 FT WIND DATA STABILITY CLASS B CLASS FREQUENCY (PERCENT) = 2.79

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4-7	1	1	0	1	0	0	0	0	0	1	0	0	0	1	3	0	0	8
(1)	1.64	1.64	.00	1.64	.00	.00	.00	.00	.00	1.64	.00	.00	.00	1.64	4.92	.00	.00	13.11
(2)	.05	.05	.00	.05	.00	.00	.00	.00	.00	.05	.00	.00	.00	.05	.14	.00	.00	.37
8-12	0	1	0	0	1	2	5	0	1	0	0	4	1	1	1	0	0	17
(1)	.00	1.64	.00	.00	1.64	3.28	8.20	.00	1.64	.00	.00	6.56	1.64	1.64	1.64	.00	.00	27.87
(2)	.00	.05	.00	.00	.05	.09	.23	.00	.05	.00	.00	.18	.05	.05	.05	.00	.00	.78
13-18	1	0	0	0	0	0	0	0	0	1	1	4	8	3	0	0	0	18
(1)	1.64	.00	.00	.00	.00	.00	.00	.00	.00	1.64	1.64	6.56	13.11	4.92	.00	.00	.00	29.51
(2)	.05	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05	.18	.37	.14	.00	.00	.00	.82
19-24	1	0	0	0	0	0	1	0	0	2	3	0	2	0	0	0	0	9
(1)	1.64	.00	.00	.00	.00	.00	1.64	.00	.00	3.28	4.92	.00	3.28	.00	.00	.00	.00	14.75
(2)	.05	.00	.00	.00	.00	.00	.05	.00	.00	.09	.14	.00	.09	.00	.00	.00	.00	.41
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4	2	0	9
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.64	3.28	6.56	3.28	.00	14.75
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.09	.18	.09	.00	.41
ALL SPEEDS	3	2	0	1	1	2	6	0	1	4	4	8	12	7	8	2	0	61
(1)	4.92	3.28	.00	1.64	1.64	3.28	9.84	.00	1.64	6.56	6.56	13.11	19.67	11.48	13.11	3.28	.00	100.00
(2)	.14	.09	.00	.05	.05	.09	.27	.00	.05	.18	.18	.37	.55	.32	.37	.09	.00	2.79

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM OCT98-DEC98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA STABILITY CLASS C CLASS FREQUENCY (PERCENT) = 3.11

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4-7	0	4	1	1	1	0	1	0	0	0	0	0	0	3	0	1	0	12
(1)	.00	5.88	1.47	1.47	1.47	.00	1.47	.00	.00	.00	.00	.00	.00	4.41	.00	1.47	.00	17.65
(2)	.00	.18	.05	.05	.05	.00	.05	.00	.00	.00	.00	.00	.00	.14	.00	.05	.00	.55
8-12	0	0	0	0	0	0	5	0	1	2	1	3	3	1	0	1	0	17
(1)	.00	.00	.00	.00	.00	.00	7.35	.00	1.47	2.94	1.47	4.41	4.41	1.47	.00	1.47	.00	25.00
(2)	.00	.00	.00	.00	.00	.00	.23	.00	.05	.09	.05	.14	.14	.05	.00	.05	.00	.78
13-18	1	0	0	0	0	0	0	1	0	2	4	3	2	3	1	1	0	18
(1)	1.47	.00	.00	.00	.00	.00	.00	1.47	.00	2.94	5.88	4.41	2.94	4.41	1.47	1.47	.00	26.47
(2)	.05	.00	.00	.00	.00	.00	.00	.05	.00	.09	.18	.14	.09	.14	.05	.05	.00	.82
19-24	0	2	1	0	1	1	0	0	0	0	6	1	2	2	0	0	0	16
(1)	.00	2.94	1.47	.00	1.47	1.47	.00	.00	.00	.00	8.82	1.47	2.94	2.94	.00	.00	.00	23.53
(2)	.00	.09	.05	.00	.05	.05	.00	.00	.00	.00	.27	.05	.09	.09	.00	.00	.00	.73
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	0	5
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.47	1.47	1.47	2.94	.00	7.35
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05	.05	.09	.00	.23
ALL SPEEDS	1	6	2	1	2	1	6	1	1	4	11	7	8	10	2	5	0	68
(1)	1.47	8.82	2.94	1.47	2.94	1.47	8.82	1.47	1.47	5.88	16.18	10.29	11.76	14.71	2.94	7.35	.00	100.00
(2)	.05	.27	.09	.05	.09	.05	.27	.05	.05	.18	.50	.32	.37	.46	.09	.23	.00	3.11

220.0 FT WIND DATA STABILITY CLASS D CLASS FREQUENCY (PERCENT) = 32.83

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	1	2	1	0	1	0	0	0	1	0	0	0	0	6
(1)	.00	.00	.00	.00	.14	.28	.14	.00	.14	.00	.00	.00	.14	.00	.00	.00	.00	.84
(2)	.00	.00	.00	.00	.05	.09	.05	.00	.05	.00	.00	.00	.05	.00	.00	.00	.00	.27
4-7	0	3	5	1	1	6	7	4	6	4	4	4	1	1	2	0	0	49
(1)	.00	.42	.70	.14	.14	.84	.98	.56	.84	.56	.56	.56	.14	.14	.28	.00	.00	6.83
(2)	.00	.14	.23	.05	.05	.27	.32	.18	.27	.18	.18	.18	.05	.05	.09	.00	.00	2.24
8-12	2	8	5	5	4	7	13	9	6	9	10	5	10	7	5	3	0	108
(1)	.28	1.12	.70	.70	.56	.98	1.81	1.26	.84	1.26	1.39	.70	1.39	.98	.70	.42	.00	15.06
(2)	.09	.37	.23	.23	.18	.32	.60	.41	.27	.41	.46	.23	.46	.32	.23	.14	.00	4.95
13-18	4	18	5	6	17	15	19	2	12	19	22	18	25	27	21	10	0	240
(1)	.56	2.51	.70	.84	2.37	2.09	2.65	.28	1.67	2.65	3.07	2.51	3.49	3.77	2.93	1.39	.00	33.47
(2)	.18	.82	.23	.27	.78	.69	.87	.09	.55	.87	1.01	.82	1.14	1.24	.96	.46	.00	10.99
19-24	4	7	8	9	11	4	12	1	6	29	22	10	16	25	30	10	0	204
(1)	.56	.98	1.12	1.26	1.53	.56	1.67	.14	.84	4.04	3.07	1.39	2.23	3.49	4.18	1.39	.00	28.45
(2)	.18	.32	.37	.41	.50	.18	.55	.05	.27	1.33	1.01	.46	.73	1.14	1.37	.46	.00	9.34
GT 24	11	0	1	0	2	0	5	1	2	0	2	0	8	38	28	12	0	110
(1)	1.53	.00	.14	.00	.28	.00	.70	.14	.28	.14	.28	.00	1.11	5.30	3.91	1.67	.00	15.34
(2)	.50	.00	.05	.00	.09	.00	.23	.05	.09	.05	.09	.00	.37	1.74	1.28	.55	.00	5.04
ALL SPEEDS	21	36	24	21	36	34	57	17	33	1	60	37	61	98	86	35	0	717
(1)	2.93	5.02	3.35	2.93	5.02	4.74	7.95	2.37	4.60	.14	8.37	5.16	8.51	13.67	11.99	4.88	.00	100.00
(2)	.96	1.65	1.10	.96	1.65	1.56	2.61	.78	1.51	.05	2.75	1.69	2.79	4.49	3.94	1.60	.00	32.83

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM OCT98-DEC98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA — STABILITY CLASS E — CLASS FREQUENCY (PERCENT) = 40.80

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	2	0	0	0	0	0	1	0	1	0	1	1	0	0	0	6
(1)	.00	.00	.22	.00	.00	.00	.00	.00	.11	.00	.11	.00	.11	.11	.00	.00	.00	.67
(2)	.00	.00	.09	.00	.00	.00	.00	.00	.05	.00	.05	.00	.05	.05	.00	.00	.00	.27
4-7	0	1	0	0	4	5	1	3	6	7	2	2	3	3	4	2	0	43
(1)	.00	.11	.00	.00	.45	.56	.11	.34	.67	.79	.22	.22	.34	.34	.45	.22	.00	4.83
(2)	.00	.05	.00	.00	.18	.23	.05	.14	.27	.32	.09	.09	.14	.14	.18	.09	.00	1.97
8-12	4	2	3	2	8	13	10	14	22	17	7	12	30	19	27	21	0	211
(1)	.45	.22	.34	.22	.90	1.46	1.12	1.57	2.47	1.91	.79	1.35	3.37	2.13	3.03	2.36	.00	23.68
(2)	.18	.09	.14	.09	.37	.60	.46	.64	1.01	.78	.32	.55	1.37	.87	1.24	.96	.00	9.66
13-18	3	6	0	4	6	7	19	12	6	18	22	45	84	47	18	10	0	307
(1)	.34	.67	.00	.45	.67	.79	2.13	1.35	.67	2.02	2.47	5.05	9.43	5.27	2.02	1.12	.00	34.46
(2)	.14	.27	.00	.18	.27	.32	.87	.55	.27	.82	1.01	2.06	3.85	2.15	.82	.46	.00	14.06
19-24	4	1	1	4	1	2	2	4	1	19	60	40	74	27	8	2	0	250
(1)	.45	.11	.11	.45	.11	.22	.22	.45	.11	2.13	6.73	4.49	8.31	3.03	.90	.22	.00	28.06
(2)	.18	.05	.05	.18	.05	.09	.09	.18	.05	.87	2.75	1.83	3.39	1.24	.37	.09	.00	11.45
GT 24	7	1	0	0	0	3	3	1	5	4	9	0	6	12	12	11	0	74
(1)	.79	.11	.00	.00	.00	.34	.34	.11	.56	.45	1.01	.00	.67	1.35	1.35	1.23	.00	8.31
(2)	.32	.05	.00	.00	.00	.14	.14	.05	.23	.18	.41	.00	.27	.55	.55	.50	.00	3.39
ALL SPEEDS	18	11	6	10	19	30	35	34	41	65	101	99	198	109	69	46	0	891
(1)	3.02	1.23	.67	1.12	2.13	3.37	3.93	3.82	4.60	7.30	11.34	11.11	22.22	12.23	7.74	5.16	.00	100.00
(2)	.82	.50	.27	.46	.87	1.37	1.60	1.56	1.88	2.98	4.62	4.53	9.07	4.99	3.16	2.11	.00	40.80

220.0 FT WIND DATA — STABILITY CLASS F — CLASS FREQUENCY (PERCENT) = 7.65

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	0	0	0	2	1	0	0	0	0	0	1	0	0	0	0	4
(1)	.00	.00	.00	.00	.00	1.20	.60	.00	.00	.00	.00	.00	.60	.00	.00	.00	.00	2.40
(2)	.00	.00	.00	.00	.00	.09	.05	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.18
4-7	1	0	1	0	0	1	1	2	4	6	2	1	2	1	1	2	0	25
(1)	.60	.00	.60	.00	.00	.60	.60	1.20	2.40	3.59	1.20	.60	1.20	.60	.60	1.20	.00	14.97
(2)	.05	.00	.05	.00	.00	.05	.05	.09	.18	.27	.09	.05	.09	.05	.05	.09	.00	1.14
8-12	0	0	0	0	0	0	6	7	5	5	7	2	6	19	5	3	0	65
(1)	.00	.00	.00	.00	.00	.00	3.59	4.19	2.99	2.99	4.19	1.20	3.59	11.38	2.99	1.80	.00	38.92
(2)	.00	.00	.00	.00	.00	.00	.27	.32	.23	.23	.32	.09	.27	.87	.23	.14	.00	2.98
13-18	0	0	0	0	0	0	3	3	2	0	4	10	20	2	3	0	0	47
(1)	.00	.00	.00	.00	.00	.00	1.80	1.80	1.20	.00	2.40	5.99	11.98	1.20	1.80	.00	.00	28.14
(2)	.00	.00	.00	.00	.00	.00	.14	.14	.09	.00	.18	.46	.92	.09	.14	.00	.00	2.15
19-24	0	0	0	0	0	0	0	0	0	0	14	10	1	0	0	0	0	25
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	8.38	5.99	.60	.00	.00	.00	.00	14.97
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.64	.46	.05	.00	.00	.00	.00	1.14
GT 24	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.60	.00	.00	.00	.00	.00	.00	.60
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.05
ALL SPEEDS	1	0	1	0	0	3	11	12	11	11	28	23	30	22	9	5	0	167
(1)	.60	.00	.60	.00	.00	1.80	6.59	7.19	6.59	6.59	16.77	13.77	17.96	13.17	5.39	2.99	.00	100.00
(2)	.05	.00	.05	.00	.00	.14	.50	.55	.50	.50	1.28	1.05	1.37	1.01	.41	.23	.00	7.65

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

PILGRIM OCT98-DEC98 MET DATA JOINT FREQUENCY DISTRIBUTION (220-FOOT TOWER)

220.0 FT WIND DATA STABILITY CLASS G CLASS FREQUENCY (PERCENT) = 1.28

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
(1)	.00	.00	.00	.00	3.57	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	3.57
(2)	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05
C-3	0	0	0	0	1	2	0	0	0	1	1	0	0	0	0	0	0	5
(1)	.00	.00	.00	.00	3.57	7.14	.00	.00	.00	3.57	3.57	.00	.00	.00	.00	.00	.00	17.86
(2)	.00	.00	.00	.00	.05	.09	.00	.00	.00	.05	.05	.00	.00	.00	.00	.00	.00	.23
4-7	0	0	2	0	1	1	0	0	1	1	2	1	0	0	0	0	0	9
(1)	.00	.00	7.14	.00	3.57	3.57	.00	.00	3.57	3.57	7.14	3.57	.00	.00	.00	.00	.00	32.14
(2)	.00	.00	.09	.00	.05	.05	.00	.00	.05	.05	.09	.05	.00	.00	.00	.00	.00	.41
8-12	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	10.71	.00	.00	.00	.00	.00	.00	10.71
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.14	.00	.00	.00	.00	.00	.00	.14
13-18	0	0	0	0	0	0	0	0	0	0	1	0	0	2	1	0	0	4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	3.57	.00	.00	7.14	3.57	.00	.00	14.29
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.09	.05	.00	.00	.18
19-24	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	17.86	.00	.00	.00	.00	.00	.00	17.86
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.23	.00	.00	.00	.00	.00	.00	.23
GT 24	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	3.57	.00	.00	.00	.00	.00	.00	3.57
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.05
ALL SPEEDS	0	0	2	0	3	3	0	0	1	2	13	1	0	2	1	0	0	28
(1)	.00	.00	7.14	.00	10.71	10.71	.00	.00	3.57	7.14	46.43	3.57	.00	7.14	3.57	.00	.00	100.00
(2)	.00	.00	.09	.00	.14	.14	.00	.00	.05	.09	.60	.05	.00	.09	.05	.00	.00	1.28

220.0 FT WIND DATA STABILITY CLASS ALL CLASS FREQUENCY (PERCENT) = 100.00

	WIND DIRECTION FROM																	
SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
Calm	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
(1)	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05
(2)	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05
C-3	0	1	2	0	2	6	2	0	2	1	2	0	3	1	0	0	0	22
(1)	.00	.05	.09	.00	.09	.27	.09	.00	.09	.05	.09	.00	.14	.05	.00	.00	.00	1.01
(2)	.00	.05	.09	.00	.09	.27	.09	.00	.09	.05	.09	.00	.14	.05	.00	.00	.00	1.01
4-7	2	15	12	5	9	15	10	9	18	19	10	8	9	13	14	7	0	175
(1)	.09	.69	.55	.23	.41	.69	.46	.41	.82	.87	.46	.37	.41	.60	.64	.32	.00	8.01
(2)	.09	.69	.55	.23	.41	.69	.46	.41	.82	.87	.46	.37	.41	.60	.64	.32	.00	8.01
8-12	10	13	8	7	20	23	40	31	41	34	28	29	63	60	46	30	0	483
(1)	.46	.60	.37	.32	.92	1.05	1.83	1.42	1.88	1.56	1.28	1.33	2.88	2.75	2.11	1.37	.00	22.12
(2)	.46	.60	.37	.32	.92	1.05	1.83	1.42	1.88	1.56	1.28	1.33	2.88	2.75	2.11	1.37	.00	22.12
13-18	15	24	10	10	25	23	42	19	24	47	57	85	157	100	51	33	0	
722																		
(1)	.69	1.10	.46	.46	1.14	1.05	1.92	.87	1.10	2.15	2.61	3.89	7.19	4.58	2.34	1.51	.00	33.06
(2)	.69	1.10	.46	.46	1.14	1.05	1.92	.87	1.10	2.15	2.61	3.89	7.19	4.58	2.34	1.51	.00	33.06
19-24	9	10	10	13	13	7	16	5	7	56	116	62	113	64	40	18	0	559
(1)	.41	.46	.46	.60	.60	.32	.73	.23	.32	2.56	5.31	2.84	5.17	2.93	1.83	.82	.00	25.60
(2)	.41	.46	.46	.60	.60	.32	.73	.23	.32	2.56	5.31	2.84	5.17	2.93	1.83	.82	.00	25.60
GT 24	18	1	1	0	2	3	8	2	7	4	14	0	16	66	48	32	0	
222																		
(1)	.82	.05	.05	.00	.09	.14	.37	.09	.32	.18	.64	.00	.73	3.02	2.20	1.47	.00	10.16
(2)	.82	.05	.05	.00	.09	.14	.37	.09	.32	.18	.64	.00	.73	3.02	2.20	1.47	.00	10.16
ALL SPEEDS	54	64	43	35	72	77	118	66	99	161	227	184	361	304	199	120	0	2184
(1)	2.47	2.93	1.97	1.60	3.30	3.53	5.40	3.02	4.53	7.37	10.39	8.42	16.53	13.92	9.11	5.49	.00	100.00
(2)	2.47	2.93	1.97	1.60	3.30	3.53	5.40	3.02	4.53	7.37	10.39	8.42	16.53	13.92	9.11	5.49	.00	100.00

(1)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)= PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C = CALM (WIND SPEED LESS THAN OR EQUAL TO 0.95 MPH)

APPENDIX B

Atmospheric Dispersion and Deposition Factors

TABLE	TITLE	PAGE
B-1	Undepleted χ/Q Factors for Main Stack	90
B-2	Depleted χ/Q Factors for Main Stack	95
B-3	Gamma χ/Q Factors for Main Stack	100
B-4	Deposition D/Q Factors for Main Stack	105
B-5	Undepleted χ/Q Factors for Reactor Building Vent	110
B-6	Depleted χ/Q Factors for Reactor Building Vent	115
B-7	Gamma χ/Q Factors for Reactor Building Vent	120
B-8	Deposition D/Q Factors for Reactor Building Vent	125

Table B-1
Undepleted χ/Q Factors for Main Stack

PWPS 1ST QUARTER 1998 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
GROUND-LEVEL AVERAGE CHI/Q BEFORE DEPLETION -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	96	3.485E-10	1.325E-08	1.127E-08	1.055E-08	1.159E-08	1.441E-08	1.528E-08	1.482E-08
NNE	184	6.853E-10	2.166E-08	1.875E-08	1.249E-08	1.231E-08	1.740E-08	2.065E-08	2.121E-08
NE	171	4.249E-10	1.553E-08	1.231E-08	8.579E-09	9.299E-09	1.427E-08	1.731E-08	1.808E-08
ENE	70	2.619E-10	9.102E-09	8.180E-09	6.977E-09	6.652E-09	7.709E-09	8.648E-09	8.823E-09
E	109	4.020E-10	1.603E-08	1.524E-08	1.169E-08	1.146E-08	1.423E-08	1.568E-08	1.556E-08
ESE	184	1.026E-09	3.030E-08	1.792E-08	1.563E-08	1.785E-08	2.388E-08	2.620E-08	2.585E-08
SE	241	1.247E-09	4.119E-08	3.287E-08	2.892E-08	3.124E-08	4.367E-08	3.660E-08	3.564E-08
SSE	142	3.087E-09	1.061E-07	3.922E-08	6.037E-08	8.135E-08	7.382E-08	6.064E-08	4.975E-08
S	120	1.945E-09	3.609E-08	7.966E-08	1.503E-07	1.289E-07	1.066E-07	7.827E-08	5.725E-08
SSW	194	3.552E-09	7.158E-08	1.740E-07	2.232E-07	3.091E-07	2.236E-07	1.423E-07	1.011E-07
SW	119	3.855E-09	3.193E-08	6.641E-08	1.070E-07	9.922E-08	8.126E-08	6.057E-08	4.681E-08
WSW	95	4.494E-09	4.127E-08	4.604E-08	4.925E-08	6.714E-08	6.141E-08	4.572E-08	3.536E-08
W	99	1.653E-09	2.407E-08	5.707E-08	6.152E-08	6.755E-08	6.390E-08	4.919E-08	4.101E-08
WNW	62	6.875E-10	9.954E-09	1.011E-08	2.105E-08	3.273E-08	3.784E-08	3.146E-08	2.709E-08
NW	38	3.126E-17	3.070E-11	5.002E-10	1.251E-09	2.622E-09	5.807E-09	7.457E-09	7.886E-09
NNW	54	1.014E-17	8.086E-10	1.076E-08	7.573E-09	7.920E-09	1.017E-08	1.114E-08	1.106E-08
AVERAGE	1978	1.479E-09	2.931E-08	3.752E-08	4.902E-08	5.606E-08	5.000E-08	3.919E-08	3.233E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	96	1.375E-08	1.262E-08	1.157E-08	1.065E-08	9.799E-09	6.772E-09	5.041E-09	3.225E-09
NNE	184	2.030E-08	1.906E-08	1.777E-08	1.657E-08	1.541E-08	1.091E-08	8.191E-09	5.284E-09
NE	171	1.755E-08	1.670E-08	1.576E-08	1.486E-08	1.395E-08	1.024E-08	7.902E-09	5.312E-09
ENE	70	8.468E-09	8.015E-09	7.537E-09	7.093E-09	6.646E-09	4.833E-09	3.702E-09	2.458E-09
E	109	1.465E-08	1.361E-08	1.259E-08	1.167E-08	1.080E-08	7.613E-09	5.743E-09	3.750E-09
ESE	184	2.423E-08	2.244E-08	2.070E-08	1.914E-08	1.767E-08	1.232E-08	9.217E-09	5.936E-09
SE	241	3.298E-08	3.024E-08	2.769E-08	2.544E-08	2.338E-08	1.604E-08	1.186E-08	7.535E-09
SSE	142	4.154E-08	3.534E-08	3.055E-08	2.672E-08	2.362E-08	1.458E-08	1.030E-08	6.676E-09
S	120	4.387E-08	3.505E-08	2.887E-08	2.427E-08	2.081E-08	1.178E-08	7.926E-09	4.554E-09
SSW	194	7.702E-08	6.133E-08	5.042E-08	4.236E-08	3.629E-08	2.051E-08	1.378E-08	7.903E-09
SW	119	3.741E-08	3.076E-08	2.587E-08	2.212E-08	1.921E-08	1.121E-08	7.608E-09	4.366E-09
WSW	95	2.832E-08	2.336E-08	1.970E-08	1.689E-08	1.470E-08	8.658E-09	5.928E-09	3.461E-09
W	99	3.438E-08	2.931E-08	2.536E-08	2.221E-08	1.967E-08	1.490E-08	1.009E-08	5.809E-09
WNW	62	2.311E-08	1.990E-08	1.734E-08	1.527E-08	1.356E-08	7.954E-09	6.154E-09	3.592E-09
NW	38	7.667E-09	7.287E-09	6.857E-09	6.441E-09	6.028E-09	6.177E-09	4.510E-09	3.207E-09
NNW	54	1.043E-08	9.692E-09	8.966E-09	8.313E-09	7.675E-09	5.351E-09	4.210E-09	3.470E-09
AVERAGE	1978	2.723E-08	2.342E-08	2.047E-08	1.813E-08	1.620E-08	1.061E-08	7.635E-09	4.784E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	96	2.331E-09	1.807E-09	1.467E-09	1.232E-09	1.054E-09	1.128E-09	9.695E-10
NNE	184	3.829E-09	2.971E-09	2.415E-09	2.027E-09	1.735E-09	1.518E-09	1.345E-09
NE	171	3.962E-09	3.138E-09	2.586E-09	2.198E-09	1.902E-09	1.678E-09	1.499E-09
ENE	70	1.814E-09	1.466E-09	1.309E-09	1.100E-09	9.419E-10	8.246E-10	7.308E-10
E	109	2.750E-09	2.154E-09	2.138E-09	1.789E-09	1.528E-09	1.333E-09	1.179E-09
ESE	184	4.306E-09	3.698E-09	2.988E-09	2.498E-09	2.131E-09	1.859E-09	1.643E-09
SE	241	5.416E-09	4.906E-09	3.926E-09	3.256E-09	2.758E-09	2.393E-09	2.105E-09
SSE	142	4.654E-09	3.529E-09	2.830E-09	2.351E-09	1.994E-09	1.732E-09	1.524E-09
S	120	3.100E-09	2.315E-09	1.836E-09	1.512E-09	1.273E-09	1.099E-09	9.623E-10
SSW	194	5.387E-09	4.028E-09	3.198E-09	2.637E-09	2.223E-09	1.922E-09	1.685E-09
SW	119	2.969E-09	2.212E-09	1.749E-09	1.437E-09	1.220E-09	1.052E-09	9.197E-10
WSW	95	2.377E-09	1.796E-09	1.483E-09	1.220E-09	1.026E-09	8.922E-10	7.807E-10
W	99	3.959E-09	2.955E-09	2.342E-09	1.927E-09	1.677E-09	1.444E-09	1.261E-09
WNW	62	2.461E-09	1.893E-09	1.557E-09	1.294E-09	1.083E-09	9.311E-10	8.121E-10
NW	38	2.261E-09	1.784E-09	1.452E-09	1.360E-09	1.143E-09	9.841E-10	8.594E-10
NNW	54	2.382E-09	1.788E-09	1.424E-09	1.176E-09	9.937E-10	8.606E-10	7.557E-10
AVERAGE	1978	3.372E-09	2.652E-09	2.169E-09	1.813E-09	1.543E-09	1.353E-09	1.191E-09

Table B-1
Undepleted χ/Q Factors for Main Stack

PNPS 2ND QUARTER 1998 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
GROUND-LEVEL AVERAGE CHI/Q BEFORE DEPLETION -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	147	1.380E-09	4.393E-08	2.492E-08	1.674E-08	1.609E-08	2.042E-08	2.436E-08	2.582E-08
NNE	206	1.123E-09	3.651E-08	2.761E-08	2.099E-08	2.113E-08	2.705E-08	3.069E-08	3.117E-08
NE	112	5.783E-10	1.770E-08	9.141E-09	6.518E-09	7.129E-09	9.907E-09	1.148E-08	1.176E-08
ENE	68	7.947E-10	2.929E-08	1.430E-08	1.009E-08	9.306E-09	9.224E-09	9.687E-09	9.817E-09
E	129	1.673E-09	5.070E-08	2.608E-08	1.529E-08	1.400E-08	1.631E-08	1.803E-08	1.819E-08
ESE	89	7.973E-10	2.157E-08	1.079E-08	7.617E-09	8.201E-09	1.152E-08	1.363E-08	1.418E-08
SE	75	5.397E-10	2.104E-08	2.022E-08	1.088E-08	9.279E-09	1.517E-08	1.366E-08	1.438E-08
SSE	82	3.579E-09	9.807E-08	5.676E-08	5.278E-08	6.709E-08	6.205E-08	5.226E-08	4.356E-08
S	74	4.784E-09	7.763E-08	6.086E-08	1.113E-07	9.320E-08	7.927E-08	5.891E-08	4.336E-08
SSW	101	6.832E-09	8.677E-08	9.298E-08	1.366E-07	2.129E-07	1.630E-07	1.039E-07	7.380E-08
SW	131	9.429E-09	8.807E-08	9.129E-08	1.433E-07	1.427E-07	1.301E-07	1.032E-07	8.308E-08
WSW	83	5.627E-09	5.563E-08	7.198E-08	7.178E-08	1.034E-07	1.067E-07	8.401E-08	6.715E-08
W	79	3.322E-09	4.430E-08	5.400E-08	5.114E-08	6.189E-08	6.743E-08	5.540E-08	4.785E-08
WNW	73	2.107E-09	3.304E-08	4.463E-08	3.258E-08	3.985E-08	4.967E-08	4.616E-08	4.264E-08
NW	159	1.999E-09	3.460E-08	2.007E-08	1.520E-08	1.685E-08	2.445E-08	2.863E-08	2.925E-08
NNW	101	2.356E-10	9.615E-09	1.352E-08	1.053E-08	1.028E-08	1.478E-08	1.852E-08	1.988E-08
AVERAGE	1709	2.800E-09	4.678E-08	3.995E-08	4.459E-08	5.208E-08	5.044E-08	4.203E-08	3.599E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	147	2.541E-08	2.451E-08	2.340E-08	2.231E-08	2.112E-08	1.582E-08	1.230E-08	8.310E-09
NNE	206	2.980E-08	2.806E-08	2.627E-08	2.463E-08	2.301E-08	1.665E-08	1.274E-08	8.466E-09
NE	112	1.131E-08	1.071E-08	1.008E-08	9.490E-09	8.898E-09	6.524E-09	5.050E-09	3.425E-09
ENE	68	9.514E-09	9.138E-09	8.727E-09	8.345E-09	7.918E-09	6.004E-09	4.717E-09	3.233E-09
E	129	1.740E-08	1.638E-08	1.534E-08	1.437E-08	1.341E-08	9.678E-09	7.394E-09	4.899E-09
ESE	89	1.374E-08	1.308E-08	1.235E-08	1.165E-08	1.093E-08	7.988E-09	6.130E-09	4.080E-09
SE	75	1.391E-08	1.320E-08	1.241E-08	1.166E-08	1.090E-08	7.846E-09	5.958E-09	3.913E-09
SSE	82	3.668E-08	3.141E-08	2.728E-08	2.397E-08	2.126E-08	1.325E-08	9.404E-09	6.153E-09
S	74	3.333E-08	2.671E-08	2.206E-08	1.861E-08	1.599E-08	9.108E-09	6.151E-09	3.550E-09
SSW	101	5.617E-08	4.467E-08	3.668E-08	3.078E-08	2.635E-08	1.484E-08	9.927E-09	5.641E-09
SW	131	6.833E-08	5.746E-08	4.923E-08	4.278E-08	3.765E-08	2.296E-08	1.603E-08	9.561E-09
WSW	83	5.490E-08	4.594E-08	3.920E-08	3.393E-08	2.976E-08	1.792E-08	1.242E-08	7.356E-09
W	79	4.106E-08	3.562E-08	3.124E-08	2.766E-08	2.469E-08	1.953E-08	1.336E-08	7.843E-09
WNW	73	3.820E-08	3.423E-08	2.823E-08	2.554E-08	2.319E-08	1.640E-08	1.221E-08	7.610E-09
NW	159	2.793E-08	2.628E-08	2.456E-08	2.297E-08	2.140E-08	2.097E-08	1.524E-08	1.077E-08
NNW	101	1.961E-08	1.889E-08	1.798E-08	1.708E-08	1.612E-08	1.198E-08	1.007E-08	1.098E-08
AVERAGE	1709	3.108E-08	2.727E-08	2.407E-08	2.161E-08	1.954E-08	1.359E-08	9.944E-09	6.612E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	147	6.192E-09	4.896E-09	4.030E-09	3.419E-09	2.953E-09	3.456E-09	3.041E-09
NNE	206	6.267E-09	4.938E-09	4.056E-09	3.437E-09	2.967E-09	2.613E-09	2.330E-09
NE	112	2.579E-09	2.060E-09	1.708E-09	1.459E-09	1.269E-09	1.126E-09	1.011E-09
ENE	68	2.429E-09	1.994E-09	1.814E-09	1.534E-09	1.321E-09	1.161E-09	1.034E-09
E	129	3.624E-09	2.855E-09	2.925E-09	2.461E-09	2.111E-09	1.850E-09	1.642E-09
ESE	89	3.018E-09	2.707E-09	2.207E-09	1.858E-09	1.595E-09	1.398E-09	1.241E-09
SE	75	2.867E-09	2.789E-09	2.248E-09	1.875E-09	1.597E-09	1.391E-09	1.228E-09
SSE	82	4.292E-09	3.255E-09	2.610E-09	2.167E-09	1.838E-09	1.595E-09	1.402E-09
S	74	2.427E-09	1.818E-09	1.446E-09	1.193E-09	1.007E-09	8.710E-10	7.641E-10
SSW	101	3.822E-09	2.845E-09	2.251E-09	1.850E-09	1.556E-09	1.342E-09	1.174E-09
SW	131	6.654E-09	5.036E-09	4.029E-09	3.341E-09	2.922E-09	2.528E-09	2.218E-09
WSW	83	5.091E-09	3.878E-09	3.089E-09	2.707E-09	2.278E-09	1.993E-09	1.742E-09
W	79	5.397E-09	4.057E-09	3.231E-09	2.671E-09	2.337E-09	2.020E-09	1.769E-09
WNW	73	5.421E-09	4.433E-09	3.957E-09	3.438E-09	2.899E-09	2.505E-09	2.194E-09
NW	159	7.616E-09	6.044E-09	4.944E-09	4.791E-09	4.044E-09	3.495E-09	3.064E-09
NNW	101	7.576E-09	5.703E-09	4.549E-09	3.762E-09	3.178E-09	2.748E-09	2.410E-09
AVERAGE	1709	4.705E-09	3.707E-09	3.081E-09	2.623E-09	2.242E-09	2.006E-09	1.766E-09

Table B-1
Undepleted χ/Q Factors for Main Stack

PNPS 3RD QUARTER 1998 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
GROUND-LEVEL AVERAGE CHI/Q BEFORE DEPLETION -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	201	1.536E-09	5.688E-08	3.970E-08	2.882E-08	2.656E-08	2.785E-08	2.835E-08	2.719E-08
NNE	595	2.084E-09	7.036E-08	6.767E-08	5.187E-08	4.947E-08	5.800E-08	6.264E-08	6.164E-08
NE	280	1.081E-09	4.307E-08	3.133E-08	2.210E-08	1.988E-08	2.155E-08	2.323E-08	2.330E-08
ENE	116	3.499E-10	1.523E-08	1.519E-08	1.114E-08	9.256E-09	9.022E-09	9.561E-09	9.588E-09
E	186	1.291E-09	5.000E-08	3.037E-08	1.966E-08	1.755E-08	1.844E-08	1.910E-08	1.858E-08
ESE	133	1.122E-09	3.807E-08	2.118E-08	1.387E-08	1.188E-08	1.174E-08	1.201E-08	1.172E-08
SE	106	2.212E-09	1.162E-07	6.586E-08	2.966E-08	1.935E-08	1.743E-08	1.164E-08	1.130E-08
SSE	96	4.383E-09	1.595E-07	7.395E-08	4.972E-08	6.082E-08	5.354E-08	4.397E-08	3.623E-08
S	34	2.781E-09	5.030E-08	2.382E-08	3.552E-08	2.952E-08	2.458E-08	1.815E-08	1.338E-08
SSW	35	2.553E-09	5.542E-08	5.159E-08	4.400E-08	5.482E-08	5.963E-08	3.927E-08	2.850E-08
SW	43	2.129E-09	3.007E-08	4.693E-08	6.179E-08	5.156E-08	5.542E-08	4.299E-08	3.399E-08
WSW	58	9.570E-09	9.154E-08	5.350E-08	4.163E-08	5.824E-08	6.141E-08	4.910E-08	3.971E-08
W	79	5.609E-09	9.250E-08	9.499E-08	6.656E-08	6.428E-08	5.819E-08	4.452E-08	3.710E-08
WNW	98	2.300E-09	4.486E-08	4.548E-08	4.982E-08	6.458E-08	6.704E-08	5.462E-08	4.691E-08
NW	82	9.288E-10	2.411E-08	2.517E-08	1.924E-08	1.768E-08	1.857E-08	1.847E-08	1.729E-08
NNW	51	9.838E-11	4.075E-09	4.372E-09	2.890E-09	2.985E-09	4.837E-09	6.113E-09	6.542E-09
AVERAGE	2193	2.502E-09	5.888E-08	4.319E-08	3.427E-08	3.553E-08	3.545E-08	3.023E-08	2.644E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	201	2.521E-08	2.322E-08	2.137E-08	1.975E-08	1.825E-08	1.285E-08	9.729E-09	6.409E-09
NNE	595	5.772E-08	5.348E-08	4.940E-08	4.577E-08	4.235E-08	2.976E-08	2.238E-08	1.454E-08
NE	280	2.232E-08	2.117E-08	2.000E-08	1.892E-08	1.784E-08	1.338E-08	1.056E-08	7.377E-09
ENE	116	9.214E-09	8.784E-09	8.343E-09	7.933E-09	7.513E-09	5.729E-09	4.575E-09	3.251E-09
E	186	1.744E-08	1.624E-08	1.510E-08	1.409E-08	1.313E-08	9.494E-09	7.324E-09	4.958E-09
ESE	133	1.106E-08	1.039E-08	9.756E-09	9.183E-09	8.614E-09	6.390E-09	5.025E-09	3.503E-09
SE	106	1.068E-08	1.008E-08	9.506E-09	8.984E-09	8.455E-09	6.346E-09	5.029E-09	3.540E-09
SSE	96	3.041E-08	2.604E-08	2.267E-08	1.997E-08	1.778E-08	1.135E-08	8.199E-09	5.832E-09
S	34	1.033E-08	8.312E-09	6.895E-09	5.843E-09	5.034E-09	2.902E-09	1.979E-09	1.160E-09
SSW	35	2.190E-08	1.759E-08	1.459E-08	1.240E-08	1.072E-08	6.232E-09	4.290E-09	2.565E-09
SW	43	2.762E-08	2.301E-08	1.957E-08	1.689E-08	1.478E-08	8.862E-09	6.130E-09	3.621E-09
WSW	58	3.282E-08	2.773E-08	2.385E-08	2.079E-08	1.834E-08	1.129E-08	7.947E-09	4.803E-09
W	79	3.117E-08	2.660E-08	2.303E-08	2.019E-08	1.788E-08	1.323E-08	9.020E-09	5.243E-09
WNW	98	4.023E-08	3.489E-08	2.806E-08	2.490E-08	2.227E-08	1.512E-08	1.108E-08	6.766E-09
NW	82	1.575E-08	1.431E-08	1.303E-08	1.193E-08	1.096E-08	1.043E-08	7.646E-09	5.598E-09
NNW	51	6.456E-09	6.216E-09	5.918E-09	5.621E-09	5.311E-09	3.980E-09	3.427E-09	4.929E-09
AVERAGE	2193	2.315E-08	2.050E-08	1.819E-08	1.645E-08	1.495E-08	1.046E-08	7.772E-09	5.256E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	201	4.736E-09	3.732E-09	3.067E-09	2.601E-09	2.248E-09	2.891E-09	2.551E-09
NNE	595	1.062E-08	8.287E-09	6.765E-09	5.703E-09	4.900E-09	4.301E-09	3.822E-09
NE	280	5.651E-09	4.561E-09	3.808E-09	3.273E-09	2.860E-09	2.545E-09	2.290E-09
ENE	116	2.525E-09	2.180E-09	2.238E-09	1.928E-09	1.689E-09	1.507E-09	1.359E-09
E	186	3.728E-09	2.973E-09	3.201E-09	2.704E-09	2.327E-09	2.043E-09	1.817E-09
ESE	133	2.682E-09	2.626E-09	2.175E-09	1.857E-09	1.612E-09	1.427E-09	1.277E-09
SE	106	2.721E-09	3.122E-09	2.556E-09	2.159E-09	1.857E-09	1.628E-09	1.446E-09
SSE	96	4.157E-09	3.200E-09	2.592E-09	2.172E-09	1.857E-09	1.622E-09	1.436E-09
S	34	8.026E-10	6.067E-10	4.857E-10	4.033E-10	3.422E-10	2.972E-10	2.618E-10
SSW	35	1.793E-09	1.367E-09	1.103E-09	9.223E-10	7.870E-10	6.860E-10	6.065E-10
SW	43	2.508E-09	1.893E-09	1.511E-09	1.251E-09	1.089E-09	9.441E-10	8.297E-10
WSW	58	3.372E-09	2.611E-09	2.351E-09	1.946E-09	1.646E-09	1.468E-09	1.288E-09
W	79	3.604E-09	2.708E-09	2.157E-09	1.783E-09	1.552E-09	1.341E-09	1.175E-09
WNW	98	4.791E-09	3.961E-09	3.657E-09	3.249E-09	2.736E-09	2.358E-09	2.063E-09
NW	82	4.005E-09	3.229E-09	2.664E-09	2.719E-09	2.294E-09	1.980E-09	1.734E-09
NNW	51	3.446E-09	2.619E-09	2.104E-09	1.750E-09	1.485E-09	1.289E-09	1.133E-09
AVERAGE	2193	3.821E-09	3.105E-09	2.653E-09	2.276E-09	1.955E-09	1.770E-09	1.568E-09

Table B-1
Undepleted χ/Q Factors for Main Stack

PNPS 4TH QUARTER 1998 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
GROUND-LEVEL AVERAGE CHI/Q BEFORE DEPLETION -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	99	5.231E-10	1.809E-08	8.060E-09	5.586E-09	7.326E-09	1.210E-08	1.442E-08	1.485E-08
NNE	161	5.650E-10	1.614E-08	1.117E-08	9.436E-09	1.174E-08	1.748E-08	1.969E-08	1.959E-08
NE	227	3.859E-10	1.086E-08	1.052E-08	1.087E-08	1.340E-08	1.933E-08	2.167E-08	2.157E-08
ENE	184	4.092E-10	1.546E-08	1.723E-08	1.337E-08	1.295E-08	1.638E-08	1.853E-08	1.868E-08
E	361	2.236E-09	7.381E-08	3.841E-08	2.368E-08	2.303E-08	2.947E-08	3.381E-08	3.453E-08
ESE	304	2.335E-09	7.310E-08	3.760E-08	2.837E-08	2.966E-08	3.443E-08	3.509E-08	3.327E-08
SE	199	1.583E-09	5.982E-08	4.549E-08	2.877E-08	2.738E-08	3.452E-08	2.764E-08	2.623E-08
SSE	120	2.459E-09	6.384E-08	3.873E-08	5.841E-08	6.635E-08	5.412E-08	4.260E-08	3.416E-08
S	54	1.486E-09	2.562E-08	3.615E-08	5.706E-08	4.517E-08	3.672E-08	2.731E-08	2.012E-08
SSW	64	1.908E-09	4.714E-08	8.536E-08	9.202E-08	1.036E-07	6.490E-08	4.084E-08	2.871E-08
SW	43	3.306E-09	2.711E-08	2.789E-08	4.608E-08	4.344E-08	3.637E-08	2.761E-08	2.169E-08
WSW	35	1.279E-09	1.354E-08	2.161E-08	2.414E-08	2.994E-08	2.487E-08	1.785E-08	1.348E-08
W	72	3.336E-09	3.638E-08	3.189E-08	3.413E-08	3.768E-08	3.475E-08	2.600E-08	2.125E-08
WNW	77	6.015E-10	1.086E-08	1.506E-08	2.219E-08	3.282E-08	3.828E-08	3.253E-08	2.864E-08
NW	118	2.898E-10	8.163E-09	1.610E-08	1.617E-08	1.820E-08	2.213E-08	2.225E-08	2.067E-08
NNW	66	9.389E-11	2.799E-09	1.360E-08	1.724E-09	3.293E-09	6.709E-09	8.363E-09	8.754E-09
AVERAGE	2184	1.425E-09	3.142E-08	2.766E-08	2.950E-08	3.162E-08	3.016E-08	2.601E-08	2.289E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	99	1.429E-08	1.346E-08	1.256E-08	1.173E-08	1.091E-08	7.784E-09	5.892E-09	3.848E-09
NNE	161	1.841E-08	1.704E-08	1.571E-08	1.452E-08	1.341E-08	9.358E-09	7.000E-09	4.507E-09
NE	227	2.030E-08	1.885E-08	1.743E-08	1.616E-08	1.496E-08	1.055E-08	7.959E-09	5.196E-09
ENE	184	1.774E-08	1.660E-08	1.545E-08	1.441E-08	1.340E-08	9.548E-09	7.234E-09	4.743E-09
E	361	3.311E-08	3.125E-08	2.930E-08	2.749E-08	2.568E-08	1.852E-08	1.413E-08	9.350E-09
ESE	304	3.048E-08	2.780E-08	2.538E-08	2.329E-08	2.138E-08	1.473E-08	1.099E-08	7.092E-09
SE	199	2.393E-08	2.169E-08	1.968E-08	1.795E-08	1.639E-08	1.107E-08	8.126E-09	5.116E-09
SSE	120	2.807E-08	2.361E-08	2.023E-08	1.759E-08	1.547E-08	9.416E-09	6.592E-09	4.191E-09
S	54	1.546E-08	1.238E-08	1.023E-08	8.631E-09	7.420E-09	4.239E-09	2.869E-09	1.659E-09
SSW	64	2.162E-08	1.706E-08	1.393E-08	1.166E-08	9.952E-09	5.568E-09	3.713E-09	2.103E-09
SW	43	1.763E-08	1.475E-08	1.261E-08	1.095E-08	9.642E-09	5.942E-09	4.185E-09	2.528E-09
WSW	35	1.059E-08	8.610E-09	7.180E-09	6.103E-09	5.274E-09	3.039E-09	2.046E-09	1.162E-09
W	72	1.760E-08	1.488E-08	1.282E-08	1.121E-08	9.929E-09	1.123E-08	8.256E-09	5.271E-09
WNW	77	2.492E-08	2.184E-08	1.932E-08	1.725E-08	1.551E-08	9.840E-09	8.095E-09	5.044E-09
NW	118	1.863E-08	1.671E-08	1.503E-08	1.359E-08	1.235E-08	1.056E-08	7.478E-09	4.954E-09
NNW	66	8.475E-09	8.027E-09	7.534E-09	7.068E-09	6.609E-09	4.780E-09	3.960E-09	4.211E-09
AVERAGE	2184	2.008E-08	1.779E-08	1.590E-08	1.435E-08	1.302E-08	9.136E-09	6.783E-09	4.436E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	99	2.819E-09	2.205E-09	1.802E-09	1.521E-09	1.308E-09	1.564E-09	1.373E-09
NNE	161	3.276E-09	2.551E-09	2.078E-09	1.749E-09	1.501E-09	1.317E-09	1.169E-09
NE	227	3.815E-09	2.992E-09	2.449E-09	2.071E-09	1.785E-09	1.570E-09	1.399E-09
ENE	184	3.479E-09	2.804E-09	2.500E-09	2.097E-09	1.794E-09	1.568E-09	1.389E-09
E	361	6.893E-09	5.415E-09	5.277E-09	4.416E-09	3.769E-09	3.290E-09	2.908E-09
ESE	304	5.166E-09	4.458E-09	3.615E-09	3.031E-09	2.592E-09	2.266E-09	2.007E-09
SE	199	3.667E-09	3.308E-09	2.649E-09	2.198E-09	1.863E-09	1.617E-09	1.423E-09
SSE	120	2.907E-09	2.197E-09	1.757E-09	1.457E-09	1.234E-09	1.070E-09	9.403E-10
S	54	1.136E-09	8.517E-10	6.777E-10	5.596E-10	4.723E-10	4.084E-10	3.581E-10
SSW	64	1.431E-09	1.069E-09	8.481E-10	6.992E-10	5.898E-10	5.101E-10	4.478E-10
SW	43	1.782E-09	1.362E-09	1.097E-09	9.151E-10	8.359E-10	7.275E-10	6.420E-10
WSW	35	7.867E-10	5.868E-10	4.734E-10	3.876E-10	3.248E-10	2.805E-10	2.449E-10
W	72	3.851E-09	3.015E-09	2.470E-09	2.090E-09	2.668E-09	2.353E-09	2.076E-09
WNW	77	3.623E-09	3.156E-09	3.262E-09	3.106E-09	2.623E-09	2.267E-09	1.987E-09
NW	118	3.438E-09	2.663E-09	2.146E-09	1.937E-09	1.625E-09	1.397E-09	1.219E-09
NNW	66	2.887E-09	2.164E-09	1.721E-09	1.420E-09	1.196E-09	1.032E-09	9.032E-10
AVERAGE	2184	3.185E-09	2.550E-09	2.176E-09	1.853E-09	1.636E-09	1.452E-09	1.280E-09

Table B-1
Undepleted χ/Q Factors for Main Stack

PNPS 1998 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
GROUND-LEVEL AVERAGE CHI/Q BEFORE DEPLETION -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	543	9.373E-10	3.293E-08	2.103E-08	1.549E-08	1.546E-08	1.871E-08	2.052E-08	2.052E-08
NNE	1146	1.126E-09	3.656E-08	3.188E-08	2.417E-08	2.413E-08	3.051E-08	3.394E-08	3.388E-08
NE	790	6.254E-10	2.221E-08	1.633E-08	1.244E-08	1.283E-08	1.670E-08	1.836E-08	1.911E-08
ENE	438	4.386E-10	1.677E-08	1.383E-08	1.050E-08	9.627E-09	1.073E-08	1.179E-08	1.191E-08
E	785	1.410E-09	4.826E-08	2.793E-08	1.787E-08	1.679E-08	1.994E-08	2.202E-08	2.208E-08
ESE	710	1.358E-09	4.215E-08	2.262E-08	1.690E-08	1.738E-08	2.082E-08	2.209E-08	2.154E-08
SE	621	1.159E-09	4.757E-08	3.732E-08	2.364E-08	2.147E-08	2.715E-08	2.252E-08	2.196E-08
SSE	440	2.586E-09	8.117E-08	4.084E-08	5.533E-08	6.868E-08	6.047E-08	4.944E-08	4.054E-08
S	282	2.390E-09	4.145E-08	4.871E-08	8.753E-08	7.162E-08	5.958E-08	4.402E-08	3.232E-08
SSW	394	3.396E-09	6.169E-08	9.952E-08	1.206E-07	1.639E-07	1.232E-07	7.867E-08	5.595E-08
SW	336	4.234E-09	4.010E-08	5.328E-08	8.591E-08	8.309E-08	7.243E-08	5.589E-08	4.421E-08
WSW	271	4.535E-09	4.363E-08	4.466E-08	4.515E-08	6.233E-08	6.110E-08	4.721E-08	3.735E-08
W	329	3.538E-09	5.030E-08	5.725E-08	5.279E-08	5.737E-08	5.520E-08	4.295E-08	3.604E-08
WNW	310	1.404E-09	2.458E-08	2.670E-08	2.992E-08	4.092E-08	4.619E-08	3.911E-08	3.438E-08
NW	397	7.547E-10	1.611E-08	1.558E-08	1.314E-08	1.395E-08	1.765E-08	1.895E-08	1.844E-08
NNW	272	1.021E-10	4.103E-09	7.063E-09	5.342E-09	5.825E-09	8.759E-09	1.059E-08	1.107E-08
AVERAGE	8064	1.875E-09	3.810E-08	3.528E-08	3.854E-08	4.284E-08	4.057E-08	3.366E-08	2.883E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	543	1.949E-08	1.825E-08	1.701E-08	1.589E-08	1.480E-08	1.062E-08	8.085E-09	5.337E-09
NNE	1146	3.198E-08	2.978E-08	2.762E-08	2.566E-08	2.380E-08	1.683E-08	1.269E-08	8.265E-09
NE	790	1.827E-08	1.723E-08	1.616E-08	1.518E-08	1.421E-08	1.039E-08	8.037E-09	5.442E-09
ENE	438	1.140E-08	1.079E-08	1.015E-08	9.568E-09	8.981E-09	6.602E-09	5.111E-09	3.457E-09
E	785	2.099E-08	1.969E-08	1.837E-08	1.719E-08	1.602E-08	1.152E-08	8.794E-09	5.839E-09
ESE	710	2.012E-08	1.863E-08	1.722E-08	1.597E-08	1.479E-08	1.044E-08	7.902E-09	5.194E-09
SE	621	2.042E-08	1.883E-08	1.734E-08	1.601E-08	1.478E-08	1.032E-08	7.741E-09	5.026E-09
SSE	440	3.383E-08	2.880E-08	2.492E-08	2.183E-08	1.933E-08	1.202E-08	8.534E-09	5.663E-09
S	282	2.482E-08	1.987E-08	1.640E-08	1.382E-08	1.187E-08	6.756E-09	4.563E-09	2.634E-09
SSW	394	4.261E-08	3.391E-08	2.788E-08	2.345E-08	2.010E-08	1.138E-08	7.657E-09	4.401E-09
SW	336	3.594E-08	2.998E-08	2.552E-08	2.205E-08	1.932E-08	1.163E-08	8.063E-09	4.767E-09
WSW	271	3.038E-08	2.534E-08	2.157E-08	1.864E-08	1.633E-08	9.816E-09	6.803E-09	4.029E-09
W	329	3.038E-08	2.600E-08	2.258E-08	1.984E-08	1.761E-08	1.444E-08	9.997E-09	5.940E-09
WNW	310	2.987E-08	2.615E-08	2.310E-08	2.060E-08	1.850E-08	1.151E-08	9.302E-09	5.700E-09
NW	397	1.713E-08	1.577E-08	1.450E-08	1.337E-08	1.234E-08	1.165E-08	8.441E-09	5.933E-09
NNW	272	1.076E-08	1.024E-08	9.659E-09	9.101E-09	8.535E-09	6.228E-09	5.171E-09	5.660E-09
AVERAGE	8064	2.490E-08	2.183E-08	1.938E-08	1.739E-08	1.571E-08	1.076E-08	7.931E-09	5.205E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	543	3.936E-09	3.093E-09	2.536E-09	2.146E-09	1.850E-09	2.219E-09	1.953E-09
NNE	1146	6.042E-09	4.720E-09	3.854E-09	3.250E-09	2.794E-09	2.452E-09	2.180E-09
NE	790	4.089E-09	3.257E-09	2.695E-09	2.295E-09	1.997E-09	1.768E-09	1.584E-09
ENE	438	2.589E-09	2.135E-09	1.991E-09	1.687E-09	1.456E-09	1.283E-09	1.144E-09
E	785	4.323E-09	3.409E-09	3.444E-09	2.892E-09	2.476E-09	2.166E-09	1.919E-09
ESE	710	3.825E-09	3.402E-09	2.771E-09	2.332E-09	2.001E-09	1.754E-09	1.557E-09
SE	621	3.669E-09	3.539E-09	2.852E-09	2.378E-09	2.024E-09	1.763E-09	1.555E-09
SSE	440	3.969E-09	3.021E-09	2.428E-09	2.021E-09	1.718E-09	1.494E-09	1.316E-09
S	282	1.801E-09	1.349E-09	1.072E-09	8.850E-10	7.466E-10	6.456E-10	5.662E-10
SSW	394	3.007E-09	2.252E-09	1.791E-09	1.479E-09	1.249E-09	1.080E-09	9.484E-10
SW	336	3.303E-09	2.493E-09	1.991E-09	1.649E-09	1.441E-09	1.248E-09	1.095E-09
WSW	271	2.792E-09	2.131E-09	1.828E-09	1.507E-09	1.270E-09	1.116E-09	9.772E-10
W	329	4.138E-09	3.138E-09	2.515E-09	2.089E-09	2.051E-09	1.784E-09	1.566E-09
WNW	310	4.037E-09	3.336E-09	3.101E-09	2.771E-09	2.334E-09	2.014E-09	1.763E-09
NW	397	4.189E-09	3.318E-09	2.709E-09	2.613E-09	2.2[illegible]1E-09	1.899E-09	1.662E-09
NNW	272	3.909E-09	2.946E-09	2.352E-09	1.946E-09	1.645E-09	1.424E-09	1.249E-09
AVERAGE	8064	3.726E-09	2.971E-09	2.496E-09	2.122E-09	1.828E-09	1.632E-09	1.440E-09

Table B-2
Depleted χ/Q Factors for Main Stack

PNPS 1ST QUARTER 1998 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
GROUND-LEVEL AVERAGE CHI/Q AFTER DEPLETION (MET. AND ATOMIC ENERGY 1968 DEPLETION MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	96	3.485E-10	1.324E-08	1.125E-08	1.051E-08	1.154E-08	1.431E-08	1.513E-08	1.461E-08
NNE	184	6.853E-10	2.165E-08	1.871E-08	1.244E-08	1.226E-08	1.734E-08	2.053E-08	2.102E-08
NE	171	4.249E-10	1.552E-08	1.228E-08	8.546E-09	9.266E-09	1.421E-08	1.719E-08	1.789E-08
ENE	70	2.619E-10	9.096E-09	8.163E-09	6.952E-09	6.620E-09	7.664E-09	8.582E-09	8.729E-09
E	109	4.020E-10	1.602E-08	1.520E-08	1.163E-08	1.139E-08	1.414E-08	1.554E-08	1.536E-08
ESE	184	1.026E-09	3.028E-08	1.788E-08	1.557E-08	1.778E-08	2.377E-08	2.601E-08	2.556E-08
SE	241	1.247E-09	4.116E-08	3.278E-08	2.882E-08	3.113E-08	4.348E-08	3.635E-08	3.527E-08
SSE	142	3.087E-09	1.060E-07	3.901E-08	5.028E-08	8.121E-08	7.348E-08	6.006E-08	4.897E-08
S	120	1.945E-09	1.606E-08	7.955E-08	1.581E-07	1.285E-07	1.057E-07	7.688E-08	5.567E-08
SSW	194	3.552E-09	7.150E-08	1.733E-07	2.225E-07	3.076E-07	2.196E-07	1.379E-07	9.654E-08
SW	119	3.855E-09	3.190E-08	6.627E-08	1.068E-07	9.889E-08	8.052E-08	5.945E-08	4.538E-08
WSW	95	4.494E-09	4.123E-08	4.594E-08	4.915E-08	6.698E-08	6.096E-08	4.507E-08	3.455E-08
W	99	1.653E-09	2.405E-08	5.695E-08	6.138E-08	6.735E-08	6.344E-08	4.848E-08	4.004E-08
WNW	62	6.875E-10	9.944E-09	1.009E-08	2.103E-08	3.268E-08	3.762E-08	3.106E-08	2.652E-08
NW	38	3.126E-17	3.070E-11	5.000E-10	1.250E-09	2.619E-09	5.789E-09	7.401E-09	7.777E-09
NNW	54	1.014E-17	8.085E-10	1.053E-08	7.282E-09	7.622E-09	9.848E-09	1.077E-08	1.064E-08
AVERAGE	1978	1.479E-09	2.928E-08	3.740E-08	4.889E-08	5.584E-08	4.949E-08	3.853E-08	3.153E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	96	1.349E-08	1.232E-08	1.123E-08	1.027E-08	9.388E-09	6.271E-09	4.510E-09	2.701E-09
NNE	184	2.003E-08	1.873E-08	1.738E-08	1.612E-08	1.491E-08	1.026E-08	7.492E-09	4.575E-09
NE	171	1.728E-08	1.635E-08	1.534E-08	1.437E-08	1.340E-08	9.503E-09	7.085E-09	4.463E-09
ENE	70	8.341E-09	7.854E-09	7.343E-09	6.868E-09	6.391E-09	4.476E-09	3.297E-09	2.030E-09
E	109	1.438E-08	1.328E-08	1.220E-08	1.124E-08	1.034E-08	7.052E-09	5.150E-09	3.159E-09
ESE	184	2.383E-08	2.193E-08	2.010E-08	1.845E-08	1.692E-08	1.135E-08	8.179E-09	4.919E-09
SE	241	3.249E-08	2.964E-08	2.698E-08	2.464E-08	2.249E-08	1.490E-08	1.063E-08	6.290E-09
SSE	142	4.061E-08	3.430E-08	2.943E-08	2.554E-08	2.240E-08	1.329E-08	9.022E-09	5.318E-09
S	120	4.226E-08	3.343E-08	2.728E-08	2.272E-08	1.929E-08	1.042E-08	6.711E-09	3.557E-09
SSW	194	7.249E-08	5.686E-08	4.605E-08	3.813E-08	3.219E-08	1.697E-08	1.069E-08	5.465E-09
SW	119	3.578E-08	2.900E-08	2.403E-08	2.025E-08	1.733E-08	9.440E-09	6.033E-09	3.140E-09
WSW	95	2.742E-08	2.239E-08	1.870E-08	1.587E-08	1.368E-08	7.666E-09	5.016E-09	2.701E-09
W	99	3.322E-08	2.799E-08	2.393E-08	2.071E-08	1.810E-08	1.223E-08	7.691E-09	3.866E-09
WNW	62	2.239E-08	1.908E-08	1.644E-08	1.431E-08	1.256E-08	6.882E-09	4.990E-09	2.607E-09
NW	38	7.502E-09	7.068E-09	6.590E-09	6.132E-09	5.683E-09	5.410E-09	3.715E-09	2.239E-09
NNW	54	9.960E-09	9.179E-09	8.414E-09	7.725E-09	7.068E-09	4.681E-09	3.485E-09	2.388E-09
AVERAGE	1978	2.634E-08	2.246E-08	1.946E-08	1.708E-08	1.513E-08	9.425E-09	6.481E-09	3.714E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	96	1.835E-09	1.341E-09	1.029E-09	8.190E-10	6.653E-10	5.838E-10	4.844E-10
NNE	184	3.147E-09	2.323E-09	1.800E-09	1.445E-09	1.183E-09	9.916E-10	8.430E-10
NE	171	3.133E-09	2.342E-09	1.826E-09	1.473E-09	1.211E-09	1.017E-09	8.659E-10
ENE	70	1.396E-09	1.049E-09	8.570E-10	6.775E-10	5.470E-10	4.528E-10	3.804E-10
E	109	2.177E-09	1.603E-09	1.381E-09	1.079E-09	8.612E-10	7.056E-10	5.874E-10
ESE	184	3.353E-09	2.645E-09	2.014E-09	1.592E-09	1.285E-09	1.063E-09	8.928E-10
SE	241	4.231E-09	3.377E-09	2.532E-09	1.978E-09	1.581E-09	1.299E-09	1.085E-09
SSE	142	3.436E-09	2.426E-09	1.817E-09	1.416E-09	1.129E-09	9.252E-10	7.702E-10
S	120	2.254E-09	1.577E-09	1.178E-09	9.193E-10	7.354E-10	6.058E-10	5.075E-10
SSW	194	3.376E-09	2.317E-09	1.705E-09	1.315E-09	1.043E-09	8.539E-10	7.123E-10
SW	119	1.975E-09	1.377E-09	1.028E-09	8.029E-10	6.416E-10	5.297E-10	4.450E-10
WSW	95	1.730E-09	1.222E-09	9.067E-10	7.084E-10	5.679E-10	4.579E-10	3.848E-10
W	99	2.340E-09	1.572E-09	1.133E-09	8.562E-10	6.107E-10	4.540E-10	3.743E-10
WNW	62	1.621E-09	1.116E-09	8.005E-10	5.576E-10	4.260E-10	3.443E-10	2.835E-10
NW	38	1.376E-09	9.233E-10	6.503E-10	3.122E-10	2.364E-10	1.854E-10	1.483E-10
NNW	54	1.464E-09	9.918E-10	7.179E-10	5.435E-10	4.223E-10	3.386E-10	2.765E-10
AVERAGE	1978	2.428E-09	1.763E-09	1.336E-09	1.031E-09	8.216E-10	6.755E-10	5.651E-10

Table B-2
Depleted χ/Q Factors for Main Stack

PNPS 2ND QUARTER 1998 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
GROUND-LEVEL AVERAGE CHI/Q AFTER DEPLETION (MET. AND ATOMIC ENERGY 1968 DEPLETION MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	147	1.380E-09	4.390E-08	2.486E-08	1.668E-08	1.601E-08	2.032E-08	2.417E-08	2.548E-08
NNE	206	1.123E-09	3.649E-08	2.755E-08	2.091E-08	2.104E-08	2.691E-08	3.046E-08	3.081E-08
NE	112	5.783E-10	1.769E-08	9.117E-09	6.493E-09	7.101E-09	9.865E-09	1.141E-08	1.166E-08
ENE	68	7.947E-10	2.926E-08	1.425E-08	1.004E-08	9.229E-09	9.117E-09	9.552E-09	9.623E-09
E	129	1.673E-09	5.067E-08	2.601E-08	1.523E-08	1.394E-08	1.622E-08	1.787E-08	1.794E-08
ESE	89	7.973E-10	2.155E-08	1.077E-08	7.595E-09	8.178E-09	1.148E-08	1.355E-08	1.401E-08
SE	75	5.397E-10	2.102E-08	2.016E-08	1.081E-08	9.231E-09	1.511E-08	1.358E-08	1.424E-08
SSE	82	3.579E-09	9.800E-08	5.658E-08	5.266E-08	6.691E-08	6.165E-08	5.155E-08	4.258E-08
S	74	4.784E-09	7.756E-08	6.076E-08	1.112E-07	9.290E-08	7.835E-08	5.740E-08	4.163E-08
SSW	101	6.832E-09	8.669E-08	9.282E-08	1.364E-07	2.119E-07	1.593E-07	9.978E-08	6.953E-08
SW	131	9.429E-09	8.796E-08	9.100E-08	1.430E-07	1.423E-07	1.288E-07	1.011E-07	8.035E-08
WSW	83	5.627E-09	5.557E-08	7.179E-08	7.156E-08	1.030E-07	1.054E-07	8.193E-08	6.439E-08
W	79	3.322E-09	4.425E-08	5.383E-08	5.093E-08	6.160E-08	6.687E-08	5.455E-08	4.667E-08
WNW	73	2.107E-09	3.301E-08	4.448E-08	3.242E-08	3.966E-08	4.934E-08	4.555E-08	4.165E-08
NW	159	1.999E-09	3.457E-08	2.002E-08	1.515E-08	1.679E-08	2.435E-08	2.844E-08	2.893E-08
NNW	101	2.356E-10	9.610E-09	1.349E-08	1.048E-08	1.023E-08	1.470E-08	1.838E-08	1.962E-08
AVERAGE	1709	2.800E-09	4.674E-08	3.984E-08	4.447E-08	5.187E-08	4.986E-08	4.120E-08	3.495E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	147	2.486E-08	2.372E-08	2.235E-08	2.100E-08	1.956E-08	1.344E-08	9.659E-09	5.755E-09
NNE	206	2.930E-08	2.741E-08	2.548E-08	2.370E-08	2.196E-08	1.518E-08	1.108E-08	6.738E-09
NE	112	1.118E-08	1.054E-08	9.875E-09	9.254E-09	8.635E-09	6.170E-09	4.650E-09	2.991E-09
ENE	68	9.225E-09	8.725E-09	8.171E-09	7.633E-09	7.057E-09	4.660E-09	3.265E-09	1.949E-09
E	129	1.704E-08	1.592E-08	1.477E-08	1.370E-08	1.265E-08	8.621E-09	6.222E-09	3.723E-09
ESE	89	1.348E-08	1.271E-08	1.188E-08	1.107E-08	1.026E-08	7.007E-09	5.020E-09	2.948E-09
SE	75	1.372E-08	1.294E-08	1.209E-08	1.128E-08	1.047E-08	7.243E-09	5.278E-09	3.194E-09
SSE	82	3.548E-08	3.003E-08	2.577E-08	2.235E-08	1.957E-08	1.141E-08	7.578E-09	4.230E-09
S	74	3.157E-08	2.496E-08	2.035E-08	1.694E-08	1.437E-08	7.711E-09	4.933E-09	2.589E-09
SSW	101	5.193E-08	4.052E-08	3.267E-08	2.694E-08	2.266E-08	1.178E-08	7.345E-09	3.697E-09
SW	131	6.518E-08	5.403E-08	4.561E-08	3.904E-08	3.383E-08	1.911E-08	1.238E-08	6.416E-09
WSW	83	5.165E-08	4.235E-08	3.537E-08	2.996E-08	2.571E-08	1.390E-08	8.711E-09	4.307E-09
W	79	3.960E-08	3.393E-08	2.938E-08	2.566E-08	2.258E-08	1.565E-08	9.813E-09	4.906E-09
WNW	73	3.686E-08	3.259E-08	2.648E-08	2.359E-08	2.108E-08	1.357E-08	9.190E-09	4.830E-09
NW	159	2.747E-08	2.568E-08	2.364E-08	2.213E-08	2.046E-08	1.384E-08	1.306E-08	8.259E-09
NNW	101	1.922E-08	1.836E-08	1.731E-08	1.628E-08	1.521E-08	1.064E-08	8.332E-09	6.640E-09
AVERAGE	1709	2.986E-08	2.590E-08	2.259E-08	2.003E-08	1.788E-08	1.156E-08	7.908E-09	4.573E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	147	3.875E-09	2.796E-09	2.114E-09	1.655E-09	1.323E-09	1.109E-09	9.043E-10
NNE	206	4.588E-09	3.341E-09	2.548E-09	2.015E-09	1.627E-09	1.346E-09	1.131E-09
NE	112	2.138E-09	1.621E-09	1.278E-09	1.040E-09	8.612E-10	7.287E-10	6.245E-10
ENE	68	1.361E-09	1.057E-09	9.107E-10	7.381E-10	6.096E-10	5.146E-10	4.402E-10
E	129	2.527E-09	1.849E-09	1.700E-09	1.347E-09	1.092E-09	9.082E-10	7.677E-10
ESE	89	1.960E-09	1.557E-09	1.170E-09	9.165E-10	7.354E-10	6.063E-10	5.082E-10
SE	75	2.162E-09	1.808E-09	1.340E-09	1.033E-09	8.129E-10	6.572E-10	5.395E-10
SSE	82	2.609E-09	1.767E-09	1.276E-09	9.629E-10	7.456E-10	5.953E-10	4.846E-10
S	74	1.630E-09	1.136E-09	8.454E-10	6.576E-10	5.251E-10	4.318E-10	3.616E-10
SSW	101	2.264E-09	1.543E-09	1.130E-09	8.674E-10	6.850E-10	5.583E-10	4.642E-10
SW	131	3.920E-09	2.630E-09	1.884E-09	1.412E-09	1.077E-09	8.541E-10	6.922E-10
WSW	83	2.553E-09	1.678E-09	1.122E-09	8.313E-10	6.365E-10	4.809E-10	3.920E-10
W	79	2.928E-09	1.938E-09	1.376E-09	1.025E-09	7.107E-10	5.120E-10	4.156E-10
WNW	73	2.943E-09	1.988E-09	1.386E-09	8.415E-10	6.116E-10	4.853E-10	3.940E-10
NW	159	5.347E-09	3.849E-09	2.875E-09	1.533E-09	1.187E-09	9.496E-10	7.747E-10
NNW	101	3.929E-09	2.581E-09	1.822E-09	1.351E-09	1.030E-09	8.132E-10	6.550E-10
AVERAGE	1709	3.921E-09	2.071E-09	1.548E-09	1.139E-09	8.918E-10	7.219E-10	5.968E-10

Table B-2
Depleted χ/Q Factors for Main Stack

PNPS 3RD QUARTER 1996 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
GROUND-LEVEL AVERAGE CHI/Q AFTER DEPLETION (MET. AND ATOMIC ENERGY 1968 DEPLETION MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	201	1.536E-09	5.684E-08	3.958E-08	2.868E-08	2.640E-08	2.763E-08	2.804E-08	2.678E-08
NNE	595	2.084E-09	7.032E-08	6.753E-08	5.168E-08	4.926E-08	5.773E-08	6.223E-08	6.106E-08
NE	280	1.081E-09	4.303E-08	3.123E-08	2.199E-08	1.976E-08	2.141E-08	2.303E-08	2.302E-08
ENE	116	3.499E-10	1.522E-08	1.514E-08	1.108E-08	9.187E-09	8.937E-09	9.453E-09	9.451E-09
E	186	1.291E-09	4.996E-08	3.026E-08	1.955E-08	1.744E-08	1.831E-08	1.892E-08	1.835E-08
ESE	133	1.122E-09	3.804E-08	2.111E-08	1.380E-08	1.180E-08	1.166E-08	1.190E-08	1.158E-08
SE	106	2.212E-09	1.160E-07	6.551E-08	2.937E-08	1.913E-08	1.725E-08	1.151E-08	1.115E-08
SSE	96	4.383E-09	1.593E-07	7.359E-08	4.959E-08	6.063E-08	5.312E-08	4.332E-08	3.541E-08
S	34	2.781E-09	5.025E-08	2.374E-08	3.542E-08	2.938E-08	2.424E-08	1.765E-08	1.283E-08
SSW	35	2.553E-09	5.536E-08	5.128E-08	4.365E-08	5.425E-08	5.854E-08	3.615E-08	2.740E-08
SW	43	2.129E-09	3.004E-08	4.669E-08	6.150E-08	6.121E-08	5.464E-08	4.178E-08	3.245E-08
WSW	58	9.570E-09	9.143E-08	5.324E-08	4.142E-08	5.796E-08	6.065E-08	4.788E-08	3.812E-08
W	79	5.609E-09	9.239E-08	9.456E-08	6.618E-08	6.385E-08	5.749E-08	4.356E-08	3.587E-08
WNW	98	2.300E-09	4.480E-08	4.530E-08	4.966E-08	6.433E-08	6.646E-08	5.371E-08	4.569E-08
NW	82	9.288E-10	2.409E-08	2.510E-08	1.914E-08	1.757E-08	1.841E-08	1.823E-08	1.697E-08
NNW	51	9.838E-11	4.072E-09	4.358E-09	2.873E-09	2.971E-09	4.815E-09	6.060E-09	6.444E-09
AVERAGE	2193	2.502E-09	5.883E-08	4.301E-08	3.410E-08	3.532E-08	3.508E-08	2.971E-08	2.578E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	201	2.469E-08	2.259E-08	2.065E-08	1.895E-08	1.737E-08	1.174E-08	8.533E-09	5.210E-09
NNE	595	5.697E-08	5.257E-08	4.835E-08	4.459E-08	4.107E-08	2.813E-08	2.061E-08	1.275E-08
NE	280	2.195E-08	2.072E-08	1.948E-08	1.833E-08	1.717E-08	1.251E-08	9.580E-09	6.309E-09
ENE	116	9.047E-09	8.588E-09	8.118E-09	7.681E-09	7.236E-09	5.366E-09	4.167E-09	2.805E-09
E	186	1.714E-08	1.589E-08	1.471E-08	1 366E-08	1.265E-08	8.895E-09	6.673E-09	4.284E-09
ESE	133	1.089E-08	1.019E-08	9.523E-09	8.923E-09	8.331E-09	6.024E-09	4.616E-09	3.052E-09
SE	106	1.051E-08	9.883E-09	9.284E-09	8.738E-09	8.188E-09	5.997E-09	4.631E-09	3.087E-09
SSE	96	2.946E-08	2.501E-08	2.159E-08	1.885E-08	1.664E-08	1.018E-08	7.060E-09	4.541E-09
S	34	9.784E-09	7.778E-09	6.378E-09	5.345E-09	4.555E-09	2.498E-09	1.631E-09	8.883E-10
SSW	35	2.085E-08	1.657E-08	1.361E-08	1.145E-08	9.806E-09	5.411E-09	3.532E-09	1.903E-09
SW	43	2.585E-08	2.110E-08	1.757E-08	1.485E-08	1.272E-08	6.881E-09	4.331E-09	2.173E-09
WSW	58	3.096E-08	2.569E-08	2.169E-08	1.855E-08	1.605E-08	8.980E-09	5.767E-09	2.947E-09
W	79	2.973E-08	2.502E-08	2.135E-08	1.845E-08	1.610E-08	1.050E-08	6.594E-09	3.326E-09
WNW	98	3.878E-08	3.327E-08	2.848E-08	2.323E-08	2.055E-08	1.309E-08	8.987E-09	4.854E-09
NW	82	1.534E-08	1.383E-08	1.249E-08	1.135E-08	1.034E-08	9.176E-09	6.324E-09	3.845E-09
NNW	51	6.310E-09	6.023E-09	5.680E-09	5.342E-09	4.997E-09	3.548E-09	2.883E-09	3.480E-09
AVERAGE	2193	2.239E-08	1.967E-08	1.731E-08	1.552E-08	1.399E-08	9.307E-09	6.620E-09	4.091E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	201	3.590E-09	2.649E-09	2.046E-09	1.637E-09	1.337E-09	1.272E-09	1.049E-09
NNE	595	8.883E-09	6.636E-09	5.193E-09	4.205E-09	3.471E-09	2.931E-09	2.508E-09
NE	280	4.562E-09	3.478E-09	2.745E-09	2.235E-09	1.851E-09	1.564E-09	1.339E-09
ENE	116	2.067E-09	1.686E-09	1.594E-09	1.289E-09	1.057E-09	8.826E-10	7.448E-10
E	186	3.061E-09	2.323E-09	2.259E-09	1.806E-09	1.471E-09	1.226E-09	1.035E-09
ESE	133	2.213E-09	1.991E-09	1.554E-09	1.253E-09	1.029E-09	8.627E-10	7.331E-10
SE	106	2.241E-09	2.225E-09	1.689E-09	1.325E-09	1.059E-09	8.651E-10	7.170E-10
SSE	96	2.944E-09	2.057E-09	1.511E-09	1.151E-09	8.951E-10	7.140E-10	5.791E-10
S	34	5.774E-10	4.131E-10	3.145E-10	2.497E-10	2.030E-10	1.696E-10	1.441E-10
SSW	35	1.197E-09	8.232E-10	6.014E-10	4.577E-10	3.567E-10	2.858E-10	2.335E-10
SW	43	1.312E-09	8.798E-10	6.321E-10	4.768E-10	3.704E-10	2.958E-10	2.409E-10
WSW	58	1.787E-09	1.204E-09	8.549E-10	6.330E-10	4.829E-10	3.471E-10	2.798E-10
W	79	2.028E-09	1.376E-09	1.003E-09	7.675E-10	5.640E-10	4.327E-10	3.615E-10
WNW	98	3.061E-09	2.177E-09	1.603E-09	9.422E-10	6.849E-10	5.452E-10	4.443E-10
NW	82	2.385E-09	1.636E-09	1.180E-09	6.037E-10	4.736E-10	3.836E-10	3.170E-10
NNW	51	2.153E-09	1.449E-09	1.033E-09	7.651E-10	5.783E-10	4.486E-10	3.541E-10
AVERAGE	2193	2.754E-09	2.063E-09	1.613E-09	1.237E-09	9.927E-10	8.266E-10	6.925E-10

Table B-2
Depleted χ/Q Factors for Main Stack

PNPS 4TH QUARTER 1998 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
GROUND-LEVEL AVERAGE CHI/Q AFTER DEPLETION (MET. AND ATOMIC ENERGY 1968 DEPLETION MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	99	5.231E-10	1.807E-08	8.032E-09	5.564E-09	7.302E-09	1.205E-08	1.430E-08	1.465E-08
NNE	161	5.650E-10	1.613E-08	1.114E-08	9.406E-09	1.171E-08	1.742E-08	1.957E-08	1.939E-08
NE	227	3.859E-10	1.085E-08	1.050E-08	1.085E-08	1.337E-08	1.926E-08	2.153E-08	2.136E-08
ENE	184	4.092E-10	1.545E-08	1.719E-08	1.331E-08	1.289E-08	1.630E-08	1.841E-08	1.850E-08
E	361	2.236E-09	7.375E-08	3.830E-08	2.358E-08	2.293E-08	2.935E-08	3.362E-08	3.425E-08
ESE	304	2.335E-09	7.305E-08	3.748E-08	2.825E-08	2.952E-08	3.423E-08	3.482E-08	3.292E-08
SE	199	1.583E-09	5.977E-08	4.531E-08	2.860E-08	2.726E-08	3.437E-08	2.746E-08	2.597E-08
SSE	120	2.459E-09	6.380E-08	3.863E-08	5.829E-08	6.616E-08	5.378E-08	4.213E-08	3.359E-08
S	54	1.486E-09	2.560E-08	3.609E-08	5.697E-08	4.505E-08	3.644E-08	2.686E-08	1.960E-08
SSW	64	1.908E-09	4.708E-08	8.512E-08	9.164E-08	1.028E-07	6.342E-08	3.943E-08	2.741E-08
SW	43	3.306E-09	2.708E-08	2.782E-08	4.598E-08	4.326E-08	3.593E-08	2.694E-08	2.083E-08
WSW	35	1.279E-09	1.352E-08	2.156E-08	2.408E-08	2.983E-08	2.464E-08	1.755E-08	1.314E-08
W	72	3.336E-09	3.634E-08	3.182E-08	3.407E-08	3.758E-08	3.453E-08	2.568E-08	2.082E-08
WNW	77	6.015E-10	1.085E-08	1.502E-08	2.215E-08	3.276E-08	3.805E-08	3.211E-08	2.802E-08
NW	118	2.898E-10	8.159E-09	1.607E-08	1.610E-08	1.812E-08	2.200E-08	2.203E-08	2.036E-08
NNW	66	9.389E-11	2.798E-09	1.357E-09	1.721E-09	3.288E-09	6.687E-09	8.307E-09	8.654E-09
AVERAGE	2184	1.425E-09	3.139E-08	2.759E-08	2.941E-08	3.149E-08	2.990E-08	2.567E-08	2.247E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	99	1.400E-08	1.307E-08	1.210E-08	1.120E-08	1.033E-08	7.035E-09	5.090E-09	3.055E-09
NNE	161	1.813E-08	1.670E-08	1.532E-08	1.408E-08	1.293E-08	8.757E-09	6.354E-09	3.857E-09
NE	227	2.002E-08	1.851E-08	1.703E-08	1.571E-08	1.448E-08	9.940E-09	7.301E-09	4.532E-09
ENE	184	1.750E-08	1.631E-08	1.512E-08	1.403E-08	1.299E-08	9.037E-09	6.682E-09	4.179E-09
E	361	3.272E-08	3.076E-08	2.871E-08	2.681E-08	2.492E-08	1.750E-08	1.299E-08	8.137E-09
ESE	304	3.006E-08	2.731E-08	2.483E-08	2.269E-08	2.074E-08	1.394E-08	1.014E-08	6.234E-09
SE	199	2.360E-08	2.129E-08	1.923E-08	1.745E-08	1.585E-08	1.042E-08	7.437E-09	4.433E-09
SSE	120	2.743E-08	2.292E-08	1.950E-08	1.683E-08	1.469E-08	8.610E-09	5.800E-09	3.338E-09
S	54	1.492E-08	1.184E-08	9.681E-09	8.085E-09	6.879E-09	3.733E-09	2.404E-09	1.270E-09
SSW	64	2.041E-08	1.595E-08	1.290E-08	1.070E-08	9.050E-09	4.866E-09	3.135E-09	1.675E-09
SW	43	1.663E-08	1.366E-08	1.146E-08	9.763E-09	8.433E-09	4.762E-09	3.105E-09	1.648E-09
WSW	35	1.025E-08	8.258E-09	6.830E-09	5.757E-09	4.935E-09	2.736E-09	1.778E-09	9.478E-10
W	72	1.710E-08	1.434E-08	1.225E-08	1.062E-08	9.318E-09	1.004E-08	6.873E-09	3.607E-09
WNW	77	2.414E-08	2.093E-08	1.831E-08	1.615E-08	1.435E-08	8.507E-09	6.518E-09	3.549E-09
NW	118	1.824E-08	1.624E-08	1.450E-08	1.302E-08	1.174E-08	9.529E-09	6.481E-09	3.879E-09
NNW	66	8.333E-09	7.845E-09	7.318E-09	6.822E-09	6.336E-09	4.427E-09	3.524E-09	3.141E-09
AVERAGE	2184	1.959E-08	1.725E-08	1.532E-08	1.373E-08	1.237E-08	8.365E-09	5.976E-09	3.593E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	99	2.067E-09	1.498E-09	1.137E-09	8.934E-10	7.160E-10	6.321E-10	5.126E-10
NNE	161	2.646E-09	1.947E-09	1.505E-09	1.197E-09	9.734E-10	8.102E-10	6.838E-10
NE	227	3.171E-09	2.374E-09	1.858E-09	1.505E-09	1.243E-09	1.050E-09	8.990E-10
ENE	184	2.929E-09	2.247E-09	1.876E-09	1.503E-09	1.228E-09	1.027E-09	8.709E-10
E	361	5.687E-09	4.242E-09	3.689E-09	2.928E-09	2.373E-09	1.973E-09	1.664E-09
ESE	304	4.332E-09	3.481E-09	2.688E-09	2.150E-09	1.755E-09	1.467E-09	1.244E-09
SE	199	3.015E-09	2.450E-09	1.855E-09	1.460E-09	1.175E-09	9.709E-10	8.146E-10
SSE	120	2.141E-09	1.504E-09	1.123E-09	8.741E-10	6.966E-10	5.712E-10	4.763E-10
S	54	8.035E-10	5.628E-10	4.218E-10	3.306E-10	2.662E-10	2.209E-10	1.866E-10
SSW	64	1.084E-09	7.745E-10	5.893E-10	4.674E-10	3.797E-10	3.168E-10	2.688E-10
SW	43	1.046E-09	7.279E-10	5.371E-10	4.131E-10	3.300E-10	2.637E-10	2.145E-10
WSW	35	6.068E-10	4.286E-10	3.188E-10	2.494E-10	2.000E-10	1.619E-10	1.358E-10
W	72	2.090E-09	1.313E-09	8.973E-10	6.575E-10	4.153E-10	2.961E-10	2.465E-10
WNW	77	2.249E-09	1.666E-09	1.244E-09	6.409E-10	4.694E-10	3.750E-10	3.062E-10
NW	118	2.482E-09	1.751E-09	1.298E-09	7.777E-10	6.119E-10	4.967E-10	4.110E-10
NNW	66	1.951E-09	1.331E-09	9.676E-10	7.326E-10	5.674E-10	4.520E-10	3.663E-10
AVERAGE	2184	2.394E-09	1.769E-09	1.375E-09	1.049E-09	8.376E-10	6.928E-10	5.813E-10

Table B-2
Depleted χ/Q Factors for Main Stack

PNPS 1998 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
GROUND-LEVEL AVERAGE CHI/Q AFTER DEPLETION (MET. AND ATOMIC ENERGY 1968 DEPLETION MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	543	9.373E-10	3.290E-08	2.097E-08	1.542E-08	1.538E-08	1.859E-08	2.033E-08	2.023E-08
NNE	1146	1.126E-09	3.654E-08	3.181E-08	2.409E-08	2.403E-08	3.037E-08	3.371E-08	3.354E-08
NE	790	6.254E-10	2.220E-08	1.628E-08	1.239E-08	1.277E-08	1.662E-08	1.873E-08	1.891E-08
ENE	438	4.386E-10	1.676E-08	1.379E-08	1.045E-08	9.569E-09	1.066E-08	1.169E-08	1.176E-08
E	785	1.410E-09	4.823E-08	2.784E-08	1.778E-08	1.670E-08	1.983E-08	2.185E-08	2.183E-08
ESE	710	1.358E-09	4.213E-08	2.256E-08	1.683E-08	1.730E-08	2.070E-08	2.192E-08	2.130E-08
SE	621	1.159E-09	4.753E-08	3.717E-08	2.349E-08	2.134E-08	2.701E-08	2.236E-08	2.173E-08
SSE	440	2.586E-09	8.110E-08	4.067E-08	5.522E-08	6.850E-08	6.010E-08	4.885E-08	3.976E-08
S	282	2.390E-09	4.142E-08	4.862E-08	8.739E-08	7.141E-08	5.900E-08	4.310E-08	3.127E-08
SSW	394	3.396E-09	6.163E-08	9.919E-08	1.202E-07	1.629E-07	1.207E-07	7.603E-08	5.339E-08
SW	336	4.234E-09	4.005E-08	5.311E-08	8.569E-08	8.277E-08	7.163E-08	5.466E-08	4.263E-08
WSW	271	4.535E-09	4.358E-08	4.451E-08	4.501E-08	8.210E-08	6.046E-08	4.619E-08	3.605E-08
W	329	3.538E-09	5.025E-08	5.706E-08	5.260E-08	5.712E-08	5.472E-08	4.225E-08	3.511E-08
WNW	310	1.404E-09	2.456E-08	2.662E-08	2.983E-08	4.079E-08	4.587E-08	3.856E-08	3.358E-08
NW	397	7.547E-10	1.609E-08	1.554E-08	1.308E-08	1.389E-08	1.755E-08	1.877E-08	1.817E-08
NNW	272	1.021E-10	4.100E-09	6.995E-09	5.254E-09	5.735E-09	8.652E-09	1.044E-08	1.086E-08
AVERAGE	8064	1.875E-09	3.807E-08	3.517E-08	3.842E-08	4.265E-08	4.016E-08	3.309E-08	2.813E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	543	1.908E-08	1.773E-08	1.638E-08	1.515E-08	1.397E-08	9.484E-09	6.853E-09	4.127E-09
NNE	1146	3.153E-08	2.922E-08	2.696E-08	2.492E-08	2.298E-08	1.575E-08	1.151E-08	7.061E-09
NE	790	1.800E-08	1.689E-08	1.577E-08	1.472E-08	1.371E-08	9.732E-09	7.306E-09	4.672E-09
ENE	438	1.120E-08	1.053E-08	9.836E-09	9.192E-09	8.550E-09	5.992E-09	4.444E-09	2.806E-09
E	785	2.066E-08	1.928E-08	1.790E-08	1.664E-08	1.541E-08	1.072E-08	7.915E-09	4.933E-09
ESE	710	1.980E-08	1.824E-08	1.676E-08	1.544E-08	1.421E-08	9.683E-09	7.072E-09	4.350E-09
SE	621	2.012E-08	1.847E-08	1.691E-08	1.554E-08	1.426E-08	9.641E-09	6.999E-09	4.260E-09
SSE	440	3.292E-08	2.779E-08	2.383E-08	2.069E-08	1.815E-08	1.078E-08	7.310E-09	4.340E-09
S	282	2.376E-08	1.881E-08	1.536E-08	1.281E-08	1.088E-08	5.881E-09	3.786E-09	2.007E-09
SSW	394	3.998E-08	3.136E-08	2.541E-08	2.107E-08	1.782E-08	9.449E-09	5.989E-09	3.095E-09
SW	336	3.413E-08	2.800E-08	2.344E-08	1.992E-08	1.716E-08	9.526E-09	6.123E-09	3.167E-09
WSW	271	2.887E-08	2.369E-08	1.983E-08	1.685E-08	1.450E-08	8.009E-09	5.126E-09	2.633E-09
W	329	2.926E-08	2.474E-08	2.122E-08	1.841E-08	1.613E-08	1.189E-08	7.621E-09	3.869E-09
WNW	310	2.886E-08	2.497E-08	2.180E-08	1.920E-08	1.702E-08	9.843E-09	7.381E-09	3.944E-09
NW	397	1.677E-08	1.534E-08	1.399E-08	1.281E-08	1.172E-08	1.040E-08	7.154E-09	4.396E-09
NNW	272	1.049E-08	9.905E-09	9.260E-09	8.646E-09	8.031E-09	5.568E-09	4.359E-09	3.790E-09
AVERAGE	8064	2.409E-08	2.094E-08	1.842E-08	1.637E-08	1.466E-08	9.522E-09	6.684E-09	3.966E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	543	2.807E-09	2.048E-09	1.565E-09	1.239E-09	1.001E-09	8.956E-10	7.347E-10
NNE	1146	4.877E-09	3.610E-09	2.800E-09	2.249E-09	1.843E-09	1.545E-09	1.314E-09
NE	790	3.321E-09	2.507E-09	1.969E-09	1.597E-09	1.320E-09	1.114E-09	9.522E-10
ENE	438	1.986E-09	1.548E-09	1.345E-09	1.080E-09	8.835E-10	7.384E-10	6.250E-10
E	785	3.442E-09	2.566E-09	2.313E-09	1.834E-09	1.485E-09	1.233E-09	1.039E-09
ESE	710	3.013E-09	2.463E-09	1.892E-09	1.508E-09	1.226E-09	1.021E-09	8.629E-10
SE	621	2.922E-09	2.480E-09	1.867E-09	1.460E-09	1.166E-09	9.562E-10	7.962E-10
SSE	440	2.776E-09	1.936E-09	1.431E-09	1.101E-09	8.671E-10	7.020E-10	5.781E-10
S	282	1.273E-09	8.923E-10	6.680E-10	5.223E-10	4.190E-10	3.461E-10	2.909E-10
SSW	394	1.927E-09	1.329E-09	9.809E-10	7.575E-10	6.009E-10	4.913E-10	4.094E-10
SW	336	1.955E-09	1.332E-09	9.688E-10	7.377E-10	5.756E-10	4.628E-10	3.795E-10
WSW	271	1.616E-09	1.099E-09	7.790E-10	5.896E-10	4.596E-10	3.525E-10	2.904E-10
W	329	2.312E-09	1.526E-09	1.085E-09	8.141E-10	5.662E-10	4.177E-10	3.449E-10
WNW	310	2.463E-09	1.738E-09	1.263E-09	7.457E-10	5.475E-10	4.372E-10	3.568E-10
NW	397	2.791E-09	1.961E-09	1.441E-09	7.762E-10	6.041E-10	4.856E-10	3.981E-10
NNW	272	2.306E-09	1.545E-09	1.105E-09	8.260E-10	6.329E-10	4.998E-10	4.021E-10
AVERAGE	8064	2.612E-09	1.911E-09	1.467E-09	1.115E-09	8.873E-10	7.311E-10	6.109E-10

Table B-3
Gamma χ/Q Factors for Main Stack

PHPS 1ST QUARTER 1998 GENERAL X/QS: ELEVATED
STACK RELEASE
AVERAGE GAMMA DILUTION FACTORS (MET. AND ATOMIC ENERGY 1968 FINITE CLOUD SECTOR AVERAGE MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	96	3.156E-07	1.629E-07	8.122E-08	5.350E-08	4.104E-08	2.850E-08	2.195E-08	1.786E-08
NNE	184	4.858E-07	2.505E-07	1.245E-07	8.106E-08	6.149E-08	4.239E-08	3.279E-08	2.691E-08
NE	171	5.092E-07	2.604E-07	1.298E-07	8.557E-08	6.516E-08	4.507E-08	3.490E-08	2.864E-08
ENE	70	2.304E-07	1.186E-07	5.903E-08	3.875E-08	2.952E-08	2.032E-08	1.565E-08	1.278E-08
E	109	3.764E-07	1.943E-07	9.689E-08	6.322E-08	4.800E-08	3.296E-08	2.535E-08	2.070E-08
ESE	184	5.522E-07	2.859E-07	1.396E-07	9.428E-08	7.231E-08	5.036E-08	3.896E-08	3.182E-08
SE	241	9.938E-07	5.116E-07	3.039E-07	1.790E-07	1.193E-07	8.323E-08	4.947E-08	4.030E-08
SSE	142	8.350E-07	4.474E-07	2.259E-07	1.027E-07	8.181E-08	5.545E-08	4.141E-08	3.275E-08
S	120	4.536E-07	2.369E-07	1.351E-07	1.017E-07	7.494E-08	5.157E-08	3.766E-08	2.875E-08
SSW	194	9.477E-07	4.949E-07	2.573E-07	1.714E-07	1.492E-07	9.939E-08	6.880E-08	5.181E-08
SW	119	5.425E-07	2.800E-07	1.576E-07	1.056E-07	7.920E-08	5.300E-08	3.838E-08	2.971E-08
WSW	95	5.079E-07	2.638E-07	1.240E-07	7.430E-08	5.630E-08	3.874E-08	2.802E-08	2.172E-08
W	99	6.653E-07	3.412E-07	1.992E-07	1.133E-07	8.619E-08	5.794E-08	3.921E-08	3.089E-08
WNW	62	2.743E-07	1.404E-07	1.040E-07	6.462E-08	5.486E-08	3.826E-08	2.667E-08	2.131E-08
NW	38	1.925E-07	9.687E-08	4.934E-08	3.373E-08	2.600E-08	1.830E-08	1.429E-08	1.174E-08
NNW	54	2.163E-07	1.084E-07	6.009E-08	3.618E-08	2.784E-08	1.964E-08	1.533E-08	1.259E-08
AVERAGE	1978	5.062E-07	2.621E-07	1.405E-07	8.743E-08	6.707E-08	4.594E-08	3.305E-08	2.627E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	96	1.500E-08	1.289E-08	1.127E-08	9.997E-09	8.963E-09	5.817E-09	4.228E-09	2.655E-09
NNE	184	2.277E-08	1.970E-08	1.733E-08	1.545E-08	1.391E-08	9.167E-09	6.728E-09	4.282E-09
NE	171	2.424E-08	2.100E-08	1.851E-08	1.654E-08	1.492E-08	9.927E-09	7.353E-09	4.754E-09
ENE	70	1.077E-08	9.305E-09	8.184E-09	7.299E-09	6.576E-09	4.347E-09	3.206E-09	2.063E-09
E	109	1.745E-08	1.505E-08	1.321E-08	1.175E-08	1.057E-08	6.932E-09	5.082E-09	3.234E-09
ESE	184	2.680E-08	2.310E-08	2.026E-08	1.801E-08	1.618E-08	1.057E-08	7.725E-09	4.889E-09
SE	241	3.385E-08	2.910E-08	2.547E-08	2.260E-08	2.027E-08	1.317E-08	9.590E-09	6.043E-09
SSE	142	2.693E-08	2.275E-08	1.963E-08	1.719E-08	1.525E-08	9.604E-09	6.898E-09	4.443E-09
S	120	2.292E-08	1.891E-08	1.600E-08	1.379E-08	1.207E-08	7.295E-09	5.103E-09	3.073E-09
SSW	194	4.114E-08	3.383E-08	2.856E-08	2.456E-08	2.146E-08	1.291E-08	8.991E-09	5.372E-09
SW	119	2.399E-08	1.996E-08	1.699E-08	1.470E-08	1.291E-08	7.852E-09	5.476E-09	3.254E-09
WSW	95	1.757E-08	1.465E-08	1.250E-08	1.084E-08	9.539E-09	5.846E-09	4.111E-09	2.483E-09
W	99	2.540E-08	2.140E-08	1.841E-08	1.608E-08	1.423E-08	9.830E-09	6.870E-09	4.113E-09
WNW	62	1.758E-08	1.488E-08	1.284E-08	1.124E-08	9.972E-09	5.800E-09	4.548E-09	2.743E-09
NW	38	9.942E-09	8.611E-09	7.585E-09	6.770E-09	6.103E-09	4.755E-09	3.449E-09	2.305E-09
NNW	54	1.064E-08	9.196E-09	8.083E-09	7.198E-09	6.476E-09	4.253E-09	3.213E-09	2.370E-09
AVERAGE	1978	2.169E-08	1.840E-08	1.593E-08	1.400E-08	1.246E-08	8.005E-09	5.786E-09	3.630E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	96	1.904E-09	1.471E-09	1.194E-09	1.002E-09	8.572E-10	8.453E-10	7.446E-10
NNE	184	3.094E-09	2.401E-09	1.954E-09	1.642E-09	1.407E-09	1.231E-09	1.091E-09
NE	171	3.477E-09	2.723E-09	2.231E-09	1.886E-09	1.625E-09	1.428E-09	1.271E-09
ENE	70	1.502E-09	1.193E-09	1.028E-09	8.653E-10	7.427E-10	6.509E-10	5.776E-10
E	109	2.341E-09	1.820E-09	1.650E-09	1.383E-09	1.183E-09	1.033E-09	9.142E-10
ESE	184	3.523E-09	2.891E-09	2.344E-09	1.964E-09	1.678E-09	1.465E-09	1.296E-09
SE	241	4.342E-09	3.690E-09	2.978E-09	2.487E-09	2.119E-09	1.846E-09	1.630E-09
SSE	142	3.166E-09	2.438E-09	1.975E-09	1.655E-09	1.415E-09	1.236E-09	1.094E-09
S	120	2.152E-09	1.637E-09	1.315E-09	1.094E-09	9.291E-10	8.073E-10	7.109E-10
SSW	194	3.748E-09	2.844E-09	2.281E-09	1.896E-09	1.608E-09	1.396E-09	1.229E-09
SW	119	2.258E-09	1.705E-09	1.361E-09	1.127E-09	9.589E-10	8.295E-10	7.273E-10
WSW	95	1.741E-09	1.330E-09	1.093E-09	9.080E-10	7.698E-10	6.710E-10	5.900E-10
W	99	2.870E-09	2.176E-09	1.744E-09	1.448E-09	1.251E-09	1.084E-09	9.517E-10
WNW	62	1.919E-09	1.482E-09	1.217E-09	1.016E-09	8.575E-10	7.414E-10	6.498E-10
NW	38	1.646E-09	1.290E-09	1.052E-09	9.368E-10	7.969E-10	6.930E-10	6.107E-10
NNW	54	1.671E-09	1.274E-09	1.025E-09	8.534E-10	7.255E-10	6.311E-10	5.563E-10
AVERAGE	1978	2.585E-09	2.023E-09	1.653E-09	1.385E-09	1.183E-09	1.037E-09	9.152E-10

Table B-3
Gamma χ/Q Factors for Main Stack

PNPS 2ND QUARTER 1998 GENERAL X/QS: ELEVATED
STACK RELEASE
AVERAGE GAMMA DILUTION FACTORS (MFT. AND ATOMIC ENERGY 1968 FINITE CLOUD SECTOR AVERAGE MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	147	7.725E-07	4.001E-07	1.941E-07	1.244E-07	9.480E-08	6.561E-08	5.088E-08	4.181E-08
NNE	206	8.190E-07	4.222E-07	2.087E-07	1.360E-07	1.036E-07	7.148E-08	5.519E-08	4.516E-08
NE	112	3.949E-07	2.031E-07	9.910E-08	6.424E-08	4.899E-08	3.382E-08	2.608E-08	2.129E-08
ENE	68	3.258E-07	1.718E-07	8.070E-08	4.973E-08	3.790E-08	2.608E-08	2.008E-08	1.640E-08
E	129	5.333E-07	2.813E-07	1.320E-07	8.078E-08	6.120E-08	4.207E-08	3.245E-08	2.659E-08
ESE	89	3.794E-07	1.962E-07	9.490E-08	6.353E-08	4.854E-08	3.373E-08	2.616E-08	2.146E-08
SE	75	7.169E-07	3.667E-07	1.836E-07	1.002E-07	6.270E-08	4.329E-08	2.396E-08	1.967E-08
SSE	82	1.115E-06	5.856E-07	2.912E-07	9.731E-08	7.675E-08	5.168E-08	3.852E-08	3.048E-08
S	74	4.761E-07	2.565E-07	1.096E-07	7.715E-08	5.724E-08	3.982E-08	2.925E-08	2.238E-08
SSW	101	7.376E-07	3.897E-07	1.757E-07	1.199E-07	1.069E-07	7.282E-08	5.049E-08	3.805E-08
SW	131	1.098E-06	5.698E-07	3.101E-07	1.872E-07	1.417E-07	9.686E-08	7.123E-08	5.582E-08
WSW	83	1.137E-06	5.849E-07	2.572E-07	1.451E-07	1.108E-07	7.809E-08	5.723E-08	4.469E-08
W	79	8.133E-07	4.195E-07	2.533E-07	1.319E-07	1.010E-07	6.898E-08	4.724E-08	3.763E-08
WNW	73	5.313E-07	2.749E-07	2.133E-07	1.278E-07	1.050E-07	7.179E-08	5.050E-08	4.079E-08
NW	159	7.242E-07	3.723E-07	1.824E-07	1.190E-07	9.105E-08	6.328E-08	4.899E-08	4.007E-08
NNW	101	5.605E-07	2.850E-07	1.445E-07	9.665E-08	7.349E-08	5.072E-08	3.931E-08	3.232E-08
AVERAGE	1709	6.959E-07	3.612E-07	1.832E-07	1.076E-07	8.261E-08	5.688E-08	4.172E-08	3.341E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	147	3.544E-08	3.077E-08	2.718E-08	2.434E-08	2.201E-08	1.473E-08	1.095E-08	7.112E-09
NNE	206	3.814E-08	3.298E-08	2.902E-08	2.588E-08	2.332E-08	1.543E-08	1.139E-08	7.321E-09
NE	112	1.796E-08	1.553E-08	1.367E-08	1.220E-08	1.101E-08	7.337E-09	5.455E-09	3.557E-09
ENE	68	1.384E-08	1.199E-08	1.057E-08	9.462E-09	8.554E-09	5.729E-09	4.268E-09	2.789E-09
E	129	2.249E-08	1.947E-08	1.714E-08	1.530E-08	1.380E-08	9.159E-09	6.770E-09	4.361E-09
ESE	89	1.816E-08	1.573E-08	1.386E-08	1.239E-08	1.118E-08	7.434E-09	5.503E-09	3.555E-09
SE	75	1.666E-08	1.443E-08	1.272E-08	1.136E-08	1.025E-08	6.803E-09	5.028E-09	3.243E-09
SSE	82	2.506E-08	2.118E-08	1.827E-08	1.600E-08	1.420E-08	8.944E-09	6.419E-09	4.138E-09
S	74	1.784E-08	1.473E-08	1.247E-08	1.074E-08	9.408E-09	5.694E-09	3.984E-09	2.396E-09
SSW	101	3.021E-08	2.484E-08	2.096E-08	1.802E-08	1.575E-08	9.466E-09	6.580E-09	3.913E-09
SW	131	4.551E-08	3.818E-08	3.274E-08	2.854E-08	2.522E-08	1.568E-08	1.112E-08	6.789E-09
WSW	83	3.634E-08	3.043E-08	2.604E-08	2.265E-08	1.999E-08	1.234E-08	8.718E-09	5.295E-09
W	79	3.107E-08	2.633E-08	2.277E-08	1.998E-08	1.775E-08	1.257E-08	8.862E-09	5.400E-09
WNW	73	3.407E-08	2.916E-08	2.331E-08	2.060E-08	1.842E-08	1.224E-08	8.973E-09	5.630E-09
NW	159	3.382E-08	2.922E-08	2.570E-08	2.291E-08	2.063E-08	1.593E-08	1.155E-08	7.718E-09
NNW	101	2.742E-08	2.380E-08	2.101E-08	1.880E-08	1.699E-08	1.134E-08	8.774E-09	7.267E-09
AVERAGE	1709	2.775E-08	2.367E-08	2.047E-08	1.807E-08	1.615E-08	1.068E-08	7.771E-09	5.030E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	147	5.209E-09	4.083E-09	3.349E-09	2.833E-09	2.442E-09	2.531E-09	2.239E-09
NNE	206	5.333E-09	4.165E-09	3.407E-09	2.878E-09	2.476E-09	2.174E-09	1.933E-09
NE	112	2.621E-09	2.065E-09	1.700E-09	1.444E-09	1.249E-09	1.102E-09	9.838E-10
ENE	68	2.052E-09	1.646E-09	1.434E-09	1.213E-09	1.045E-09	9.190E-10	8.180E-10
E	129	3.182E-09	2.488E-09	2.300E-09	1.936E-09	1.661E-09	1.455E-09	1.290E-09
ESE	89	2.597E-09	2.186E-09	1.784E-09	1.504E-09	1.291E-09	1.132E-09	1.006E-09
SE	75	2.364E-09	2.088E-09	1.695E-09	1.423E-09	1.218E-09	1.066E-09	9.441E-10
SSE	82	2.946E-09	2.266E-09	1.836E-09	1.538E-09	1.314E-09	1.147E-09	1.014E-09
S	74	1.678E-09	1.277E-09	1.026E-09	8.534E-10	7.249E-10	6.299E-10	5.548E-10
SSW	101	2.722E-09	2.060E-09	1.648E-09	1.366E-09	1.156E-09	1.002E-09	8.800E-10
SW	131	4.793E-09	3.665E-09	2.952E-09	2.462E-09	2.128E-09	1.849E-09	1.629E-09
WSW	83	3.726E-09	2.858E-09	2.380E-09	1.978E-09	1.678E-09	1.469E-09	1.292E-09
W	79	3.806E-09	2.908E-09	2.345E-09	1.957E-09	1.703E-09	1.483E-09	1.307E-09
WNW	73	4.038E-09	3.227E-09	2.759E-09	2.363E-09	2.012E-09	1.753E-09	1.547E-09
NW	159	5.522E-09	4.336E-09	3.543E-09	3.172E-09	2.705E-09	2.358E-09	2.082E-09
NNW	101	5.144E-09	3.942E-09	3.184E-09	2.661E-09	2.269E-09	1.977E-09	1.745E-09
AVERAGE	1709	3.608E-09	2.829E-09	2.334E-09	1.974E-09	1.692E-09	1.503E-09	1.329E-09

Table B-3
Gamma χ/Q Factors for Main Stack

PNPS 3RD QUARTER 1998 GENERAL X/QS: ELEVATED
STACK RELEASE
AVERAGE GAMMA DILUTION FACTORS (MET. AND ATOMIC ENERGY 1968 FINITE CLOUD SECTOR AVERAGE MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	201	7.197E-07	3.786E-07	1.825E-07	1.143E-07	8.654E-08	5.900E-08	4.508E-08	3.664E-08
NNE	595	1.468E-06	7.596E-07	3.783E-07	2.461E-07	1.864E-07	1.275E-07	9.774E-08	7.966E-08
NE	280	8.227E-07	4.264E-07	2.086E-07	1.334E-07	1.010E-07	6.890E-08	5.279E-08	4.302E-08
ENE	116	4.631E-07	2.373E-07	1.181E-07	7.709E-08	5.797E-08	3.903E-08	2.964E-08	2.406E-08
E	186	5.641E-07	2.979E-07	1.413E-07	8.686E-08	6.558E-08	4.463E-08	3.413E-08	2.780E-08
ESE	133	4.005E-07	2.117E-07	9.928E-08	6.293E-08	4.742E-08	3.215E-08	2.452E-08	1.993E-08
SE	106	9.955E-07	5.355E-07	2.289E-07	1.066E-07	6.606E-08	4.403E-08	3.225E-08	1.811E-08
SSE	96	1.302E-06	6.981E-07	3.288E-07	8.979E-08	7.057E-08	4.727E-08	3.516E-08	2.781E-08
S	34	2.047E-07	1.145E-07	3.922E-08	2.468E-08	1.829E-08	1.264E-08	9.258E-09	7.073E-09
SSW	35	3.144E-07	1.727E-07	7.021E-08	4.210E-08	3.494E-08	2.387E-08	1.638E-08	1.239E-08
SW	43	4.533E-07	2.357E-07	1.323E-07	7.963E-08	5.956E-08	3.999E-08	2.907E-08	2.265E-08
WSW	58	8.366E-07	4.394E-07	1.694E-07	9.044E-08	6.835E-08	4.803E-08	3.526E-08	2.766E-08
W	79	7.490E-07	3.994E-07	2.236E-07	1.114E-07	8.118E-08	5.366E-08	3.601E-08	2.840E-08
WNW	98	5.622E-07	2.941E-07	2.236E-07	1.332E-07	1.109E-07	7.618E-08	5.311E-08	4.235E-08
NW	82	4.288E-07	2.226E-07	1.108E-07	7.170E-08	5.396E-08	3.641E-08	2.762E-08	2.235E-08
NNW	51	2.163E-07	1.100E-07	5.537E-08	3.682E-08	2.796E-08	1.928E-08	1.493E-08	1.227E-08
AVERAGE	2193	6.563E-07	3.458E-07	1.694E-07	9.419E-08	7.105E-08	4.829E-08	3.518E-08	2.826E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	201	3.078E-08	2.649E-08	2.322E-08	2.063E-08	1.854E-08	1.215E-08	8.917E-09	5.695E-09
NNE	595	6.704E-08	5.777E-08	5.066E-08	4.505E-08	4.049E-08	2.653E-08	1.944E-08	1.237E-08
NE	280	3.629E-08	3.137E-08	2.763E-08	2.467E-08	2.226E-08	1.486E-08	1.108E-08	7.255E-09
ENE	116	2.025E-08	1.749E-08	1.540E-08	1.375E-08	1.241E-08	8.324E-09	6.237E-09	4.128E-09
E	186	2.342E-08	2.021E-08	1.776E-08	1.582E-08	1.425E-08	9.438E-09	6.984E-09	4.523E-09
ESE	133	1.677E-08	1.448E-08	1.274E-08	1.136E-08	1.025E-08	6.831E-09	5.090E-09	3.339E-09
SE	106	1.528E-08	1.321E-08	1.164E-08	1.040E-08	9.393E-09	6.292E-09	4.705E-09	3.102E-09
SSE	96	2.288E-08	1.935E-08	1.672E-08	1.466E-08	1.303E-08	8.274E-09	5.971E-09	3.937E-09
S	34	5.637E-09	4.651E-09	3.937E-09	3.394E-09	2.973E-09	1.802E-09	1.263E-09	7.620E-10
SSW	35	9.875E-09	8.153E-09	6.909E-09	5.970E-09	5.242E-09	3.200E-09	2.257E-09	1.380E-09
SW	43	1.840E-08	1.539E-08	1.316E-08	1.144E-08	1.008E-08	6.206E-09	4.375E-09	2.650E-09
WSW	58	2.259E-08	1.898E-08	1.630E-08	1.422E-08	1.258E-08	7.839E-09	5.577E-09	3.424E-09
W	79	2.325E-08	1.956E-08	1.681E-08	1.467E-08	1.297E-08	8.851E-09	6.174E-09	3.684E-09
WNW	98	3.495E-08	2.960E-08	2.346E-08	2.057E-08	1.827E-08	1.188E-08	8.580E-09	5.255E-09
NW	82	1.872E-08	1.606E-08	1.404E-08	1.245E-08	1.116E-08	8.497E-09	6.138E-09	4.104E-09
NNW	51	1.041E-08	9.031E-09	7.973E-09	7.133E-09	6.446E-09	4.315E-09	3.372E-09	3.063E-09
AVERAGE	2193	2.353E-08	2.011E-08	1.740E-08	1.539E-08	1.377E-08	9.081E-09	6.634E-09	4.292E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	201	4.138E-09	3.227E-09	2.640E-09	2.230E-09	1.919E-09	2.052E-09	1.815E-09
NNE	595	8.951E-09	6.959E-09	5.676E-09	4.781E-09	4.105E-09	3.598E-09	3.193E-09
NE	280	5.361E-09	4.233E-09	3.492E-09	2.971E-09	2.573E-09	2.271E-09	2.030E-09
ENE	116	3.077E-09	2.524E-09	2.317E-09	1.976E-09	1.715E-09	1.517E-09	1.358E-09
E	186	3.317E-09	2.604E-09	2.457E-09	2.074E-09	1.783E-09	1.564E-09	1.390E-09
ESE	133	2.470E-09	2.156E-09	1.774E-09	1.506E-09	1.302E-09	1.148E-09	1.024E-09
SE	106	2.302E-09	2.174E-09	1.782E-09	1.508E-09	1.300E-09	1.142E-09	1.016E-09
SSE	96	2.822E-09	2.182E-09	1.774E-09	1.491E-09	1.278E-09	1.118E-09	9.916E-10
S	34	5.356E-10	4.087E-10	3.294E-10	2.748E-10	2.341E-10	2.038E-10	1.799E-10
SSW	35	9.789E-10	7.528E-10	6.113E-10	5.134E-10	4.398E-10	3.847E-10	3.410E-10
SW	43	1.862E-09	1.418E-09	1.141E-09	9.500E-10	8.182E-10	7.112E-10	6.265E-10
WSW	58	2.427E-09	1.875E-09	1.590E-09	1.326E-09	1.129E-09	9.946E-10	8.768E-10
W	79	2.569E-09	1.947E-09	1.562E-09	1.298E-09	1.121E-09	9.717E-10	8.539E-10
WNW	98	3.723E-09	2.957E-09	2.531E-09	2.167E-09	1.838E-09	1.594E-09	1.402E-09
NW	82	2.934E-09	2.311E-09	1.892E-09	1.731E-09	1.475E-09	1.283E-09	1.132E-09
NNW	51	2.185E-09	1.684E-09	1.366E-09	1.146E-09	9.796E-10	8.553E-10	7.567E-10
AVERAGE	2193	3.103E-09	2.463E-09	2.059E-09	1.746E-09	1.501E-09	1.338E-09	1.187E-09

Table B-3
Gamma χ/Q Factors for Main Stack

PNPS 4TH QUARTER 1998 GENERAL X/QS: ELEVATED
STACK RELEASE
AVERAGE GAMMA DILUTION FACTORS (MET. AND ATOMIC ENERGY 1968 FINITE CLOUD SECTOR AVERAGE MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	99	3.710E-07	1.916E-07	9.335E-08	6.057E-08	4.663E-08	3.282E-08	2.564E-08	2.110E-08
NNE	161	4.469E-07	2.295E-07	1.141E-07	7.540E-08	5.788E-08	4.042E-08	3.134E-08	2.565E-08
NE	227	5.333E-07	2.716E-07	1.369E-07	9.197E-08	7.061E-08	4.916E-08	3.800E-08	3.101E-08
ENE	184	4.517E-07	2.322E-07	1.168E-07	7.700E-08	5.845E-08	4.015E-08	3.092E-08	2.528E-08
E	361	9.065E-07	4.761E-07	2.261E-07	1.408E-07	1.073E-07	7.431E-08	5.756E-08	4.720E-08
ESE	304	7.314E-07	3.879E-07	1.818E-07	1.163E-07	8.883E-08	6.140E-08	4.714E-08	3.829E-08
SE	199	7.476E-07	3.936E-07	2.271E-07	1.268E-07	8.365E-08	5.767E-08	3.407E-08	2.774E-08
SSE	120	5.803E-07	3.085E-07	1.631E-07	7.611E-08	5.979E-08	3.970E-08	2.922E-08	2.286E-08
S	54	1.883E-07	1.007E-07	5.264E-08	3.727E-08	2.719E-08	1.847E-08	1.346E-08	1.028E-08
SSW	64	3.681E-07	1.987E-07	9.626E-08	6.234E-08	5.153E-08	3.250E-08	2.212E-08	1.645E-08
SW	43	2.958E-07	1.543E-07	8.172E-08	5.348E-08	4.053E-08	2.759E-08	2.019E-08	1.573E-08
WSW	35	1.973E-07	1.025E-07	4.959E-08	3.004E-08	2.265E-08	1.531E-08	1.094E-08	8.393E-09
W	72	4.989E-07	2.585E-07	1.410E-07	7.773E-08	5.928E-08	4.002E-08	2.717E-08	2.153E-08
WNW	77	3.780E-07	1.929E-07	1.436E-07	8.874E-08	7.451E-08	5.145E-08	3.589E-08	2.883E-08
NW	118	3.912E-07	2.000E-07	1.031E-07	6.976E-08	5.326E-08	3.664E-08	2.800E-08	2.267E-08
NNW	66	2.161E-07	1.095E-07	5.513E-08	3.726E-08	2.877E-08	2.030E-08	1.587E-08	1.305E-08
AVERAGE	2184	4.564E-07	2.380E-07	1.239E-07	7.635E-08	5.818E-08	3.987E-08	2.922E-08	2.350E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILLS) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	99	1.787E-08	1.548E-08	1.363E-08	1.215E-08	1.095E-08	7.229E-09	5.314E-09	3.386E-09
NNE	161	2.163E-08	1.865E-08	1.637E-08	1.455E-08	1.308E-08	8.566E-09	6.265E-09	3.968E-09
NE	227	2.612E-08	2.251E-08	1.975E-08	1.757E-08	1.579E-08	1.037E-08	7.611E-09	4.858E-09
ENE	184	2.132E-08	1.941E-08	1.618E-08	1.441E-08	1.297E-08	8.540E-09	6.276E-09	4.011E-09
E	361	3.992E-08	3.456E-08	3.044E-08	2.717E-08	2.450E-08	1.624E-08	1.199E-08	7.722E-09
ESE	304	3.211E-08	2.758E-08	2.412E-08	2.139E-08	1.918E-08	1.248E-08	9.104E-09	5.762E-09
SE	199	2.328E-08	2.000E-08	1.748E-08	1.549E-08	1.388E-08	8.994E-09	6.529E-09	4.092E-09
SSE	120	1.862E-08	1.562E-08	1.339E-08	1.167E-08	1.031E-08	6.401E-09	4.548E-09	2.872E-09
S	54	8.195E-09	6.762E-09	5.723E-09	4.933E-09	4.321E-09	2.618E-09	1.833E-09	1.105E-09
SSW	64	1.289E-08	1.050E-08	8.785E-09	7.503E-09	6.519E-09	3.836E-09	2.622E-09	1.520E-09
SW	43	1.277E-08	1.068E-08	9.140E-09	7.953E-09	7.019E-09	4.353E-09	3.083E-09	1.879E-09
WSW	35	8.724E-09	5.561E-09	4.712E-09	4.064E-09	3.559E-09	2.145E-09	1.486E-09	8.743E-10
W	72	1.773E-08	1.501E-08	1.297E-08	1.139E-08	1.014E-08	8.048E-09	5.795E-09	3.631E-09
WNW	77	2.395E-08	2.041E-08	1.772E-08	1.561E-08	1.392E-08	8.388E-09	6.755E-09	4.204E-09
NW	118	1.895E-08	1.621E-08	1.411E-08	1.246E-08	1.113E-08	8.093E-09	5.747E-09	3.662E-09
NNW	66	1.105E-08	9.571E-09	8.430E-09	7.523E-09	6.782E-09	4.489E-09	3.450E-09	2.804E-09
AVERAGE	2184	1.957E-08	1.672E-08	1.456E-08	1.287E-08	1.150E-08	7.550E-09	5.526E-09	3.522E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	99	2.452E-09	1.906E-09	1.552E-09	1.306E-09	1.120E-09	1.159E-09	1.022E-09
NNE	161	2.863E-09	2.221E-09	1.807E-09	1.519E-09	1.302E-09	1.139E-09	1.010E-09
NE	227	3.526E-09	2.747E-09	2.244E-09	1.893E-09	1.627E-09	1.428E-09	1.269E-09
ENE	184	2.910E-09	2.304E-09	1.978E-09	1.662E-09	1.424E-09	1.246E-09	1.104E-09
E	361	5.626E-09	4.394E-09	3.975E-09	3.339E-09	2.860E-09	2.502E-09	2.217E-09
ESE	304	4.158E-09	3.423E-09	2.779E-09	2.333E-09	1.997E-09	1.745E-09	1.546E-09
SE	199	2.932E-09	2.481E-09	1.999E-09	1.668E-09	1.420E-09	1.235E-09	1.090E-09
SSE	120	2.028E-09	1.552E-09	1.253E-09	1.047E-09	8.920E-10	7.772E-10	6.862E-10
S	54	7.745E-10	5.898E-10	4.742E-10	3.948E-10	3.355E-10	2.916E-10	2.569E-10
SSW	64	1.043E-09	7.817E-10	6.231E-10	5.151E-10	4.350E-10	3.760E-10	3.297E-10
SW	43	1.328E-09	1.016E-09	8.199E-10	6.847E-10	5.983E-10	5.209E-10	4.597E-10
WSW	35	6.036E-10	4.552E-10	3.681E-10	3.035E-10	2.557E-10	2.213E-10	1.936E-10
W	72	2.616E-09	2.032E-09	1.658E-09	1.398E-09	1.377E-09	1.211E-09	1.075E-09
WNW	77	3.008E-09	2.440E-09	2.166E-09	1.900E-09	1.618E-09	1.407E-09	1.241E-09
NW	118	2.569E-09	1.980E-09	1.598E-09	1.390E-09	1.176E-09	1.018E-09	8.936E-10
NNW	66	1.977E-09	1.510E-09	1.217E-09	1.014E-09	8.630E-10	7.506E-10	6.615E-10
AVERAGE	2184	2.526E-09	1.990E-09	1.657E-09	1.398E-09	1.206E-09	1.064E-09	9.408E-10

Table B-3
Gamma χ/Q Factors for Main Stack

PNPS 1998 GENERAL X/QS: ELEVATED
STACK RELEASE
AVERAGE GAMMA DILUTION FACTORS (MET. AND ATOMIC ENERGY 1968 FINITE CLOUD SECTOR AVERAGE MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	543	5.372E-07	2.796E-07	1.360E-07	8.698E-08	6.632E-08	4.583E-08	3.537E-08	2.892E-08
NNE	1146	8.128E-07	4.196E-07	2.085E-07	1.360E-07	1.034E-07	7.115E-08	5.480E-08	4.478E-08
NE	790	5.768E-07	2.964E-07	1.466E-07	9.580E-08	7.296E-08	5.027E-08	3.873E-08	3.164E-08
ENE	438	3.739E-07	1.929E-07	9.535E-08	6.186E-08	4.687E-08	3.200E-08	2.453E-08	1.999E-08
E	785	6.043E-07	3.172E-07	1.514E-07	9.439E-08	7.163E-08	4.926E-08	3.796E-08	3.105E-08
ESE	710	5.228E-07	2.743E-07	1.306E-07	8.519E-08	6.498E-08	4.488E-08	3.454E-08	2.815E-08
SE	621	7.059E-07	3.691E-07	2.146E-07	1.212E-07	7.985E-08	5.496E-08	3.252E-08	2.651E-08
SSE	440	7.146E-07	3.807E-07	1.977E-07	9.094E-08	7.179E-08	4.821E-08	3.583E-08	2.828E-08
S	282	2.964E-07	1.586E-07	8.151E-08	5.828E-08	4.299E-08	2.963E-08	2.167E-08	1.655E-08
SSW	394	5.588E-07	2.967E-07	1.459E-07	9.609E-08	8.301E-08	5.531E-08	3.815E-08	2.869E-08
SW	336	5.438E-07	2.822E-07	1.542E-07	1.019E-07	7.677E-08	5.197E-08	3.796E-08	2.959E-08
WSW	271	5.631E-07	2.925E-07	1.368E-07	8.180E-08	6.212E-08	4.333E-08	3.161E-08	2.463E-08
W	329	6.744E-07	3.512E-07	1.935E-07	1.064E-07	8.076E-08	5.432E-08	3.682E-08	2.916E-08
WNW	310	4.351E-07	2.249E-07	1.623E-07	9.793E-08	8.204E-08	5.649E-08	3.932E-08	3.152E-08
NW	397	4.232E-07	2.173E-07	1.088E-07	7.188E-08	5.477E-08	3.772E-08	2.898E-08	2.359E-08
NNW	272	2.890E-07	1.465E-07	7.534E-08	4.945E-08	3.780E-08	2.631E-08	2.045E-08	1.682E-08
AVERAGE	8064	5.395E-07	2.812E-07	1.462E-07	8.976E-08	6.863E-08	4.698E-08	3.433E-08	2.749E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	543	2.441E-08	2.108E-08	1.853E-08	1.652E-08	1.487E-08	9.814E-09	7.223E-09	4.626E-09
NNE	1146	3.775E-08	3.258E-08	2.861E-08	2.547E-08	2.291E-08	1.505E-08	1.105E-08	7.040E-09
NE	790	2.670E-08	2.307E-08	2.030E-08	1.811E-08	1.633E-08	1.084E-08	8.033E-09	5.209E-09
ENE	438	1.686E-08	1.457E-08	1.282E-08	1.144E-08	1.031E-08	6.857E-09	5.086E-09	3.306E-09
E	785	2.622E-08	2.267E-08	1.994E-08	1.778E-08	1.602E-08	1.060E-08	7.827E-09	5.037E-09
ESE	710	2.369E-08	2.041E-08	1.791E-08	1.593E-08	1.432E-08	9.410E-09	6.913E-09	4.423E-09
SE	621	2.231E-08	1.922E-08	1.686E-08	1.499E-08	1.347E-08	8.828E-09	6.471E-09	4.125E-09
SSE	440	2.321E-08	1.958E-08	1.688E-08	1.477E-08	1.310E-08	8.243E-09	5.914E-09	3.819E-09
S	282	1.320E-08	1.089E-08	9.215E-09	7.940E-09	6.952E-09	4.206E-09	2.943E-09	1.772E-09
SSW	394	2.274E-08	1.868E-08	1.575E-08	1.354E-08	1.183E-08	7.100E-09	4.935E-09	2.940E-09
SW	336	2.403E-08	2.010E-08	1.719E-08	1.494E-08	1.318E-08	8.128E-09	5.733E-09	3.470E-09
WSW	271	2.001E-08	1.674E-08	1.431E-08	1.244E-08	1.097E-08	6.771E-09	4.781E-09	2.902E-09
W	329	2.397E-08	2.024E-08	1.744E-08	1.527E-08	1.354E-08	9.671E-09	6.818E-09	4.142E-09
WNW	310	2.614E-08	2.222E-08	1.927E-08	1.695E-08	1.509E-08	8.990E-09	7.181E-09	4.434E-09
NW	397	1.983E-08	1.707E-08	1.495E-08	1.328E-08	1.192E-08	9.051E-09	6.523E-09	4.312E-09
NNW	272	1.425E-08	1.235E-08	1.089E-08	9.733E-09	8.784E-09	5.839E-09	4.502E-09	3.719E-09
AVERAGE	8064	2.283E-08	1.947E-08	1.693E-08	1.494E-08	1.335E-08	8.713E-09	6.371E-09	4.080E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	543	3.361E-09	2.621E-09	2.141E-09	1.807E-09	1.553E-09	1.616E-09	1.428E-09
NNE	1146	5.099E-09	3.965E-09	3.234E-09	2.724E-09	2.339E-09	2.050E-09	1.819E-09
NE	790	3.821E-09	3.001E-09	2.465E-09	2.090E-09	1.804E-09	1.588E-09	1.416E-09
ENE	438	2.428E-09	1.952E-09	1.721E-09	1.457E-09	1.255E-09	1.104E-09	9.831E-10
E	785	3.673E-09	2.871E-09	2.636E-09	2.217E-09	1.901E-09	1.664E-09	1.476E-09
ESE	710	3.213E-09	2.686E-09	2.189E-09	1.842E-09	1.581E-09	1.384E-09	1.228E-09
SE	621	2.988E-09	2.613E-09	2.118E-09	1.775E-09	1.517E-09	1.325E-09	1.172E-09
SSE	440	2.720E-09	2.094E-09	1.697E-09	1.422E-09	1.216E-09	1.062E-09	9.394E-10
S	282	1.241E-09	9.447E-10	7.592E-10	6.319E-10	5.369E-10	4.667E-10	4.111E-10
SSW	394	2.049E-09	1.553E-09	1.246E-09	1.035E-09	8.783E-10	7.624E-10	6.709E-10
SW	336	2.438E-09	1.858E-09	1.493E-09	1.243E-09	1.072E-09	9.307E-10	8.192E-10
WSW	271	2.042E-09	1.567E-09	1.306E-09	1.086E-09	9.315E-10	8.070E-10	7.100E-10
W	329	2.919E-09	2.231E-09	1.799E-09	1.502E-09	1.346E-09	1.172E-09	1.034E-09
WNW	310	3.154E-09	2.513E-09	2.158E-09	1.853E-09	1.574E-09	1.368E-09	1.204E-09
NW	397	3.070E-09	2.401E-09	1.958E-09	1.750E-09	1.489E-09	1.295E-09	1.142E-09
NNW	272	2.631E-09	2.016E-09	1.628E-09	1.360E-09	1.160E-09	1.010E-09	8.918E-10
AVERAGE	8064	2.928E-09	2.305E-09	1.909E-09	1.612E-09	1.384E-09	1.225E-09	1.084E-09

Table B-4
Deposition D/Q Factors for Main Stack

PNPS 1ST QUARTER 1998 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
AVERAGE DEPOSITION RATES (DEPLETED CHI/Q * DEP. VELOCITY MODEL -- MET. AND ATOMIC ENERGY 1968) -- (1/M2)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	96	3.485E-12	1.324E-10	1.125E-10	1.051E-10	1.154E-10	1.431E-10	1.513E-10	1.461E-10
NNE	184	6.853E-12	2.165E-10	1.871E-10	1.744E-10	1.226E-10	1.734E-10	2.053E-10	2.102E-10
NE	171	4.249E-12	1.552E-10	1.228E-10	8.546E-11	9.266E-11	1.421E-10	1.719E-10	1.789E-10
ENE	70	2.619E-12	9.096E-11	8.163E-11	6.952E-11	6.620E-11	7.664E-11	8.582E-11	8.729E-11
E	109	4.020E-12	1.602E-10	1.520E-10	1.163E-10	1.139E-10	1.414E-10	1.554E-10	1.536E-10
ESE	184	1.025E-11	3.028E-10	1.788E-10	1.557E-10	1.778E-10	2.377E-10	2.601E-10	2.556E-10
SE	241	1.247E-11	4.116E-10	3.278E-10	2.882E-10	3.113E-10	4.348E-10	3.635E-10	3.527E-10
SSE	142	3.087E-11	1.060E-09	3.901E-10	6.028E-10	8.121E-10	7.348E-10	6.006E-10	4.897E-10
S	120	1.945E-11	3.606E-10	7.955E-10	1.581E-09	1.285E-09	1.057E-09	7.688E-10	5.567E-10
SSW	194	3.552E-11	7.150E-10	1.733E-09	2.225E-09	3.076E-09	2.196E-09	1.379E-09	9.654E-10
SW	119	3.855E-11	3.190E-10	6.627E-10	1.068E-09	9.889E-10	8.052E-10	5.945E-10	4.538E-10
WSW	95	4.494E-11	4.123E-10	4.594E-10	4.915E-10	6.698E-10	6.096E-10	4.507E-10	3.455E-10
W	99	1.653E-11	2.405E-10	5.695E-10	6.138E-10	6.735E-10	6.344E-10	4.848E-10	4.004E-10
WNW	62	6.875E-12	9.944E-11	1.009E-10	2.103E-10	3.268E-10	3.762E-10	3.106E-10	2.652E-10
NW	38	3.126E-19	3.070E-13	5.000E-12	1.250E-11	3.619E-11	5.789E-11	7.401E-11	7.777E-11
NNW	54	1.014E-19	8.085E-12	1.053E-10	7.282E-11	7.622E-11	9.848E-11	1.077E-10	1.064E-10
AVERAGE	1978	1.479E-11	2.928E-10	3.740E-10	4.889E-10	5.584E-10	6.949E-10	3.853E-10	3.153E-10

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	96	1.349E-10	1.232E-10	1.123E-10	1.027E-10	9.388E-11	6.271E-11	4.510E-11	2.701E-11
NNE	184	2.003E-10	1.873E-10	1.758E-10	1.612E-10	1.491E-10	1.026E-10	7.492E-11	4.575E-11
NE	171	1.728E-10	1.635E-10	1.534E-10	1.437E-10	1.340E-10	9.503E-11	7.085E-11	4.463E-11
ENE	70	8.341E-11	7.854E-11	7.343E-11	6.868E-11	6.391E-11	4.476E-11	3.297E-11	2.030E-11
E	109	1.438E-10	1.328E-10	1.220E-10	1.128E-10	1.034E-10	7.052E-11	5.150E-11	3.159E-11
ESE	184	2.383E-10	2.193E-10	2.010E-10	1.845E-10	1.692E-10	1.135E-10	8.179E-11	4.919E-11
SE	241	3.249E-10	2.964E-10	2.698E-10	2.464E-10	2.249E-10	1.490E-10	1.063E-10	6.290E-11
SSE	142	4.061E-10	3.430E-10	2.943E-10	2.556E-10	2.240E-10	1.329E-10	9.022E-11	5.318E-11
S	120	4.226E-10	3.343E-10	2.728E-10	2.272E-10	1.929E-10	1.042E-10	6.711E-11	3.557E-11
SSW	194	7.249E-10	5.686E-10	4.605E-10	3.813E-10	3.2[illegible]E-10	1.697E-10	1.069E-10	5.465E-11
SW	119	3.578E-10	2.900E-10	2.403E-10	2.025E-10	1.733E-10	9.440E-11	6.033E-11	3.140E-11
WSW	95	2.742E-10	2.239E-10	1.870E-10	1.587E-10	1.368E-10	7.666E-11	5.016E-11	2.701E-11
W	99	3.322E-10	2.799E-10	2.393E-10	2.071E-10	1.810E-10	1.123E-10	7.691E-11	3.866E-11
WNW	62	2.239E-10	1.908E-10	1.644E-10	1.431E-10	1.256E-10	6.882E-11	4.990E-11	2.607E-11
NW	38	7.502E-11	7.068E-11	6.590E-11	6.132E-11	5.683E-11	5.410E-11	3.715E-11	2.239E-11
NNW	54	9.960E-11	9.179E-11	8.414E-11	7.725E-11	7.068E-11	4.681E-11	3.485E-11	2.388E-11
AVERAGE	1978	2.634E-10	2.246E-10	1.946E-10	1.708E-10	1.513E-10	9.425E-11	6.481E-11	3.714E-11

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	96	1.835E-11	1.341E-11	1.029E-11	8.190E-12	6.653E-12	5.838E-12	4.844E-12
NNE	184	3.147E-11	2.323E-11	1.800E-11	1.445E-11	1.183E-11	9.916E-12	8.430E-12
NE	171	3.133E-11	2.342E-11	1.826E-11	1.473E-11	1.211E-11	1.017E-11	8.659E-12
ENE	70	1.396E-11	1.049E-11	8.570E-12	6.775E-12	5.470E-12	4.528E-12	3.804E-12
E	109	2.177E-11	1.603E-11	1.381E-11	1.079E-11	8.612E-12	7.056E-12	5.874E-12
ESE	184	3.353E-11	2.645E-11	2.014E-11	1.592E-11	1.285E-11	1.063E-11	8.928E-12
SE	241	4.231E-11	3.377E-11	2.532E-11	1.978E-11	1.581E-11	1.299E-11	1.085E-11
SSE	142	3.436E-11	2.426E-11	1.817E-11	1.416E-11	1.129E-11	9.252E-12	7.702E-12
S	120	2.254E-11	1.577E-11	1.178E-11	9.193E-12	7.354E-12	6.058E-12	5.075E-12
SSW	194	3.376E-11	2.317E-11	1.705E-11	1.315E-11	1.043E-11	8.539E-12	7.123E-12
SW	119	1.975E-11	1.377E-11	1.028E-11	8.029E-12	6.416E-12	5.297E-12	4.450E-12
WSW	95	1.730E-11	1.222E-11	9.067E-12	7.084E-12	5.679E-12	4.579E-12	3.848E-12
W	99	2.340E-11	1.572E-11	1.133E-11	8.562E-12	6.107E-12	4.540E-12	3.743E-12
WNW	62	1.621E-11	1.116E-11	8.005E-12	5.576E-12	4.260E-12	3.443E-12	2.835E-12
NW	38	1.376E-11	9.233E-12	6.503E-12	3.122E-12	2.364E-12	1.854E-12	1.483E-12
NNW	54	1.464E-11	9.918E-12	7.179E-12	5.435E-12	4.223E-12	3.386E-12	2.765E-12
AVERAGE	1978	2.428E-11	1.763E-11	1.336E-11	1.031E-11	8.216E-12	6.755E-12	5.651E-12

Table B-4
Deposition D/Q Factors for Main Stack

PNPS 2ND QUARTER 1998 GENERAL X/Q.: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
AVERAGE DEPOSITION RATES (DEPLETED CHI/Q * DEP. VELOCITY MODEL -- MET. AND ATOMIC ENERGY 1968) -- (1/M2)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	147	1.380E-11	4.390E-10	2.486E-10	1.668E-10	1.601E-10	2.032E-10	2.417E-10	2.548E-10
NNE	206	1.123E-11	3.649E-10	2.755E-10	2.091E-10	2.104E-10	2.691E-10	3.046E-10	3.081E-10
NE	112	5.783E-12	1.769E-10	9.117E-11	6.493E-11	7.101E-11	9.865E-11	1.141E-10	1.166E-10
ENE	68	7.947E-12	2.926E-10	1.425E-10	1.004E-10	9.229E-11	9.117E-11	9.552E-11	9.623E-11
E	129	1.673E-11	5.067E-10	2.601E-10	1.523E-10	1.394E-10	1.622E-10	1.787E-10	1.794E-10
ESE	89	7.973E-12	2.155E-10	1.077E-10	7.595E-11	8.178E-11	1.148E-10	1.355E-10	1.401E-10
SE	75	5.397E-12	2.102E-10	2.016E-10	1.081E-10	9.231E-11	1.511E-10	1.358E-10	1.424E-10
SSE	82	3.579E-11	9.800E-10	5.658E-10	5.266E-10	6.691E-10	6.165E-10	5.155E-10	4.258E-10
S	74	4.784E-11	7.756E-10	6.076E-10	1.112E-09	9.290E-10	7.835E-10	5.740E-10	4.163E-10
SSW	101	6.832E-11	8.669E-10	9.282E-10	1.364E-09	2.119E-09	1.593E-09	9.978E-10	6.953E-10
SW	131	9.429E-11	8.796E-10	9.100E-10	1.430E-09	1.423E-09	1.288E-09	1.011E-09	8.035E-10
WSW	83	5.627E-11	5.557E-10	7.179E-10	7.156E-10	1.030E-09	1.054E-09	8.193E-10	6.439E-10
W	79	3.322E-11	4.425E-10	5.383E-10	5.093E-10	6.160E-10	6.687E-10	5.455E-10	4.667E-10
WNW	73	2.107E-11	3.301E-10	4.448E-10	3.242E-10	3.966E-10	4.934E-10	4.555E-10	4.165E-10
NW	159	1.999E-11	3.457E-10	2.002E-10	1.515E-10	1.679E-10	2.435E-10	2.844E-10	2.893E-10
NNW	101	2.356E-12	9.610E-11	1.349E-10	1.048E-10	1.023E-10	1.470E-10	1.838E-10	1.962E-10
AVERAGE	1709	2.800E-11	4.674E-10	3.984E-10	4.447E-10	5.187E-10	4.986E-10	4.120E-10	3.495E-10

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	147	2.486E-10	2.372E-10	2.235E-10	2.100E-10	1.956E-10	1.344E-10	9.659E-11	5.755E-11
NNE	206	2.930E-10	2.741E-10	2.548E-10	2.370E-10	2.196E-10	1.518E-10	1.108E-10	6.738E-11
NE	112	1.118E-10	1.054E-10	9.875E-11	9.254E-11	8.635E-11	6.170E-11	4.650E-11	2.991E-11
ENE	68	9.225E-11	8.725E-11	8.171E-11	7.633E-11	7.057E-11	4.660E-11	3.265E-11	1.949E-11
E	129	1.704E-10	1.592E-10	1.477E-10	1.370E-10	1.265E-10	8.621E-11	6.222E-11	3.723E-11
ESE	89	1.348E-10	1.271E-10	1.188E-10	1.107E-10	1.026E-10	7.007E-11	5.020E-11	2.948E-11
SE	75	1.372E-10	1.294E-10	1.209E-10	1.128E-10	1.047E-10	7.243E-11	5.278E-11	3.194E-11
SSE	82	3.548E-10	3.003E-10	2.577E-10	2.235E-10	1.957E-10	1.141E-10	7.578E-11	4.230E-11
S	74	3.157E-10	2.496E-10	2.035E-10	1.694E-10	1.437E-10	7.711E-11	4.933E-11	2.589E-11
SSW	101	5.193E-10	4.052E-10	3.267E-10	2.694E-10	2.266E-10	1.178E-10	7.345E-11	3.697E-11
SW	131	6.518E-10	5.403E-10	4.561E-10	3.904E-10	3.383E-10	1.911E-10	1.238E-10	6.416E-11
WSW	83	5.165E-10	4.235E-10	3.537E-10	2.996E-10	2.571E-10	1.390E-10	8.711E-11	4.307E-11
W	79	3.960E-10	3.393E-10	2.938E-10	2.566E-10	2.258E-10	1.565E-10	9.813E-11	4.906E-11
WNW	73	3.686E-10	3.259E-10	2.648E-10	2.359E-10	2.108E-10	1.357E-10	9.190E-11	4.830E-11
NW	159	2.747E-10	2.568E-10	2.384E-10	2.213E-10	2.046E-10	1.884E-10	1.306E-10	8.259E-11
NNW	101	1.922E-10	1.836E-10	1.731E-10	1.628E-10	1.521E-10	1.064E-10	8.332E-11	6.640E-11
AVERAGE	1709	2.986E-10	2.590E-10	2.259E-10	2.003E-10	1.788E-10	1.156E-10	7.908E-11	4.573E-11

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	147	3.875E-11	2.796E-11	2.114E-11	1.655E-11	1.323E-11	1.109E-11	9.043E-12
NNE	206	4.588E-11	3.341E-11	2.548E-11	2.015E-11	1.627E-11	1.346E-11	1.131E-11
NE	112	2.138E-11	1.621E-11	1.278E-11	1.040E-11	8.612E-12	7.287E-12	6.245E-12
ENE	68	1.361E-11	1.057E-11	9.107E-12	7.381E-12	6.096E-12	5.146E-12	4.402E-12
E	129	2.527E-11	1.849E-11	1.700E-11	1.347E-11	1.092E-11	9.082E-12	7.677E-12
ESE	89	1.960E-11	1.557E-11	1.170E-11	9.165E-12	7.354E-12	6.063E-12	5.082E-12
SE	75	2.162E-11	1.808E-11	1.340E-11	1.033E-11	8.129E-12	6.572E-12	5.395E-12
SSE	82	2.609E-11	1.767E-11	1.276E-11	9.629E-12	7.456E-12	5.953E-12	4.846E-12
S	74	1.630E-11	1.136E-11	8.454E-12	6.576E-12	5.251E-12	4.318E-12	3.616E-12
SSW	101	2.264E-11	1.543E-11	1.130E-11	8.674E-12	6.850E-12	5.583E-12	4.642E-12
SW	131	3.920E-11	2.630E-11	1.884E-11	1.412E-11	1.077E-11	8.541E-12	6.922E-12
WSW	83	2.553E-11	1.678E-11	1.122E-11	8.313E-12	6.365E-12	4.809E-12	3.920E-12
W	79	2.928E-11	1.936E-11	1.376E-11	1.025E-11	7.107E-12	5.120E-12	4.156E-12
WNW	73	2.943E-11	1.988E-11	1.386E-11	8.415E-12	6.116E-12	4.853E-12	3.940E-12
NW	159	5.347E-11	3.849E-11	2.875E-11	1.533E-11	1.187E-11	9.496E-12	7.747E-12
NNW	101	3.929E-11	2.581E-11	1.822E-11	1.351E-11	1.030E-11	8.132E-12	6.550E-12
AVERAGE	1709	2.921E-11	2.071E-11	1.548E-11	1.139E-11	8.918E-12	7.219E-12	5.968E-12

Table B-4
Deposition D/Q Factors for Main Stack

PNPS 3RD QUARTER 1998 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
AVERAGE DEPOSITION RATES (DEPLETED CHI/Q * DEP. VELOCITY MODEL -- MET. AND ATOMIC ENERGY 1968) -- (1/M2)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	201	1.536E-11	5.684E-10	3.958E-10	2.868E-10	2.640E-10	2.763E-10	2.804E-10	2.678E-10
NNE	595	2.084E-11	7.032E-10	6.753E-10	5.168E-10	4.926E-10	5.773E-10	6.223E-10	6.106E-10
NE	280	1.081E-11	4.303E-10	3.123E-10	2.199E-10	1.976E-10	2.141E-10	2.303E-10	2.302E-10
ENE	116	3.499E-12	1.522E-10	1.514E-10	1.108E-10	9.187E-11	8.937E-11	9.453E-11	9.451E-11
E	186	1.291E-11	4.996E-10	3.026E-10	1.955E-10	1.744E-10	1.831E-10	1.892E-10	1.835E-10
ESE	133	1.122E-11	3.804E-10	2.111E-10	1.380E-10	1.180E-10	1.166E-10	1.190E-10	1.158E-10
SE	106	2.212E-11	1.160E-09	6.551E-10	2.937E-10	1.913E-10	1.725E-10	1.151E-10	1.115E-10
SSE	96	4.383E-11	1.593E-09	7.359E-10	4.959E-10	6.063E-10	5.312E-10	4.332E-10	3.541E-10
S	34	2.781E-11	5.025E-10	2.374E-10	3.542E-10	2.938E-10	2.424E-10	1.765E-10	1.283E-10
SSW	35	2.553E-11	5.536E-10	5.128E-10	4.365E-10	5.425E-10	5.854E-10	3.815E-10	2.740E-10
SW	43	2.129E-11	3.004E-10	4.669E-10	6.150E-10	6.121E-10	5.464E-10	4.178E-10	3.245E-10
WSW	58	9.570E-11	9.143E-10	5.324E-10	4.142E-10	5.796E-10	6.065E-10	4.788E-10	3.812E-10
W	79	5.609E-11	9.239E-10	9.456E-10	6.618E-10	6.385E-10	5.749E-10	4.356E-10	3.587E-10
WNW	98	2.300E-11	4.480E-10	4.530E-10	4.966E-10	6.433E-10	6.646E-10	5.371E-10	4.569E-10
NW	82	9.288E-12	2.409E-10	2.510E-10	1.914E-10	1.757E-10	1.841E-10	1.823E-10	1.697E-10
NNW	51	9.838E-13	4.072E-11	4.358E-11	2.873E-11	2.971E-11	4.815E-11	6.060E-11	6.444E-11
AVERAGE	2193	2.502E-11	5.883E-10	4.301E-10	3.410E-10	3.532E-10	3.508E-10	2.971E-10	2.578E-10

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	201	2.469E-10	2.259E-10	2.065E-10	1.895E-10	1.737E-10	1.174E-10	8.533E-11	5.210E-11
NNE	595	5.697E-10	5.257E-10	4.835E-10	4.459E-10	4.107E-10	2.813E-10	2.061E-10	1.275E-10
NE	280	2.195E-10	2.072E-10	1.948E-10	1.833E-10	1.717E-10	1.251E-10	9.580E-11	6.309E-11
ENE	116	9.047E-11	8.588E-11	8.118E-11	7.681E-11	7.236E-11	5.366E-11	4.167E-11	2.805E-11
E	186	1.714E-10	1.589E-10	1.471E-10	1.366E-10	1.265E-10	8.895E-11	6.673E-11	4.284E-11
ESE	133	1.089E-10	1.019E-10	9.523E-11	8.923E-11	8.331E-11	6.024E-11	4.616E-11	3.052E-11
SE	106	1.051E-10	9.883E-11	9.284E-11	8.738E-11	8.188E-11	5.997E-11	4.631E-11	3.087E-11
SSE	96	2.946E-10	2.501E-10	2.159E-10	1.885E-10	1.664E-10	1.018E-10	7.060E-11	4.541E-11
S	34	9.784E-11	7.778E-11	6.378E-11	5.345E-11	4.555E-11	2.498E-11	1.631E-11	8.883E-12
SSW	35	2.085E-10	1.657E-10	1.361E-10	1.145E-10	9.806E-11	5.411E-11	3.532E-11	1.903E-11
SW	43	2.585E-10	2.110E-10	1.757E-10	1.485E-10	1.272E-10	6.881E-11	4.331E-11	2.173E-11
WSW	58	3.096E-10	2.569E-10	2.169E-10	1.855E-10	1.605E-10	8.980E-11	5.767E-11	2.947E-11
W	79	2.973E-10	2.502E-10	2.135E-10	1.845E-10	1.610E-10	1.050E-10	6.594E-11	3.326E-11
WNW	98	3.878E-10	3.327E-10	2.848E-10	2.323E-10	2.055E-10	1.309E-10	8.987E-11	4.854E-11
NW	82	1.534E-10	1.383E-10	1.249E-10	1.135E-10	1.034E-10	9.176E-11	6.324E-11	3.845E-11
NNW	51	6.310E-11	6.023E-11	5.680E-11	5.342E-11	4.997E-11	3.548E-11	2.883E-11	3.480E-11
AVERAGE	2193	2.239E-10	1.967E-10	1.731E-10	1.552E-10	1.399E-10	9.307E-11	6.620E-11	4.091E-11

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	201	3.590E-11	2.649E-11	2.046E-11	1.637E-11	1.337E-11	1.272E-11	1.049E-11
NNE	595	8.883E-11	6.636E-11	5.193E-11	4.205E-11	3.471E-11	2.931E-11	2.508E-11
NE	280	4.562E-11	3.478E-11	2.745E-11	2.235E-11	1.851E-11	1.564E-11	1.339E-11
ENE	116	2.067E-11	1.686E-11	1.594E-11	1.289E-11	1.057E-11	8.826E-12	7.448E-12
E	186	3.061E-11	2.323E-11	2.259E-11	1.806E-11	1.471E-11	1.226E-11	1.035E-11
ESE	133	2.213E-11	1.991E-11	1.554E-11	1.253E-11	1.029E-11	8.627E-12	7.331E-12
SE	106	2.241E-11	2.225E-11	1.689E-11	1.325E-11	1.059E-11	8.651E-12	7.170E-12
SSE	96	2.944E-11	2.057E-11	1.511E-11	1.151E-11	8.951E-12	7.140E-12	5.791E-12
S	34	5.774E-12	4.131E-12	3.145E-12	2.497E-12	2.030E-12	1.696E-12	1.441E-12
SSW	35	1.197E-11	8.232E-12	6.014E-12	4.577E-12	3.567E-12	2.858E-12	2.335E-12
SW	43	1.312E-11	8.798E-12	6.321E-12	4.768E-12	3.704E-12	2.958E-12	2.409E-12
WSW	58	1.787E-11	1.204E-11	8.549E-12	6.330E-12	4.829E-12	3.471E-12	2.798E-12
W	79	2.028E-11	1.376E-11	1.003E-11	7.675E-12	5.640E-12	4.327E-12	3.615E-12
WNW	98	3.061E-11	2.177E-11	1.603E-11	9.422E-12	6.849E-12	5.452E-12	4.443E-12
NW	82	2.385E-11	1.636E-11	1.180E-11	6.037E-12	4.736E-12	3.836E-12	3.170E-12
NNW	51	2.153E-11	1.449E-11	1.033E-11	7.651E-12	5.783E-12	4.486E-12	3.541E-12
AVERAGE	2193	2.754E-11	2.063E-11	1.613E-11	1.237E-11	9.927E-12	8.266E-12	6.925E-12

Table B-4
Deposition D/Q Factors for Main Stack

PNPS 4TH QUARTER 1998 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
AVERAGE DEPOSITION RATES (DEPLETED CHI/Q * DEP. VELOCITY MODEL -- MET. AND ATOMIC ENERGY 1968) -- (1/M2)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	99	5.231E-12	1.807E-10	8.032E-11	5.564E-11	7.302E-11	1.205E-10	1.430E-10	1.465E-10
NNE	161	5.650E-12	1.613E-10	1.114E-10	9.406E-11	1.171E-10	1.742E-10	1.957E-10	1.939E-10
NE	227	3.859E-12	1.085E-10	1.050E-10	1.085E-10	1.337E-10	1.926E-10	2.153E-10	2.136E-10
ENE	184	4.092E-12	1.545E-10	1.719E-10	1.331E-10	1.289E-10	1.630E-10	1.841E-10	1.850E-10
E	361	2.236E-11	7.375E-10	3.830E-10	2.358E-10	2.293E-10	2.935E-10	3.362E-10	3.425E-10
ESE	304	2.335E-11	7.305E-10	3.748E-10	2.825E-10	2.952E-10	3.423E-10	3.682E-10	3.292E-10
SE	199	1.583E-11	5.977E-10	4.531E-10	2.860E-10	2.726E-10	3.437E-10	2.746E-10	2.597E-10
SSE	120	2.459E-11	6.380E-10	3.863E-10	5.829E-10	6.616E-10	5.378E-10	4.213E-10	3.359E-10
S	54	1.486E-11	2.560E-10	3.609E-10	5.697E-10	4.505E-10	3.644E-10	2.686E-10	1.960E-10
SSW	64	1.908E-11	4.708E-10	8.512E-10	9.164E-10	1.028E-09	6.342E-10	3.943E-10	2.741E-10
SW	43	3.306E-11	2.708E-10	2.782E-10	4.598E-10	4.326E-10	3.593E-10	2.694E-10	2.083E-10
WSW	35	1.279E-11	1.352E-10	2.156E-10	2.408E-10	2.983E-10	2.464E-10	1.755E-10	1.314E-10
W	72	3.336E-11	3.634E-10	3.182E-10	3.407E-10	3.758E-10	3.453E-10	2.568E-10	2.082E-10
WNW	77	6.015E-12	1.085E-10	1.502E-10	2.215E-10	3.276E-10	3.805E-10	3.211E-10	2.802E-10
NW	118	2.898E-12	8.159E-11	1.607E-10	1.610E-10	1.812E-10	2.200E-10	2.203E-10	2.036E-10
NNW	66	9.389E-13	2.798E-11	1.357E-11	1.721E-11	3.288E-11	6.687E-11	8.307E-11	8.654E-11
AVERAGE	2184	1.425E-11	3.139E-10	2.759E-10	2.941E-10	3.149E-10	2.990E-10	2.567E-10	2.247E-10

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	99	1.400E-10	1.307E-10	1.210E-10	1.120E-10	1.033E-10	7.035E-11	5.090E-11	3.055E-11
NNE	161	1.813E-10	1.670E-10	1.532E-10	1.408E-10	1.293E-10	8.757E-11	6.354E-11	3.857E-11
NE	227	2.002E-10	1.851E-10	1.703E-10	1.571E-10	1.448E-10	9.940E-11	7.301E-11	4.532E-11
ENE	184	1.750E-10	1.631E-10	1.512E-10	1.403E-10	1.299E-10	9.037E-11	6.682E-11	4.179E-11
E	361	3.272E-10	3.076E-10	2.871E-10	2.681E-10	2.492E-10	1.750E-10	1.299E-10	8.137E-11
ESE	304	3.006E-10	2.731E-10	2.483E-10	2.269E-10	2.074E-10	1.394E-10	1.014E-10	6.234E-11
SE	199	2.360E-10	2.129E-10	1.923E-10	1.745E-10	1.585E-10	1.042E-10	7.437E-11	4.433E-11
SSE	120	2.743E-10	2.292E-10	1.950E-10	1.683E-10	1.469E-10	8.610E-11	5.800E-11	3.338E-11
S	54	1.492E-10	1.184E-10	9.681E-11	8.085E-11	6.879E-11	3.733E-11	2.404E-11	1.270E-11
SSW	64	2.041E-10	1.595E-10	1.290E-10	1.070E-10	9.050E-11	4.866E-11	3.135E-11	1.675E-11
SW	43	1.663E-10	1.366E-10	1.146E-10	9.763E-11	8.433E-11	4.762E-11	3.105E-11	1.648E-11
WSW	35	1.025E-10	8.258E-11	6.830E-11	5.757E-11	4.935E-11	2.736E-11	1.778E-11	9.478E-12
W	72	1.710E-10	1.434E-10	1.225E-10	1.062E-10	9.318E-11	1.004E-10	6.873E-11	3.607E-11
WNW	77	2.414E-10	2.093E-10	1.831E-10	1.615E-10	1.435E-10	8.507E-11	6.518E-11	3.549E-11
NW	118	1.824E-10	1.624E-10	1.450E-10	1.302E-10	1.174E-10	9.529E-11	6.481E-11	3.879E-11
NNW	66	8.333E-11	7.845E-11	7.318E-11	6.822E-11	6.336E-11	4.427E-11	3.524E-11	3.141E-11
AVERAGE	2184	1.959E-10	1.725E-10	1.532E-10	1.373E-10	1.237E-10	8.365E-11	5.976E-11	3.593E-11

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	99	2.067E-11	1.498E-11	1.137E-11	8.934E-12	7.160E-12	6.321E-12	5.126E-12
NNE	161	2.646E-11	1.947E-11	1.500E-11	1.197E-11	9.734E-12	8.102E-12	6.838E-12
NE	227	3.171E-11	2.374E-11	1.858E-11	1.505E-11	1.243E-11	1.050E-11	8.990E-12
ENE	184	2.929E-11	2.247E-11	1.876E-11	1.503E-11	1.228E-11	1.027E-11	8.709E-12
E	361	5.687E-11	4.242E-11	3.689E-11	2.928E-11	2.373E-11	1.973E-11	1.664E-11
ESE	304	4.332E-11	3.481E-11	2.688E-11	2.150E-11	1.755E-11	1.467E-11	1.244E-11
SE	199	3.015E-11	2.450E-11	1.855E-11	1.460E-11	1.175E-11	9.709E-12	8.146E-12
SSE	120	2.141E-11	1.504E-11	1.123E-11	8.741E-12	6.966E-12	5.712E-12	4.763E-12
S	54	8.035E-12	5.628E-12	4.218E-12	3.306E-12	2.662E-12	2.209E-12	1.866E-12
SSW	64	1.084E-11	7.745E-12	5.893E-12	4.674E-12	3.797E-12	3.168E-12	2.688E-12
SW	43	1.046E-11	7.279E-12	5.371E-12	4.131E-12	3.300E-12	2.637E-12	2.145E-12
WSW	35	6.068E-12	4.286E-12	3.188E-12	2.494E-12	2.000E-12	1.619E-12	1.358E-12
W	72	2.090E-11	1.313E-11	8.973E-12	6.575E-12	4.153E-12	2.961E-12	2.465E-12
WNW	77	2.249E-11	1.666E-11	1.244E-11	6.439E-12	4.694E-12	3.750E-12	3.062E-12
NW	118	2.482E-11	1.751E-11	1.298E-11	7.777E-12	6.119E-12	4.967E-12	4.110E-12
NNW	66	1.951E-11	1.331E-11	9.676E-12	7.326E-12	5.674E-12	4.520E-12	3.663E-12
AVERAGE	2184	2.394E-11	1.769E-11	1.375E-11	1.049E-11	8.376E-12	6.928E-12	5.813E-12

Table B-4
Deposition D/Q Factors for Main Stack

PNPS 1998 GENERAL X/QS: ELEVATED -- SECTOR AVERAGE MODEL
STACK RELEASE
AVERAGE DEPOSITION RATES (DEPLETED CHI/Q * DEP. VELOCITY MODEL -- MET. AND ATOMIC ENERGY 1968) -- (1/M2)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	543	9.373E-12	3.290E-10	2.097E-10	1.542E-10	1.538E-10	1.859E-10	2.033E-10	2.023E-10
NNE	1146	1.126E-11	3.654E-10	3.181E-10	2.409E-10	2.403E-10	3.037E-10	3.371E-10	3.354E-10
NE	790	6.254E-12	2.220E-10	1.628E-10	1.239E-10	1.277E-10	1.662E-10	1.873E-10	1.891E-10
ENE	438	4.386E-12	1.676E-10	1.379E-10	1.045E-10	9.569E-11	1.066E-10	1.169E-10	1.176E-10
E	785	1.410E-11	4.823E-10	2.784E-10	1.778E-10	1.670E-10	1.983E-10	2.185E-10	2.183E-10
ESE	710	1.358E-11	4.213E-10	2.256E-10	1.683E-10	1.730E-10	2.070E-10	2.192E-10	2.130E-10
SE	621	1.159E-11	4.753E-10	3.717E-10	2.349E-10	2.134E-10	2.701E-10	2.236E-10	2.173E-10
SSE	440	2.586E-11	8.110E-10	4.067E-10	5.522E-10	6.850E-10	6.010E-10	4.885E-10	3.976E-10
S	282	2.390E-11	4.142E-10	4.862E-10	8.739E-10	7.141E-10	5.900E-10	4.310E-10	3.127E-10
SSW	394	3.396E-11	6.163E-10	9.919E-10	1.202E-09	1.629E-09	1.207E-09	7.603E-10	5.329E-10
SW	336	4.234E-11	4.005E-10	5.311E-10	8.569E-10	8.277E-10	7.163E-10	5.466E-10	4.263E-10
WSW	271	4.533E-11	4.358E-10	4.451E-10	4.501E-10	6.210E-10	6.046E-10	4.619E-10	3.605E-10
W	329	3.538E-11	5.025E-10	5.706E-10	5.260E-10	5.712E-10	5.472E-10	4.225E-10	3.511E-10
WNW	310	1.404E-11	2.456E-10	2.662E-10	2.983E-10	4.079E-10	4.587E-10	3.856E-10	3.358E-10
NW	397	7.547E-12	1.609E-10	1.554E-10	1.308E-10	1.389E-10	1.755E-10	1.877E-10	1.817E-10
NNW	272	1.021E-12	4.100E-11	6.995E-11	5.254E-11	5.735E-11	8.652E-11	1.044E-10	1.086E-10
AVERAGE	8064	1.875E-11	3.807E-10	3.517E-10	3.842E-10	4.265E-10	4.016E-10	3.309E-10	2.813E-10

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	543	1.908E-10	1.773E-10	1.638E-10	1.515E-10	1.397E-10	9.484E-11	6.853E-11	4.127E-11
NNE	1146	3.153E-10	2.922E-10	2.696E-10	2.492E-10	2.298E-10	1.575E-10	1.151E-10	7.061E-11
NE	790	1.800E-10	1.689E-10	1.577E-10	1.472E-10	1.371E-10	9.732E-11	7.306E-11	4.672E-11
ENE	438	1.120E-10	1.053E-10	9.836E-11	9.192E-11	8.550E-11	5.992E-11	4.444E-11	2.806E-11
E	785	2.066E-10	1.928E-10	1.790E-10	1.664E-10	1.541E-10	1.072E-10	7.915E-11	4.933E-11
ESE	710	1.980E-10	1.824E-10	1.676E-10	1.544E-10	1.421E-10	9.683E-11	7.072E-11	4.350E-11
SE	621	2.012E-10	1.847E-10	1.691E-10	1.554E-10	1.426E-10	9.641E-11	6.999E-11	4.260E-11
SSE	440	3.292E-10	2.779E-10	2.383E-10	2.069E-10	1.815E-10	1.078E-10	7.310E-11	4.340E-11
S	282	2.376E-10	1.881E-10	1.536E-10	1.281E-10	1.088E-10	5.881E-11	3.786E-11	2.007E-11
SSW	394	3.998E-10	3.136E-10	2.541E-10	2.107E-10	1.782E-10	9.449E-11	5.989E-11	3.095E-11
SW	336	3.413E-10	2.800E-10	2.344E-10	1.992E-10	1.716E-10	9.526E-11	6.123E-11	3.167E-11
WSW	271	2.887E-10	2.369E-10	1.983E-10	1.685E-10	1.450E-10	8.009E-11	5.126E-11	2.633E-11
W	329	2.926E-10	2.474E-10	2.122E-10	1.841E-10	1.613E-10	1.189E-10	7.621E-11	3.869E-11
WNW	310	2.886E-10	2.497E-10	2.180E-10	1.920E-10	1.702E-10	9.843E-11	7.381E-11	3.944E-11
NW	397	1.677E-10	1.534E-10	1.399E-10	1.281E-10	1.172E-10	1.040E-10	7.154E-11	4.396E-11
NNW	272	1.049E-10	9.905E-11	9.260E-11	8.646E-11	8.031E-11	5.568E-11	4.359E-11	3.790E-11
AVERAGE	8064	2.409E-10	2.094E-10	1.842E-10	1.637E-10	1.466E-10	9.522E-11	6.684E-11	3.966E-11

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	543	2.807E-11	2.048E-11	1.565E-11	1.239E-11	1.001E-11	8.956E-12	7.347E-12
NNE	1146	4.877E-11	3.610E-11	2.800E-11	2.249E-11	1.843E-11	1.545E-11	1.314E-11
NE	790	3.321E-11	2.507E-11	1.969E-11	1.597E-11	1.320E-11	1.114E-11	9.522E-12
ENE	438	1.986E-11	1.548E-11	1.345E-11	1.080E-11	8.835E-12	7.384E-12	6.250E-12
E	785	3.442E-11	2.566E-11	2.313E-11	1.834E-11	1.485E-11	1.233E-11	1.039E-11
ESE	710	3.013E-11	2.463E-11	1.892E-11	1.508E-11	1.226E-11	1.021E-11	8.629E-12
SE	621	2.922E-11	2.480E-11	1.867E-11	1.460E-11	1.166E-11	9.562E-12	7.962E-12
SSE	440	2.776E-11	1.936E-11	1.431E-11	1.101E-11	8.671E-12	7.020E-12	5.781E-12
S	282	1.273E-11	8.923E-12	6.680E-12	5.223E-12	4.190E-12	3.461E-12	2.909E-12
SSW	394	1.927E-11	1.329E-11	9.809E-12	7.575E-12	6.009E-12	4.913E-12	4.094E-12
SW	336	1.955E-11	1.332E-11	9.688E-12	7.377E-12	5.756E-12	4.628E-12	3.795E-12
WSW	271	1.616E-11	1.099E-11	7.790E-12	5.896E-12	4.596E-12	3.525E-12	2.904E-12
W	329	2.312E-11	1.526E-11	1.085E-11	8.141E-12	5.662E-12	4.177E-12	3.449E-12
WNW	310	2.463E-11	1.738E-11	1.263E-11	7.457E-12	5.475E-12	4.372E-12	3.568E-12
NW	397	2.791E-11	1.961E-11	1.441E-11	7.762E-12	6.041E-12	4.856E-12	3.981E-12
NNW	272	2.306E-11	1.545E-11	1.105E-11	8.260E-12	6.329E-12	4.998E-12	4.021E-12
AVERAGE	8064	2.612E-11	1.911E-11	1.467E-11	1.115E-11	8.873E-12	7.311E-12	6.109E-12

Table B-5
Undepleted χ/Q Factors for Reactor Building Vent

PNPS 1ST QUARTER 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
GROUND-LEVEL AVERAGE CHI/Q BEFORE DEPLETION (SPLIT-H MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	151	3.270E-05	9.591E-06	3.260E-06	1.800E-06	1.179E-06	6.455E-07	4.214E-07	3.043E-07
NNE	237	4.107E-05	1.196E-05	4.114E-06	2.278E-06	1.492E-06	8.163E-07	5.327E-07	3.848E-07
NE	121	2.474E-05	7.294E-06	2.411E-06	1.341E-06	8.842E-07	4.881E-07	3.195E-07	2.312E-07
ENE	107	2.408E-05	7.091E-06	2.400E-06	1.333E-06	8.756E-07	4.795E-07	3.124E-07	2.253E-07
E	189	3.316E-05	9.745E-06	3.449E-06	1.905E-06	1.243E-06	6.723E-07	4.355E-07	3.128E-07
ESE	179	2.796E-05	8.213E-06	2.954E-06	1.620E-06	1.050E-06	5.649E-07	3.653E-07	2.620E-07
SE	189	2.816E-05	8.331E-06	3.074E-06	1.689E-06	1.094E-06	5.828E-07	3.745E-07	2.673E-07
SSE	77	1.183E-05	3.395E-06	1.256E-06	6.968E-07	4.546E-07	2.445E-07	1.579E-07	1.133E-07
S	84	9.821E-06	2.867E-06	9.504E-07	5.229E-07	3.400E-07	1.822E-07	1.176E-07	8.424E-08
SSW	200	1.910E-05	5.812E-06	1.872E-06	1.006E-06	6.464E-07	3.418E-07	2.193E-07	1.562E-07
SW	179	1.607E-05	4.955E-06	1.633E-06	8.819E-07	5.652E-07	2.974E-07	1.899E-07	1.347E-07
WSW	93	1.027E-05	3.137E-06	1.023E-06	5.496E-07	3.516E-07	1.851E-07	1.188E-07	8.468E-08
W	103	1.610E-05	4.911E-06	1.598E-06	9.606E-07	6.209E-07	3.303E-07	1.926E-07	1.371E-07
WNW	45	9.654E-06	2.884E-06	1.021E-06	5.588E-07	3.622E-07	1.957E-07	1.396E-07	1.002E-07
NW	39	1.118E-05	3.302E-06	1.181E-06	6.549E-07	4.278E-07	2.306E-07	1.489E-07	1.066E-07
NNW	88	1.890E-05	5.504E-06	2.011E-06	1.119E-06	7.310E-07	3.938E-07	2.542E-07	1.822E-07
AVERAGE	2081	2.093E-05	6.187E-06	2.138E-06	1.182E-06	7.699E-07	4.157E-07	2.688E-07	1.929E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	151	2.349E-07	1.888E-07	1.564E-07	1.323E-07	1.140E-07	6.563E-08	4.472E-08	2.616E-08
NNE	237	2.973E-07	2.391E-07	1.980E-07	1.674E-07	1.443E-07	8.291E-08	5.648E-08	3.308E-08
NE	121	1.787E-07	1.438E-07	1.193E-07	1.011E-07	8.733E-08	5.061E-08	3.462E-08	2.032E-08
ENE	107	1.738E-07	1.396E-07	1.156E-07	9.773E-08	8.423E-08	4.849E-08	3.304E-08	1.933E-08
E	189	2.406E-07	1.927E-07	1.591E-07	1.340E-07	1.152E-07	6.554E-08	4.431E-08	2.565E-08
ESE	179	2.013E-07	1.610E-07	1.328E-07	1.117E-07	9.583E-08	5.425E-08	3.657E-08	2.112E-08
SE	189	2.046E-07	1.631E-07	1.475E-07	1.237E-07	1.059E-07	5.401E-08	3.616E-08	2.065E-08
SSE	77	8.727E-08	6.992E-08	5.769E-08	4.851E-08	4.158E-08	2.348E-08	1.582E-08	9.144E-09
S	84	6.470E-08	5.176E-08	4.267E-08	3.587E-08	3.075E-08	1.736E-08	1.168E-08	6.715E-09
SSW	200	1.191E-07	9.476E-08	7.785E-08	6.537E-08	5.596E-08	3.151E-08	2.109E-08	1.201E-08
SW	179	1.022E-07	8.102E-08	6.632E-08	5.550E-08	4.739E-08	2.644E-08	1.757E-08	9.880E-09
WSW	93	6.456E-08	5.137E-08	4.641E-08	3.894E-08	3.333E-08	1.704E-08	1.138E-08	6.455E-09
W	103	1.044E-07	8.305E-08	6.817E-08	5.718E-08	4.894E-08	2.753E-08	1.840E-08	1.044E-08
WNW	45	7.680E-08	6.138E-08	4.599E-08	3.872E-08	3.325E-08	1.887E-08	1.271E-08	7.305E-09
NW	39	8.181E-08	6.541E-08	5.392E-08	4.537E-08	3.893E-08	2.207E-08	1.486E-08	8.547E-09
NNW	88	1.400E-07	1.120E-07	9.235E-08	7.763E-08	6.657E-08	3.763E-08	2.534E-08	1.460E-08
AVERAGE	2081	1.482E-07	1.187E-07	9.876E-08	8.320E-08	7.146E-08	4.021E-08	2.717E-08	1.571E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	151	1.797E-08	1.351E-08	1.077E-08	8.909E-09	7.524E-09	6.503E-09	5.699E-09
NNE	237	2.272E-08	1.707E-08	1.361E-08	1.125E-08	9.501E-09	8.212E-09	7.197E-09
NE	121	1.398E-08	1.052E-08	8.394E-09	6.942E-09	5.861E-09	5.059E-09	4.430E-09
ENE	107	1.327E-08	9.966E-09	7.945E-09	6.566E-09	5.540E-09	4.783E-09	4.188E-09
E	189	1.751E-08	1.310E-08	1.041E-08	8.581E-09	7.230E-09	6.243E-09	5.465E-09
ESE	179	1.440E-08	1.077E-08	8.552E-09	7.051E-09	5.943E-09	5.136E-09	4.501E-09
SE	189	1.399E-08	1.041E-08	8.235E-09	6.768E-09	5.688E-09	4.908E-09	4.294E-09
SSE	77	6.234E-09	4.658E-09	3.696E-09	3.046E-09	2.566E-09	2.218E-09	1.943E-09
S	84	4.571E-09	3.413E-09	2.706E-09	2.229E-09	1.877E-09	1.622E-09	1.421E-09
SSW	200	8.157E-09	6.084E-09	4.820E-09	3.968E-09	3.342E-09	2.888E-09	2.532E-09
SW	179	6.655E-09	4.931E-09	3.887E-09	3.187E-09	2.673E-09	2.303E-09	2.013E-09
WSW	93	4.371E-09	3.252E-09	2.571E-09	2.113E-09	1.777E-09	1.533E-09	1.343E-09
W	103	7.060E-09	5.244E-09	4.142E-09	3.399E-09	2.853E-09	2.456E-09	2.145E-09
WNW	45	4.969E-09	3.708E-09	2.942E-09	2.423E-09	2.039E-09	1.759E-09	1.540E-09
NW	39	5.813E-09	4.336E-09	3.437E-09	2.828E-09	2.378E-09	2.051E-09	1.793E-09
NNW	88	9.933E-09	7.410E-09	5.872E-09	4.832E-09	4.064E-09	3.507E-09	3.067E-09
AVERAGE	2081	1.073E-08	8.024E-09	6.375E-09	5.256E-09	4.429E-09	3.824E-09	3.348E-09

Table B-5
Undepleted χ/Q Factors for Reactor Building Vent

PNPS 2ND QUARTER 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
GROUND-LEVEL AVERAGE CHI/Q BEFORE DEPLETION (SPLIT-H MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	196	5.505E-05	1.616E-05	5.547E-06	3.078E-06	2.020E-06	1.102E-06	7.163E-07	5.160E-07
NNE	286	5.712E-05	1.678E-05	5.639E-06	3.088E-06	2.013E-06	1.108E-06	7.270E-07	5.267E-07
NE	167	4.421E-05	1.285E-05	4.102E-06	2.205E-06	1.428E-06	8.049E-07	5.382E-07	3.950E-07
ENE	134	3.619E-05	1.061E-05	3.559E-06	1.975E-06	1.299E-06	7.148E-07	4.675E-07	3.380E-07
E	157	3.450E-05	1.008E-05	3.422E-06	1.871E-06	1.219E-06	6.670E-07	4.362E-07	3.155E-07
ESE	87	2.373E-05	6.936E-06	2.388E-06	1.330E-06	8.751E-07	4.769E-07	3.098E-07	2.231E-07
SE	70	2.221E-05	6.414E-06	2.418E-06	1.337E-06	8.759E-07	4.810E-07	2.863E-07	2.073E-07
SSE	60	1.604E-05	4.731E-06	1.581E-06	7.855E-07	5.127E-07	2.807E-07	1.835E-07	1.327E-07
S	59	8.084E-06	2.328E-06	6.840E-07	3.724E-07	2.426E-07	1.307E-07	8.468E-08	6.092E-08
SSW	106	1.658E-05	4.930E-06	1.539E-06	8.487E-07	5.557E-07	3.010E-07	1.950E-07	1.400E-07
SW	162	2.855E-05	8.742E-06	2.774E-06	1.516E-06	9.835E-07	5.259E-07	3.384E-07	2.414E-07
WSW	133	2.960E-05	8.888E-06	2.848E-06	1.551E-06	1.003E-06	5.358E-07	3.453E-07	2.470E-07
W	82	3.170E-05	9.211E-06	2.840E-06	1.685E-06	1.087E-06	5.985E-07	3.588E-07	2.609E-07
WNW	96	2.889E-05	8.357E-06	2.904E-06	1.604E-06	1.049E-06	5.730E-07	4.111E-07	2.970E-07
NW	127	4.124E-05	1.199E-05	4.275E-06	2.363E-06	1.541E-06	8.343E-07	5.413E-07	3.895E-07
NNW	92	4.218E-05	1.242E-05	4.015E-06	2.267E-06	1.512E-06	8.391E-07	5.491E-07	3.973E-07
AVERAGE	2014	3.224E-05	9.463E-06	3.158E-06	1.742E-06	1.138E-06	6.233E-07	4.055E-07	2.930E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	196	3.979E-07	3.195E-07	2.644E-07	2.233E-07	1.923E-07	1.103E-07	7.505E-08	4.379E-08
NNE	286	4.070E-07	3.275E-07	2.715E-07	2.300E-07	1.985E-07	1.146E-07	7.822E-08	4.593E-08
NE	167	3.074E-07	2.489E-07	2.076E-07	1.769E-07	1.534E-07	8.989E-08	6.207E-08	3.716E-08
ENE	134	2.612E-07	2.102E-07	1.743E-07	1.476E-07	1.274E-07	7.359E-08	5.026E-08	2.949E-08
E	157	2.437E-07	1.961E-07	1.625E-07	1.376E-07	1.186E-07	6.828E-08	4.657E-08	2.733E-08
ESE	87	1.721E-07	1.383E-07	1.144E-07	9.665E-08	8.322E-08	4.775E-08	3.249E-08	1.896E-08
SE	70	1.605E-07	1.293E-07	1.180E-07	9.985E-08	8.611E-08	4.960E-08	3.387E-08	1.991E-08
SSE	60	1.024E-07	8.236E-08	6.827E-08	5.781E-08	4.987E-08	2.879E-08	1.965E-08	1.153E-08
S	59	4.698E-08	3.773E-08	3.122E-08	2.635E-08	2.264E-08	1.290E-08	8.741E-09	5.092E-09
SSW	106	1.076E-07	8.617E-08	7.119E-08	6.008E-08	5.167E-08	2.956E-08	2.003E-08	1.159E-08
SW	162	1.841E-07	1.466E-07	1.206E-07	1.014E-07	8.692E-08	4.924E-08	3.303E-08	1.880E-08
WSW	133	1.891E-07	1.510E-07	1.368E-07	1.150E-07	9.865E-08	5.081E-08	3.422E-08	1.970E-08
W	82	2.020E-07	1.628E-07	1.351E-07	1.145E-07	9.881E-08	5.698E-08	3.896E-08	2.303E-08
WNW	96	2.295E-07	1.846E-07	1.390E-07	1.175E-07	1.012E-07	5.801E-08	3.950E-08	2.315E-08
NW	127	3.001E-07	2.407E-07	1.989E-07	1.676E-07	1.440E-07	8.198E-08	5.552E-08	3.228E-08
NNW	92	3.075E-07	2.479E-07	2.060E-07	1.748E-07	1.511E-07	8.808E-08	6.045E-08	3.558E-08
AVERAGE	2014	2.262E-07	1.819E-07	1.512E-07	1.279E-07	1.103E-07	6.315E-08	4.304E-08	2.521E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	196	3.003E-08	2.253E-08	1.795E-08	1.482E-08	1.250E-08	1.080E-08	9.455E-09
NNE	286	3.162E-08	2.380E-08	1.902E-08	1.575E-08	1.332E-08	1.152E-08	1.011E-08
NE	167	2.585E-08	1.962E-08	1.578E-08	1.314E-08	1.116E-08	9.691E-09	8.531E-09
ENE	134	2.028E-08	1.525E-08	1.217E-08	1.007E-08	8.502E-09	7.344E-09	6.434E-09
E	157	1.882E-08	1.418E-08	1.132E-08	9.380E-09	7.935E-09	6.871E-09	6.032E-09
ESE	87	1.300E-08	9.754E-09	7.768E-09	6.414E-09	5.409E-09	4.670E-09	4.089E-09
SE	70	1.371E-08	1.032E-08	8.237E-09	6.818E-09	5.764E-09	4.987E-09	4.375E-09
SSE	60	7.939E-09	5.979E-09	4.777E-09	3.956E-09	3.346E-09	2.895E-09	2.540E-09
S	59	3.501E-09	2.634E-09	2.101E-09	1.739E-09	1.472E-09	1.277E-09	1.123E-09
SSW	106	7.925E-09	5.935E-09	4.719E-09	3.893E-09	3.281E-09	2.832E-09	2.479E-09
SW	162	1.274E-08	9.481E-09	7.501E-09	6.163E-09	5.177E-09	4.456E-09	3.893E-09
WSW	133	1.343E-08	1.003E-08	7.965E-09	6.564E-09	5.530E-09	4.776E-09	4.183E-09
W	82	1.591E-08	1.202E-08	9.628E-09	7.993E-09	6.777E-09	5.880E-09	5.173E-09
WNW	96	1.591E-08	1.196E-08	9.542E-09	7.893E-09	6.669E-09	5.770E-09	5.061E-09
NW	127	2.208E-08	1.654E-08	1.315E-08	1.085E-08	9.154E-09	7.911E-09	6.931E-09
NNW	92	2.451E-08	1.844E-08	1.472E-08	1.217E-08	1.027E-08	8.853E-09	7.742E-09
AVERAGE	2014	1.733E-08	1.303E-08	1.040E-08	8.601E-09	7.267E-09	6.283E-09	5.509E-09

Table B-5
Undepleted χ/Q Factors for Reactor Building Vent

PNPS 3RD QUARTER 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
GROUND-LEVEL AVERAGE CHI/Q BEFORE DEPLETION (SPLIT-H MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	217	4.921E-05	1.451E-05	5.027E-06	2.771E-06	1.809E-06	9.816E-07	6.372E-07	4.583E-07
NNE	638	9.251E-05	2.746E-05	9.347E-06	5.155E-06	3.371E-06	1.831E-06	1.190E-06	8.561E-07
NE	336	1.014E-04	2.966E-05	9.161E-06	4.943E-06	3.220E-06	1.831E-06	1.228E-06	9.034E-07
ENE	185	6.85xE-05	2.003E-05	6.378E-06	3.494E-06	2.290E-06	1.286E-06	8.542E-07	6.241E-07
E	152	5.296E-05	1.553E-05	5.011E-06	2.758E-06	1.812E-06	1.007E-06	6.633E-07	4.822E-07
ESE	97	3.215E-05	9.279E-06	3.096E-06	1.699E-06	1.112E-06	6.155E-07	4.054E-07	2.948E-07
SE	57	1.170E-05	3.467E-06	1.324E-06	7.224E-07	4.695E-07	2.524E-07	1.484E-07	1.065E-07
SSE	49	9.302E-06	2.741E-06	9.333E-07	4.588E-07	2.980E-07	1.603E-07	1.039E-07	7.473E-08
S	14	1.031E-06	2.827E-07	6.772E-08	3.473E-08	2.288E-08	1.271E-08	8.419E-09	6.197E-09
SSW	45	7.331E-06	2.115E-06	6.029E-07	3.251E-07	2.133E-07	1.171E-07	7.704E-08	5.616E-08
SW	48	1.168E-05	3.472E-06	1.154E-06	6.304E-07	4.073E-07	2.165E-07	1.390E-07	9.915E-08
WSW	115	2.096E-05	6.469E-06	2.082E-06	1.112E-06	7.101E-07	3.728E-07	2.385E-07	1.695E-07
W	100	2.243E-05	6.874E-06	2.169E-06	1.289E-06	8.310E-07	4.415E-07	2.578E-07	1.837E-07
WNW	42	1.205E-05	3.609E-06	1.223E-06	6.746E-07	4.419E-07	2.396E-07	1.706E-07	1.225E-07
NW	54	2.023E-05	6.037E-06	2.087E-06	1.146E-06	7.456E-07	4.013E-07	2.595E-07	1.862E-07
NNW	44	1.826E-05	5.378E-06	1.922E-06	1.067E-06	6.967E-07	3.757E-07	2.428E-07	1.740E-07
AVERAGE	2193	3.324E-05	9.807E-06	3.224E-06	1.768E-06	1.153E-06	6.339E-07	4.140E-07	2.999E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	217	3.528E-07	2.829E-07	2.339E-07	1.973E-07	1.697E-07	9.704E-08	6.586E-08	3.833E-08
NNE	638	6.591E-07	5.288E-07	4.373E-07	3.694E-07	3.181E-07	1.826E-07	1.241E-07	7.230E-08
NE	336	7.040E-07	5.708E-07	4.767E-07	4.071E-07	3.536E-07	2.087E-07	1.447E-07	8.685E-08
ENE	185	4.850E-07	3.923E-07	3.268E-07	2.782E-07	2.412E-07	1.413E-07	9.742E-08	5.803E-08
E	152	3.739E-07	3.018E-07	2.510E-07	2.133E-07	1.846E-07	1.076E-07	7.403E-08	4.387E-08
ESE	97	2.288E-07	1.847E-07	1.535E-07	1.303E-07	1.126E-07	6.528E-08	4.476E-08	2.649E-08
SE	57	8.187E-08	6.559E-08	5.959E-08	5.025E-08	4.318E-08	2.463E-08	1.667E-08	9.660E-09
SSE	49	5.757E-08	4.621E-08	3.825E-08	3.232E-08	2.781E-08	1.594E-08	1.083E-08	6.324E-09
S	14	4.895E-09	4.017E-09	3.389E-09	2.916E-09	2.538E-09	1.518E-09	1.074E-09	6.696E-10
SSW	45	4.381E-08	3.555E-08	2.971E-08	2.533E-08	2.195E-08	1.291E-08	8.944E-09	5.365E-09
SW	48	7.579E-08	6.041E-08	4.965E-08	4.165E-08	3.563E-08	1.999E-08	1.338E-08	7.640E-09
WSW	115	1.289E-07	1.023E-07	9.233E-08	7.742E-08	6.621E-08	3.379E-08	2.257E-08	1.280E-08
W	100	1.400E-07	1.115E-07	9.166E-08	7.704E-08	6.603E-08	3.737E-08	2.510E-08	1.435E-08
WNW	42	9.402E-08	7.530E-08	5.654E-08	4.773E-08	4.106E-08	2.354E-08	1.597E-08	9.259E-09
NW	54	1.430E-07	1.145E-07	9.454E-08	7.970E-08	6.851E-08	3.911E-08	2.650E-08	1.537E-08
NNW	44	1.337E-07	1.070E-07	8.825E-08	7.427E-08	6.375E-08	3.619E-08	2.442E-08	1.408E-08
AVERAGE	2193	2.317E-07	1.865E-07	1.552E-07	1.315E-07	1.135E-07	6.547E-08	4.477E-08	2.634E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	217	2.626E-08	1.969E-08	1.568E-08	1.295E-08	1.092E-08	9.434E-09	8.264E-09
NNE	638	4.957E-08	3.719E-08	2.962E-08	2.446E-08	2.064E-08	1.782E-08	1.560E-08
NE	336	6.052E-08	4.598E-08	3.702E-08	3.084E-08	2.621E-08	2.273E-08	2.000E-08
ENE	185	4.024E-08	3.046E-08	2.444E-08	2.031E-08	1.721E-08	1.490E-08	1.309E-08
E	152	3.036E-08	2.293E-08	1.837E-08	1.524E-08	1.291E-08	1.117E-08	9.798E-09
ESE	97	1.831E-08	1.383E-08	1.107E-08	9.185E-09	7.780E-09	6.741E-09	5.921E-09
SE	57	6.614E-09	4.960E-09	3.947E-09	3.259E-09	2.751E-09	2.379E-09	2.086E-09
SSE	49	4.356E-09	3.281E-09	2.620E-09	2.170E-09	1.837E-09	1.593E-09	1.400E-09
S	14	4.817E-10	3.745E-10	3.060E-10	2.585E-10	2.227E-10	1.960E-10	1.746E-10
SSW	45	3.751E-09	2.857E-09	2.300E-09	1.917E-09	1.631E-09	1.418E-09	1.250E-09
SW	48	5.183E-09	3.861E-09	3.056E-09	2.513E-09	2.114E-09	1.826E-09	1.599E-09
WSW	115	8.681E-09	6.466E-09	5.117E-09	4.209E-09	3.543E-09	3.060E-09	2.681E-09
W	100	9.765E-09	7.290E-09	5.781E-09	4.761E-09	4.009E-09	3.460E-09	3.030E-09
WNW	42	6.338E-09	4.750E-09	3.779E-09	3.118E-09	2.629E-09	2.268E-09	1.985E-09
NW	54	1.052E-08	7.880E-09	6.268E-09	5.172E-09	4.360E-09	3.764E-09	3.296E-09
NNW	44	9.591E-09	7.160E-09	5.679E-09	4.675E-09	3.933E-09	3.392E-09	2.967E-09
AVERAGE	2193	1.816E-08	1.368E-08	1.094E-08	9.065E-09	7.668E-09	6.634E-09	5.821E-09

Table B-5
Undepleted χ/Q Factors for Reactor Building Vent

PNPS 4TH QUARTER 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
GROUND-LEVEL AVERAGE CHI/Q BEFORE DEPLETION (SPLIT-H MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	130	2.717E-05	8.004E-06	2.828E-06	1.568E-06	1.025E-06	5.540E-07	3.583E-07	2.571E-07
NNE	247	4.177E-05	1.245E-05	4.211E-06	2.301E-06	1.496E-06	8.185E-07	5.350E-07	3.863E-07
NE	251	4.983E-05	1.460E-05	4.819E-06	2.655E-06	1.739E-06	9.645E-07	6.346E-07	4.607E-07
ENE	339	6.189E-05	1.806E-05	6.274E-06	3.462E-06	2.261E-06	1.232E-06	8.030E-07	5.794E-07
E	305	4.300E-05	1.262E-05	4.457E-06	2.443E-06	1.589E-06	8.568E-07	5.548E-07	3.985E-07
ESE	187	2.467E-05	7.447E-06	2.633E-06	1.435E-06	9.286E-07	4.955E-07	3.188E-07	2.276E-07
SE	140	1.923E-05	5.755E-06	2.072E-06	1.128E-06	7.292E-07	3.881E-07	2.497E-07	1.783E-07
SSE	58	5.838E-06	1.750E-06	6.100E-07	3.269E-07	2.105E-07	1.119E-07	7.217E-08	5.168E-08
S	42	5.006E-06	1.473E-06	4.793E-07	2.611E-07	1.693E-07	9.059E-08	5.839E-08	4.180E-08
SSW	84	8.612E-06	2.685E-06	8.536E-07	4.552E-07	2.913E-07	1.532E-07	9.785E-08	6.938E-08
SW	56	7.426E-06	2.314E-06	7.457E-07	3.995E-07	2.557E-07	1.345E-07	8.588E-08	6.089E-08
WSW	36	6.558E-06	2.002E-06	6.620E-07	3.589E-07	2.306E-07	1.217E-07	7.783E-08	5.528E-08
W	81	1.535E-05	4.710E-06	1.475E-06	8.907E-07	5.800E-07	3.117E-07	1.827E-07	1.305E-07
WNW	65	1.515E-05	4.565E-06	1.613E-06	8.888E-07	5.782E-07	3.102E-07	2.197E-07	1.569E-07
NW	99	2.075E-05	6.280E-06	2.307E-06	1.262E-06	8.133E-07	4.309E-07	2.760E-07	1.963E-07
NNW	64	2.043E-05	5.976E-06	2.118E-06	1.181E-06	7.746E-07	4.198E-07	2.719E-07	1.953E-07
AVERAGE	2184	2.329E-05	6.918E-06	2.385E-06	1.314E-06	8.545E-07	4.621E-07	2.998E-07	2.154E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	130	1.976E-07	1.582E-07	1.306E-07	1.100E-07	9.449E-08	5.377E-08	3.634E-08	2.101E-08
NNE	247	2.973E-07	2.386E-07	1.974E-07	1.669E-07	1.438E-07	8.271E-08	5.622E-08	3.276E-08
NE	251	3.566E-07	2.874E-07	2.387E-07	2.024E-07	1.750E-07	1.015E-07	6.955E-08	4.104E-08
ENE	339	4.471E-07	3.592E-07	2.973E-07	2.511E-07	2.162E-07	1.238E-07	8.419E-08	4.918E-08
E	305	3.065E-07	2.455E-07	2.028E-07	1.709E-07	1.468E-07	8.349E-08	5.647E-08	3.274E-08
ESE	187	1.739E-07	1.387E-07	1.141E-07	9.590E-08	8.220E-08	4.647E-08	3.120E-08	1.783E-08
SE	140	1.363E-07	1.087E-07	9.840E-08	8.265E-08	7.079E-08	3.626E-08	2.430E-08	1.386E-08
SSE	58	3.960E-08	3.166E-08	2.611E-08	2.200E-08	1.888E-08	1.072E-08	7.222E-09	4.154E-09
S	42	3.206E-08	2.563E-08	2.113E-08	1.778E-08	1.524E-08	8.616E-09	5.797E-09	3.335E-09
SSW	84	5.255E-08	4.164E-08	3.411E-08	2.860E-08	2.445E-08	1.372E-08	9.137E-09	5.151E-09
SW	56	4.613E-08	3.654E-08	2.992E-08	2.507E-08	2.142E-08	1.199E-08	7.969E-09	4.475E-09
WSW	36	4.202E-08	3.335E-08	3.007E-08	2.517E-08	2.150E-08	1.092E-08	7.269E-09	4.103E-09
W	81	9.957E-08	7.936E-08	6.532E-08	5.498E-08	4.720E-08	2.685E-08	1.805E-08	1.029E-08
WNW	65	1.200E-07	9.569E-08	7.158E-08	6.017E-08	5.160E-08	2.921E-08	1.965E-08	1.126E-08
NW	99	1.495E-07	1.189E-07	9.748E-08	8.163E-08	6.976E-08	3.901E-08	2.600E-08	1.471E-08
NNW	64	1.504E-07	1.205E-07	9.955E-08	8.389E-08	7.209E-08	4.107E-08	2.780E-08	1.611E-08
AVERAGE	2184	1.655E-07	1.325E-07	1.097E-07	9.244E-08	7.946E-08	4.501E-08	3.045E-08	1.763E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	130	1.433E-08	1.072E-08	8.508E-09	7.010E-09	5.902E-09	5.092E-09	4.455E-09
NNE	247	2.246E-08	1.686E-08	1.344E-08	1.111E-08	9.379E-09	8.102E-09	7.100E-09
NE	251	2.832E-08	2.135E-08	1.708E-08	1.415E-08	1.197E-08	1.035E-08	9.080E-09
ENE	339	3.373E-08	2.532E-08	2.018E-08	1.668E-08	1.408E-08	1.217E-08	1.067E-08
E	305	2.240E-08	1.678E-08	1.335E-08	1.102E-08	9.299E-09	8.041E-09	7.050E-09
ESE	187	1.211E-08	9.033E-09	7.157E-09	5.890E-09	4.956E-09	4.276E-09	3.743E-09
SE	140	9.410E-09	7.012E-09	5.551E-09	4.567E-09	3.842E-09	3.318E-09	2.905E-09
SSE	58	2.840E-09	2.128E-09	1.692E-09	1.398E-09	1.180E-09	1.022E-09	8.982E-10
S	42	2.276E-09	1.703E-09	1.352E-09	1.116E-09	9.411E-10	8.146E-10	7.148E-10
SSW	84	3.488E-09	2.595E-09	2.052E-09	1.687E-09	1.420E-09	1.225E-09	1.074E-09
SW	56	3.019E-09	2.240E-09	1.768E-09	1.451E-09	1.218E-09	1.050E-09	9.187E-10
WSW	36	2.769E-09	2.054E-09	1.621E-09	1.330E-09	1.116E-09	9.621E-10	8.412E-10
W	81	6.978E-09	5.194E-09	4.111E-09	3.377E-09	2.836E-09	2.440E-09	2.130E-09
WNW	65	7.647E-09	5.698E-09	4.514E-09	3.711E-09	3.119E-09	2.687E-09	2.348E-09
NW	99	9.918E-09	7.353E-09	5.800E-09	4.755E-09	3.988E-09	3.434E-09	3.000E-09
NNW	64	1.099E-08	8.219E-09	6.527E-09	5.378E-09	4.528E-09	3.906E-09	3.416E-09
AVERAGE	2184	1.204E-08	9.016E-09	7.169E-09	5.914E-09	4.986E-09	4.306E-09	3.771E-09

Table B-5
Undepleted χ/Q Factors for Reactor Building Vent

PNPS 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
GROUND-LEVEL AVERAGE CHI/Q BEFORE DEPLETION (SPLIT-H MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	694	4.086E-05	1.201E-05	4.150E-06	2.295E-06	1.502E-06	8.174E-07	5.311E-07	3.823E-07
NNE	1408	5.838E-05	1.725E-05	5.856E-06	3.221E-06	2.103E-06	1.149E-06	7.496E-07	5.409E-07
NE	875	5.569E-05	1.629E-05	5.181E-06	2.818E-06	1.838E-06	1.034E-06	6.880E-07	5.033E-07
ENE	765	4.822E-05	1.410E-05	4.704E-06	2.594E-06	1.699E-06	9.383E-07	6.160E-07	4.466E-07
E	803	4.114E-05	1.206E-05	4.106E-06	2.256E-06	1.474E-06	8.052E-07	5.254E-07	3.794E-07
ESE	550	2.719E-05	7.988E-06	2.773E-06	1.524E-06	9.932E-07	5.392E-07	3.505E-07	2.524E-07
SE	456	2.018E-05	5.952E-06	2.123E-06	1.165E-06	7.564E-07	4.066E-07	2.628E-07	1.885E-07
SSE	244	1.007E-05	2.952E-06	1.027E-06	5.609E-07	3.649E-07	1.971E-07	1.279E-07	9.205E-08
S	199	5.709E-06	1.658E-06	5.372E-07	2.933E-07	1.908E-07	1.025E-07	6.624E-08	4.755E-08
SSW	435	1.275E-05	3.839E-06	1.202E-06	6.505E-07	4.212E-07	2.253E-07	1.454E-07	1.041E-07
SW	445	1.567E-05	4.790E-06	1.552E-06	8.432E-07	5.440E-07	2.888E-07	1.852E-07	1.318E-07
WSW	377	1.667E-05	5.074E-06	1.638E-06	8.843E-07	5.680E-07	3.007E-07	1.931E-07	1.376E-07
W	366	2.125E-05	6.390E-06	2.009E-06	1.200E-06	7.754E-07	4.180E-07	2.464E-07	1.769E-07
WNW	248	1.626E-05	4.806E-06	1.674E-06	9.223E-07	6.017E-07	3.263E-07	2.328E-07	1.674E-07
NW	319	2.314E-05	6.843E-06	2.441E-06	1.344E-06	8.740E-07	4.699E-07	3.036E-07	2.176E-07
NNW	288	2.466E-05	7.236E-06	2.492E-06	1.394E-06	9.190E-07	5.017E-07	3.259E-07	2.346E-07
AVERAGE	8472	2.737E-05	8.078E-06	2.717E-06	1.498E-06	9.766E-07	5.325E-07	3.469E-07	2.502E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	694	2.945E-07	2.364E-07	1.955E-07	1.650E-07	1.420E-07	8.133E-08	5.524E-08	3.217E-08
NNE	1408	4.170E-07	3.350E-07	2.773E-07	2.344E-07	2.020E-07	1.162E-07	7.909E-08	4.620E-08
NE	875	3.911E-07	3.164E-07	2.636E-07	2.244E-07	1.946E-07	1.140E-07	7.864E-08	4.689E-08
ENE	765	3.456E-07	2.784E-07	2.311E-07	1.958E-07	1.691E-07	9.789E-08	6.699E-08	3.946E-08
E	803	2.928E-07	2.354E-07	1.950E-07	1.649E-07	1.421E-07	8.172E-08	5.567E-08	3.259E-08
ESE	550	1.944E-07	1.560E-07	1.290E-07	1.089E-07	9.365E-08	5.356E-08	3.634E-08	2.115E-08
SE	456	1.447E-07	1.158E-07	1.051E-07	8.844E-08	7.590E-08	3.913E-08	2.639E-08	1.522E-08
SSE	244	7.089E-08	5.688E-08	4.703E-08	3.969E-08	3.413E-08	1.950E-08	1.322E-08	7.694E-09
S	199	3.659E-08	2.933E-08	2.423E-08	2.041E-08	1.752E-08	9.945E-09	6.719E-09	3.893E-09
SSW	435	7.970E-08	6.370E-08	5.253E-08	4.427E-08	3.801E-08	2.164E-08	1.461E-08	8.421E-09
SW	445	1.004E-07	7.981E-08	6.552E-08	5.497E-08	4.705E-08	2.647E-08	1.769E-08	1.003E-08
WSW	377	1.050E-07	8.360E-08	7.556E-08	6.344E-08	5.432E-08	2.783E-08	1.865E-08	1.064E-08
W	366	1.356E-07	1.084E-07	8.942E-08	7.537E-08	6.477E-08	3.690E-08	2.493E-08	1.441E-08
WNW	248	1.287E-07	1.031E-07	7.743E-08	6.530E-08	5.615E-08	3.205E-08	2.171E-08	1.260E-08
NW	319	1.670E-07	1.336E-07	1.101E-07	9.266E-08	7.952E-08	4.509E-08	3.041E-08	1.754E-08
NNW	288	1.809E-07	1.452E-07	1.202E-07	1.015E-07	8.737E-08	5.014E-08	3.408E-08	1.984E-08
AVERAGE	8472	1.928E-07	1.548E-07	1.286E-07	1.087E-07	9.364E-08	5.334E-08	3.627E-08	2.117E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	694	2.205E-08	1.653E-08	1.316E-08	1.087E-08	9.169E-09	7.919E-09	6.935E-09
NNE	1408	3.172E-08	2.383E-08	1.900E-08	1.570E-08	1.326E-08	1.146E-08	1.004E-08
NE	875	3.254E-08	2.465E-08	1.980E-08	1.646E-08	1.396E-08	1.210E-08	1.063E-08
ENE	765	2.719E-08	2.049E-08	1.638E-08	1.356E-08	1.147E-08	9.916E-09	8.696E-09
E	803	2.241E-08	1.685E-08	1.345E-08	1.112E-08	9.400E-09	8.130E-09	7.130E-09
ESE	550	1.449E-08	1.087E-08	8.658E-09	7.153E-09	6.037E-09	5.219E-09	4.575E-09
SE	456	1.038E-08	7.762E-09	6.163E-09	5.080E-09	4.281E-09	3.698E-09	3.240E-09
SSE	244	5.278E-09	3.963E-09	3.158E-09	2.611E-09	2.205E-09	1.909E-09	1.675E-09
S	199	2.666E-09	2.000E-09	1.592E-09	1.315E-09	1.111E-09	9.627E-10	8.456E-10
SSW	435	5.758E-09	4.314E-09	3.430E-09	2.831E-09	2.389E-09	2.066E-09	1.812E-09
SW	445	6.784E-09	5.042E-09	3.985E-09	3.272E-09	2.749E-09	2.368E-09	2.071E-09
WSW	377	7.226E-09	5.387E-09	4.268E-09	3.512E-09	2.956E-09	2.552E-09	2.235E-09
W	366	9.844E-09	7.371E-09	5.863E-09	4.838E-09	4.081E-09	3.526E-09	3.090E-09
WNW	248	8.615E-09	6.453E-09	5.133E-09	4.235E-09	3.571E-09	3.084E-09	2.700E-09
NW	319	1.196E-08	8.932E-09	7.089E-09	5.839E-09	4.917E-09	4.244E-09	3.715E-09
NNW	288	1.358E-08	1.018E-08	8.095E-09	6.677E-09	5.625E-09	4.851E-09	4.242E-09
AVERAGE	8472	1.453E-08	1.091E-08	8.701E-09	7.193E-09	6.074E-09	5.250E-09	4.602E-09

Table B-6
Depleted χ/Q Factors for Reactor Building Vent

PNPS 1ST QUARTER 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
GROUND-LEVEL AVERAGE CHI/Q AFTER DEPLETION (REGULATORY GUIDE 1.111 DEPLETION MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	151	3.154E-05	9.110E-06	2.980E-06	1.604E-06	1.033E-06	5.503E-07	3.491E-07	2.464E-07
NNE	237	3.961E-05	1.136E-05	3.761E-06	2.030E-06	1.308E-06	6.959E-07	4.413E-07	3.115E-07
NE	121	2.386E-05	6.928E-06	2.204E-06	1.195E-06	7.752E-07	4.161E-07	2.647E-07	1.872E-07
ENE	107	2.322E-05	6.735E-06	2.194E-06	1.188E-06	7.677E-07	4.088E-07	2.588E-07	1.824E-07
E	189	3.198E-05	9.257E-06	3.152E-06	1.698E-06	1.090E-06	5.732E-07	3.608E-07	2.532E-07
ESE	179	2.696E-05	7.802E-06	2.700E-06	1.444E-06	9.209E-07	4.815E-07	3.026E-07	2.121E-07
SE	189	2.716E-05	7.914E-06	2.809E-06	1.505E-06	9.590E-07	4.968E-07	3.102E-07	2.164E-07
SSE	77	1.141E-05	3.225E-06	1.148E-06	6.209E-07	3.985E-07	2.085E-07	1.308E-07	9.174E-08
S	84	9.472E-06	2.723E-06	8.686E-07	4.660E-07	2.981E-07	1.554E-07	9.740E-08	6.820E-08
SSW	200	1.842E-05	5.521E-06	1.711E-06	8.968E-07	5.667E-07	2.914E-07	1.816E-07	1.265E-07
SW	179	1.550E-05	4.706E-06	1.492E-06	7.859E-07	4.955E-07	2.535E-07	1.573E-07	1.090E-07
WSW	93	9.904E-06	2.980E-06	9.346E-07	4.898E-07	3.083E-07	1.578E-07	9.842E-08	6.856E-08
W	103	1.552E-05	4.665E-06	1.460E-06	8.560E-07	5.443E-07	2.816E-07	1.595E-07	1.110E-07
WNW	45	9.310E-06	2.739E-06	9.328E-07	4.980E-07	3.175E-07	1.668E-07	1.156E-07	8.112E-08
NW	39	1.078E-05	3.137E-06	1.080E-06	5.836E-07	3.750E-07	1.965E-07	1.233E-07	8.631E-08
NNW	88	1.822E-05	5.228E-06	1.838E-06	9.974E-07	6.409E-07	3.357E-07	2.106E-07	1.475E-07
AVERAGE	2081	2.018E-05	5.877E-06	1.954E-06	1.054E-06	6.749E-07	3.544E-07	2.226E-07	1.562E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	151	1.868E-07	1.477E-07	1.206E-07	1.007E-07	8.575E-08	4.637E-08	3.008E-08	1.634E-08
NNE	237	2.364E-07	1.870E-07	1.527E-07	1.274E-07	1.085E-07	5.858E-08	3.800E-08	2.066E-08
NE	121	1.421E-07	1.125E-07	9.198E-08	7.697E-08	6.566E-08	3.576E-08	2.329E-08	1.270E-08
ENE	107	1.382E-07	1.092E-07	8.910E-08	7.440E-08	6.333E-08	3.426E-08	2.223E-08	1.207E-08
E	189	1.913E-07	1.508E-07	1.226E-07	1.020E-07	8.659E-08	4.630E-08	2.981E-08	1.602E-08
ESE	179	1.600E-07	1.260E-07	1.023E-07	8.503E-08	7.205E-08	3.833E-08	2.460E-08	1.319E-08
SE	189	1.627E-07	1.276E-07	1.137E-07	9.419E-08	7.960E-08	3.816E-08	2.433E-08	1.290E-08
SSE	77	6.939E-08	5.471E-08	4.447E-08	3.692E-08	3.127E-08	1.659E-08	1.064E-08	5.712E-09
S	84	5.144E-08	4.049E-08	3.289E-08	2.731E-08	2.312E-08	1.227E-08	7.856E-09	4.195E-09
SSW	200	9.466E-08	7.413E-08	6.001E-08	4.976E-08	4.207E-08	2.226E-08	1.419E-08	7.500E-09
SW	179	8.126E-08	6.338E-08	5.113E-08	4.225E-08	3.563E-08	1.868E-08	1.182E-08	6.171E-09
WSW	93	5.133E-08	4.019E-08	3.578E-08	2.965E-08	2.506E-08	1.204E-08	7.656E-09	4.032E-09
W	103	8.304E-08	6.497E-08	5.255E-08	4.353E-08	3.680E-08	1.945E-08	1.238E-08	6.523E-09
WNW	45	6.107E-08	4.802E-08	3.545E-08	2.948E-08	2.500E-08	1.334E-08	8.551E-09	4.563E-09
NW	39	6.505E-08	5.118E-08	4.157E-08	3.453E-08	2.927E-08	1.559E-08	1.000E-08	5.339E-09
NNW	88	1.113E-07	8.764E-08	7.119E-08	5.910E-08	5.005E-08	2.659E-08	1.705E-08	9.122E-09
AVERAGE	2081	1.179E-07	9.285E-08	7.613E-08	6.333E-08	5.373E-08	2.841E-08	1.828E-08	9.815E-09

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	151	1.046E-08	7.418E-09	5.630E-09	4.460E-09	3.622E-09	3.026E-09	2.569E-09
NNE	237	1.322E-08	9.374E-09	7.113E-09	5.633E-09	4.574E-09	3.821E-09	3.244E-09
NE	121	8.139E-09	5.775E-09	4.387E-09	3.475E-09	2.821E-09	2.354E-09	1.997E-09
ENE	107	7.724E-09	5.473E-09	4.152E-09	3.287E-09	2.667E-09	2.226E-09	1.888E-09
E	189	1.019E-08	7.194E-09	5.439E-09	4.296E-09	3.480E-09	2.905E-09	2.464E-09
ESE	179	8.384E-09	5.914E-09	4.469E-09	3.530E-09	2.861E-09	2.390E-09	2.029E-09
SE	189	8.146E-09	5.718E-09	4.304E-09	3.388E-09	2.738E-09	2.284E-09	1.935E-09
SSE	77	3.629E-09	2.558E-09	1.932E-09	1.525E-09	1.235E-09	1.032E-09	8.759E-10
S	84	2.661E-09	1.874E-09	1.414E-09	1.116E-09	9.035E-10	7.548E-10	6.406E-10
SSW	200	4.748E-09	3.341E-09	2.519E-09	1.987E-09	1.609E-09	1.344E-09	1.141E-09
SW	179	3.874E-09	2.708E-09	2.031E-09	1.595E-09	1.287E-09	1.071E-09	9.072E-10
WSW	93	2.544E-09	1.786E-09	1.343E-09	1.058E-09	8.553E-10	7.135E-10	6.052E-10
W	103	4.110E-09	2.880E-09	2.165E-09	1.702E-09	1.373E-09	1.143E-09	9.671E-10
WNW	45	2.893E-09	2.036E-09	1.537E-09	1.213E-09	9.816E-10	8.186E-10	6.939E-10
NW	39	3.384E-09	2.381E-09	1.796E-09	1.416E-09	1.145E-09	9.541E-10	8.082E-10
NNW	88	5.782E-09	4.069E-09	3.069E-09	2.419E-09	1.956E-09	1.632E-09	1.382E-09
AVERAGE	2081	6.244E-09	4.406E-09	3.331E-09	2.631E-09	2.132E-09	1.779E-09	1.509E-09

Table B-6
Depleted χ/Q Factors for Reactor Building Vent

PNPS 2ND QUARTER 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
GROUND-LEVEL AVERAGE CHI/Q AFTER DEPLETION (REGULATORY GUIDE 1.111 DEPLETION MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	196	5.309E-05	1.535E-05	5.070E-06	2.743E-06	1.771E-06	9.392E-07	5.934E-07	4.177E-07
NNE	286	5.509E-05	1.594E-05	5.154E-06	2.752E-06	1.765E-06	9.446E-07	6.022E-07	4.264E-07
NE	167	4.264E-05	1.220E-05	3.749E-06	1.965E-06	1.252E-06	6.862E-07	4.458E-07	3.197E-07
ENE	134	3.490E-05	1.008E-05	3.252E-06	1.760E-06	1.139E-06	6.094E-07	3.872E-07	2.737E-07
E	157	3.327E-05	9.572E-06	3.127E-06	1.667E-06	1.069E-06	5.686E-07	3.613E-07	2.554E-07
ESE	87	2.288E-05	6.588E-06	2.182E-06	1.185E-06	7.672E-07	4.066E-07	2.566E-07	1.806E-07
SE	70	2.142E-05	6.092E-06	2.210E-06	1.191E-06	7.679E-07	4.101E-07	2.371E-07	1.678E-07
SSE	60	1.547E-05	4.493E-06	1.445E-06	7.000E-07	4.495E-07	2.393E-07	1.520E-07	1.074E-07
S	59	7.796E-06	2.212E-06	6.252E-07	3.319E-07	2.127E-07	1.114E-07	7.014E-08	4.932E-08
SSW	106	1.599E-05	4.683E-06	1.407E-06	7.564E-07	4.872E-07	2.566E-07	1.615E-07	1.133E-07
SW	162	2.754E-05	8.304E-06	2.535E-06	1.351E-06	8.622E-07	4.484E-07	2.803E-07	1.955E-07
WSW	133	2.854E-05	8.442E-06	2.603E-06	1.382E-06	8.792E-07	4.568E-07	2.860E-07	1.999E-07
W	82	3.057E-05	8.749E-06	2.596E-06	1.501E-06	9.526E-07	5.102E-07	2.972E-07	2.112E-07
WNW	96	2.786E-05	7.938E-06	2.654E-06	1.429E-06	9.194E-07	4.885E-07	3.406E-07	2.404E-07
NW	127	3.977E-05	1.139E-05	3.907E-06	2.106E-06	1.351E-06	7.113E-07	4.484E-07	3.153E-07
NNW	92	4.068E-05	1.179E-05	3.669E-06	2.020E-06	1.326E-06	7.153E-07	4.548E-07	3.216E-07
AVERAGE	2014	3.109E-05	8.989E-06	2.887E-06	1.553E-06	9.981E-07	5.314E-07	3.359E-07	2.372E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	196	3.163E-07	2.499E-07	2.038E-07	1.700E-07	1.446E-07	7.796E-08	5.049E-08	2.735E-08
NNE	286	3.236E-07	2.562E-07	2.093E-07	1.751E-07	1.492E-07	8.094E-08	5.262E-08	2.869E-08
NE	167	2.445E-07	1.948E-07	1.600E-07	1.346E-07	1.154E-07	6.351E-08	4.176E-08	2.321E-08
ENE	134	2.077E-07	1.645E-07	1.344E-07	1.124E-07	9.577E-08	5.199E-08	3.381E-08	1.842E-08
E	157	1.938E-07	1.534E-07	1.253E-07	1.047E-07	8.917E-08	4.824E-08	3.133E-08	1.707E-08
ESE	87	1.368E-07	1.082E-07	8.821E-08	7.357E-08	6.257E-08	3.374E-08	2.186E-08	1.184E-08
SE	70	1.276E-07	1.012E-07	9.094E-08	7.601E-08	6.474E-08	3.505E-08	2.278E-08	1.244E-08
SSE	60	8.144E-08	6.444E-08	5.263E-08	4.401E-08	3.750E-08	2.034E-08	1.322E-08	7.200E-09
S	59	3.736E-08	2.952E-08	2.407E-08	2.006E-08	1.702E-08	9.113E-09	5.881E-09	3.181E-09
SSW	106	8.553E-08	6.742E-08	5.488E-08	4.574E-08	3.885E-08	2.089E-08	1.347E-08	7.240E-09
SW	162	1.464E-07	1.147E-07	9.294E-08	7.716E-08	6.535E-08	3.479E-08	2.222E-08	1.174E-08
WSW	133	1.503E-07	1.181E-07	1.054E-07	8.755E-08	7.417E-08	3.590E-08	2.302E-08	1.230E-08
W	82	1.606E-07	1.274E-07	1.041E-07	8.713E-08	7.429E-08	4.026E-08	2.621E-08	1.439E-08
WNW	96	1.825E-07	1.444E-07	1.072E-07	8.942E-08	7.606E-08	4.099E-08	2.657E-08	1.446E-08
NW	127	2.386E-07	1.883E-07	1.533E-07	1.276E-07	1.083E-07	5.792E-08	3.735E-08	2.016E-08
NNW	92	2.445E-07	1.940E-07	1.588E-07	1.331E-07	1.136E-07	6.223E-08	4.066E-08	2.223E-08
AVERAGE	2014	1.799E-07	1.423E-07	1.166E-07	9.738E-08	8.291E-08	4.462E-08	2.895E-08	1.575E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	196	1.748E-08	1.237E-08	9.379E-09	7.420E-09	6.019E-09	5.024E-09	4.262E-09
NNE	286	1.841E-08	1.307E-08	9.938E-09	7.884E-09	6.410E-09	5.360E-09	4.555E-09
NE	167	1.505E-08	1.077E-08	8.245E-09	6.578E-09	5.374E-09	4.509E-09	3.846E-09
ENE	134	1.181E-08	8.376E-09	6.361E-09	5.040E-09	4.093E-09	3.417E-09	2.900E-09
E	157	1.096E-08	7.785E-09	5.918E-09	4.696E-09	3.820E-09	3.197E-09	2.719E-09
ESE	87	7.567E-09	5.356E-09	4.059E-09	3.211E-09	2.604E-09	2.173E-09	1.843E-09
SE	70	7.978E-09	5.665E-09	4.305E-09	3.413E-09	2.774E-09	2.320E-09	1.972E-09
SSE	60	4.621E-09	3.283E-09	2.496E-09	1.980E-09	1.610E-09	1.347E-09	1.145E-09
S	59	2.038E-09	1.446E-09	1.098E-09	8.706E-10	7.084E-10	5.942E-10	5.063E-10
SSW	106	4.613E-09	3.259E-09	2.466E-09	1.949E-09	1.579E-09	1.318E-09	1.118E-09
SW	162	7.417E-09	5.207E-09	3.920E-09	3.085E-09	2.492E-09	2.074E-09	1.755E-09
WSW	133	7.815E-09	5.510E-09	4.163E-09	3.286E-09	2.662E-09	2.222E-09	1.885E-09
W	82	9.264E-09	6.601E-09	5.031E-09	4.002E-09	3.262E-09	2.736E-09	2.332E-09
WNW	96	9.262E-09	6.569E-09	4.987E-09	3.951E-09	3.210E-09	2.685E-09	2.281E-09
NW	127	1.285E-08	9.081E-09	6.874E-09	5.434E-09	4.406E-09	3.681E-09	3.124E-09
NNW	92	1.426E-08	1.012E-08	7.693E-09	6.093E-09	4.943E-09	4.119E-09	3.490E-09
AVERAGE	2014	1.009E-08	7.155E-09	5.433E-09	4.306E-09	3.498E-09	2.924E-09	2.483E-09

Table B-6
Depleted χ/Q Factors for Reactor Building Vent

PNPS 3RD QUARTER 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
GROUND-LEVEL AVERAGE CHI/Q AFTER DEPLETION (REGULATORY GUIDE 1.111 DEPLETION MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	217	4.746E-05	1.378E-05	4.594E-06	2.470E-06	1.586E-06	8.369E-07	5.278E-07	3.711E-07
NNE	638	8.922E-05	2.609E-05	8.543E-06	4.594E-06	2.955E-06	1.561E-06	9.855E-07	6.931E-07
NE	336	9.783E-05	2.817E-05	8.373E-06	4.405E-06	2.823E-06	1.561E-06	1.018E-06	7.314E-07
ENE	185	6.610E-05	1.902E-05	5.830E-06	3.114E-06	2.008E-06	1.096E-06	7.075E-07	5.052E-07
E	152	5.107E-05	1.475E-05	4.580E-06	2.458E-06	1.589E-06	8.583E-07	5.494E-07	3.904E-07
ESE	97	3.100E-05	8.814E-06	2.829E-06	1.514E-06	9.746E-07	5.247E-07	3.358E-07	2.387E-07
SE	57	1.128E-05	3.293E-06	1.210E-06	6.437E-07	4.117E-07	2.151E-07	1.229E-07	8.624E-08
SSE	49	8.971E-06	2.604E-06	8.530E-07	4.089E-07	2.612E-07	1.367E-07	8.606E-08	6.050E-08
S	14	9.947E-07	2.685E-07	6.189E-08	3.095E-08	2.006E-08	1.084E-08	6.974E-09	5.017E-09
SSW	45	7.070E-06	2.009E-06	5.510E-07	2.897E-07	1.870E-07	9.980E-08	6.381E-08	4.546E-08
SW	48	1.126E-05	3.298E-06	1.055E-06	5.618E-07	3.571E-07	1.846E-07	1.151E-07	8.027E-08
WSW	115	2.021E-05	6.145E-06	1.903E-06	9.914E-07	6.226E-07	3.178E-07	1.976E-07	1.372E-07
W	100	2.163E-05	6.530E-06	1.983E-06	1.149E-06	7.285E-07	3.764E-07	2.335E-07	1.487E-07
WNW	42	1.162E-05	3.428E-06	1.118E-06	6.012E-07	3.874E-07	2.043E-07	1.414E-07	9.914E-08
NW	54	1.951E-05	5.734E-06	1.907E-06	1.021E-06	6.536E-07	3.421E-07	2.149E-07	1.507E-07
NNW	44	1.761E-05	5.109E-06	1.757E-06	9.506E-07	6.108E-07	3.203E-07	2.011E-07	1.409E-07
AVERAGE	2193	3.205E-05	9.315E-06	2.947E-06	1.575E-06	1.011E-06	5.404E-07	3.429E-07	2.428E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	217	2.806E-07	2.214E-07	1.803E-07	1.502E-07	1.276E-07	6.857E-08	4.430E-08	2.394E-08
NNE	638	5.241E-07	4.137E-07	3.371E-07	2.812E-07	2.391E-07	1.290E-07	8.350E-08	4.516E-08
NE	336	5.598E-07	4.466E-07	3.674E-07	3.099E-07	2.660E-07	1.475E-07	9.732E-08	5.425E-08
ENE	185	3.857E-07	3.069E-07	2.519E-07	2.118E-07	1.813E-07	9.980E-08	6.554E-08	3.625E-08
E	152	2.973E-07	2.361E-07	1.935E-07	1.623E-07	1.388E-07	7.606E-08	4.980E-08	2.740E-08
ESE	97	1.819E-07	1.445E-07	1.183E-07	9.916E-08	8.464E-08	4.612E-08	3.011E-08	1.654E-08
SE	57	6.510E-08	5.131E-08	4.594E-08	3.825E-08	3.247E-08	1.740E-08	1.122E-08	6.034E-09
SSE	49	4.577E-08	3.615E-08	2.948E-08	2.460E-08	2.091E-08	1.126E-08	7.288E-09	3.950E-09
S	14	3.892E-09	3.143E-09	2.613E-09	2.220E-09	1.908E-09	1.072E-09	7.223E-10	4.183E-10
SSW	45	3.484E-08	2.782E-08	2.290E-08	1.928E-08	1.651E-08	9.121E-09	6.017E-09	3.351E-09
SW	48	6.027E-08	4.726E-08	3.827E-08	3.170E-08	2.679E-08	1.413E-08	9.003E-09	4.772E-09
WSW	115	1.025E-07	8.007E-08	7.117E-08	5.893E-08	4.978E-08	2.388E-08	1.518E-08	7.996E-09
W	100	1.114E-07	8.723E-08	7.066E-08	5.865E-08	4.965E-08	2.640E-08	1.689E-08	8.964E-09
WNW	42	7.476E-08	5.891E-08	4.359E-08	3.633E-08	3.087E-08	1.663E-08	1.074E-08	5.784E-09
NW	54	1.137E-07	8.959E-08	7.288E-08	6.067E-08	5.151E-08	2.763E-08	1.783E-08	9.603E-09
NNW	44	1.063E-07	8.371E-08	6.803E-08	5.654E-08	4.793E-08	2.557E-08	1.643E-08	8.797E-09
AVERAGE	2193	1.842E-07	1.459E-07	1.196E-07	1.001E-07	8.536E-08	4.626E-08	3.012E-08	1.645E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	36.95	40.00	45.00	50.00
N	217	1.528E-08	1.081E-08	8.192E-09	6.480E-09	5.257E-09	4.389E-09	3.725E-09
NNE	638	2.885E-08	2.042E-08	1.548E-08	1.225E-08	9.933E-09	8.290E-09	7.032E-09
NE	336	3.523E-08	2.525E-08	1.934E-08	1.544E-08	1.261E-08	1.058E-08	9.015E-09
ENE	185	2.343E-08	1.673E-08	1.277E-08	1.017E-08	8.286E-09	6.935E-09	5.900E-09
E	152	1.767E-08	1.259E-08	9.602E-09	7.631E-09	6.212E-09	5.195E-09	4.417E-09
ESE	97	1.066E-08	7.593E-09	5.786E-09	4.598E-09	3.745E-09	3.136E-09	2.669E-09
SE	57	3.850E-09	2.724E-09	2.063E-09	1.632E-09	1.324E-09	1.107E-09	9.403E-10
SSE	49	2.535E-09	1.802E-09	1.369E-09	1.086E-09	8.842E-10	7.410E-10	6.311E-10
S	14	2.804E-10	2.057E-10	1.599E-10	1.294E-10	1.072E-10	9.118E-11	7.871E-11
SSW	45	2.184E-09	1.569E-09	1.202E-09	9.599E-10	7.852E-10	6.600E-10	5.637E-10
SW	48	3.017E-09	2.120E-09	1.597E-09	1.258E-09	1.018E-09	8.496E-10	7.207E-10
WSW	115	5.053E-09	3.551E-09	2.674E-09	2.107E-09	1.705E-09	1.424E-09	1.208E-09
W	100	5.684E-09	4.003E-09	3.021E-09	2.383E-09	1.930E-09	1.610E-09	1.366E-09
WNW	42	3.689E-09	2.608E-09	1.975E-09	1.561E-09	1.265E-09	1.055E-09	8.947E-10
NW	54	6.123E-09	4.327E-09	3.276E-09	2.589E-09	2.099E-09	1.751E-09	1.486E-09
NNW	44	5.583E-09	3.932E-09	2.968E-09	2.340E-09	1.893E-09	1.578E-09	1.337E-09
AVERAGE	2193	1.057E-08	7.515E-09	5.718E-09	4.538E-09	3.691E-09	3.087E-09	2.624E-09

Table B-6
Depleted χ/Q Factors for Reactor Building Vent

PNPS 4TH QUARTER 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
GROUND-LEVEL AVERAGE CHI/Q AFTER DEPLETION (REGULATORY GUIDE 1.111 DEPLETION MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	130	2.620E-05	7.602E-06	2.585E-06	1.397E-06	8.989E-07	4.723E-07	2.968E-07	2.081E-07
NNE	247	4.028E-05	1.183E-05	3.849E-06	2.050E-06	1.312E-06	6.978E-07	4.432E-07	3.127E-07
NE	251	4.805E-05	1.387E-05	4.405E-06	2.366E-06	1.525E-06	8.223E-07	5.257E-07	3.730E-07
ENE	339	5.969E-05	1.715E-05	5.734E-06	3.086E-06	1.982E-06	1.051E-06	6.652E-07	4.690E-07
E	305	4.147E-05	1.199E-05	4.074E-06	2.177E-06	1.393E-06	7.304E-07	4.596E-07	3.226E-07
ESE	187	2.379E-05	7.074E-06	2.407E-06	1.278E-06	8.141E-07	4.224E-07	2.641E-07	1.843E-07
SE	140	1.855E-05	5.466E-06	1.894E-06	1.006E-06	6.393E-07	3.309E-07	2.068E-07	1.444E-07
SSE	58	5.630E-06	1.662E-06	5.575E-07	2.913E-07	1.845E-07	9.536E-08	5.978E-08	4.184E-08
S	42	4.827E-06	1.399E-06	4.381E-07	2.326E-07	1.485E-07	7.723E-08	4.837E-08	3.384E-08
SSW	84	8.305E-06	2.551E-06	7.802E-07	4.057E-07	2.554E-07	1.306E-07	8.106E-08	5.617E-08
SW	56	7.162E-06	2.198E-06	6.815E-07	3.560E-07	2.242E-07	1.146E-07	7.114E-08	4.930E-08
WSW	36	6.324E-06	1.902E-06	6.051E-07	3.198E-07	2.022E-07	1.038E-07	6.447E-08	4.475E-08
W	81	1.481E-05	4.474E-06	1.348E-06	7.938E-07	5.085E-07	2.657E-07	1.513E-07	1.056E-07
WNW	65	1.461E-05	4.336E-06	1.474E-06	7.921E-07	5.069E-07	2.644E-07	1.819E-07	1.270E-07
NW	99	2.001E-05	5.965E-06	2.109E-06	1.124E-06	7.131E-07	3.873E-07	2.286E-07	1.589E-07
NNW	64	1.970E-05	5.676E-06	1.936E-06	1.053E-06	6.791E-07	3.579E-07	2.252E-07	1.581E-07
AVERAGE	2184	2.246E-05	6.572E-06	2.180E-06	1.171E-06	7.491E-07	3.940E-07	2.483E-07	1.744E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	130	1.571E-07	1.238E-07	1.007E-07	8.374E-08	7.104E-08	3.799E-08	2.445E-08	1.312E-08
NNE	247	2.364E-07	1.867E-07	1.522E-07	1.271E-07	1.082E-07	5.843E-08	3.782E-08	2.046E-08
NE	251	2.836E-07	2.249E-07	1.840E-07	1.541E-07	1.315E-07	7.171E-08	4.679E-08	2.564E-08
ENE	339	3.555E-07	2.810E-07	2.292E-07	1.911E-07	1.625E-07	8.750E-08	5.664E-08	3.072E-08
E	305	2.437E-07	1.921E-07	1.563E-07	1.301E-07	1.103E-07	5.899E-08	3.799E-08	2.045E-08
ESE	187	1.383E-07	1.085E-07	8.795E-08	7.301E-08	6.180E-08	3.284E-08	2.099E-08	1.114E-08
SE	140	1.084E-07	8.507E-08	7.585E-08	6.292E-08	5.322E-08	2.562E-08	1.635E-08	8.661E-09
SSE	58	3.149E-08	2.477E-08	2.013E-08	1.674E-08	1.419E-08	7.575E-09	4.859E-09	2.595E-09
S	42	2.549E-08	2.005E-08	1.629E-08	1.353E-08	1.146E-08	6.088E-09	3.900E-09	2.083E-09
SSW	84	4.179E-08	3.258E-08	2.630E-08	2.177E-08	1.838E-08	9.691E-09	6.147E-09	3.218E-09
SW	56	3.668E-08	2.859E-08	2.307E-08	1.908E-08	1.610E-08	8.471E-09	5.361E-09	2.795E-09
WSW	36	3.341E-08	2.609E-08	2.318E-08	1.916E-08	1.617E-08	7.716E-09	4.890E-09	2.563E-09
W	81	7.917E-08	6.209E-08	5.035E-08	4.185E-08	3.549E-08	1.897E-08	1.214E-08	6.427E-09
WNW	65	9.539E-08	7.486E-08	5.518E-08	4.580E-08	3.879E-08	2.064E-08	1.322E-08	7.032E-09
NW	99	1.189E-07	9.299E-08	7.514E-08	6.214E-08	5.245E-08	2.756E-08	1.749E-08	9.186E-09
NNW	64	1.196E-07	9.430E-08	7.674E-08	6.386E-08	5.420E-08	2.902E-08	1.870E-08	1.006E-08
AVERAGE	2184	1.316E-07	1.036E-07	8.453E-08	7.037E-08	5.974E-08	3.180E-08	2.048E-08	1.101E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	130	8.344E-09	5.884E-09	4.446E-09	3.509E-09	2.841E-09	2.369E-09	2.008E-09
NNE	247	1.307E-08	9.259E-09	7.024E-09	5.561E-09	4.515E-09	3.770E-09	3.201E-09
NE	251	1.648E-08	1.172E-08	8.924E-09	7.084E-09	5.762E-09	4.817E-09	4.093E-09
ENE	339	1.964E-08	1.391E-08	1.055E-08	8.349E-09	6.777E-09	5.662E-09	4.808E-09
E	305	1.304E-08	9.216E-09	6.976E-09	5.517E-09	4.476E-09	3.742E-09	3.178E-09
ESE	187	7.052E-09	4.961E-09	3.740E-09	2.948E-09	2.386E-09	1.990E-09	1.687E-09
SE	140	5.478E-09	3.850E-09	2.901E-09	2.286E-09	1.850E-09	1.544E-09	1.309E-09
SSE	58	1.653E-09	1.169E-09	8.844E-10	6.997E-10	5.683E-10	4.758E-10	4.049E-10
S	42	1.325E-09	9.351E-10	7.067E-10	5.585E-10	4.530E-10	3.790E-10	3.222E-10
SSW	84	2.030E-09	1.425E-09	1.072E-09	8.447E-10	6.834E-10	5.702E-10	4.839E-10
SW	56	1.757E-09	1.230E-09	9.237E-10	7.262E-10	5.864E-10	4.886E-10	4.141E-10
WSW	36	1.612E-09	1.128E-09	8.470E-10	6.656E-10	5.373E-10	4.477E-10	3.792E-10
W	81	4.062E-09	2.852E-09	2.148E-09	1.691E-09	1.365E-09	1.135E-09	9.601E-10
WNW	65	4.451E-09	3.129E-09	2.359E-09	1.858E-09	1.502E-09	1.250E-09	1.058E-09
NW	99	5.773E-09	4.038E-09	3.031E-09	2.380E-09	1.920E-09	1.598E-09	1.352E-09
NNW	64	6.398E-09	4.513E-09	3.411E-09	2.692E-09	2.179E-09	1.817E-09	1.540E-09
AVERAGE	2184	7.010E-09	4.951E-09	3.746E-09	2.961E-09	2.400E-09	2.003E-09	1.700E-09

Table B-6
Depleted χ/Q Factors for Reactor Building Vent

PNPS 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
GROUND-LEVEL AVERAGE CHI/Q AFTER DEPLETION (REGULATORY GUIDE 1.111 DEPLETION MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	694	3.941E-05	1.141E-05	3.793E-06	2.046E-06	1.317E-06	6.968E-07	4.399E-07	3.095E-07
NNE	1408	5.630E-05	1.638E-05	5.353E-06	2.871E-06	1.844E-06	9.796E-07	6.209E-07	4.379E-07
NE	875	5.371E-05	1.547E-05	4.735E-06	2.511E-06	1.612E-06	8.813E-07	5.699E-07	4.075E-07
ENE	765	4.650E-05	1.340E-05	4.299E-06	2.312E-06	1.490E-06	7.999E-07	5.102E-07	3.616E-07
E	803	3.968E-05	1.146E-05	3.753E-06	2.011E-06	1.292E-06	6.864E-07	4.352E-07	3.071E-07
ESE	550	2.622E-05	7.588E-06	2.535E-06	1.358E-06	8.707E-07	4.597E-07	2.903E-07	2.043E-07
SE	456	1.946E-05	5.654E-06	1.941E-06	1.038E-06	6.632E-07	3.466E-07	2.177E-07	1.526E-07
SSE	244	9.709E-06	2.804E-06	9.386E-07	4.999E-07	3.199E-07	1.681E-07	1.060E-07	7.452E-08
S	199	5.506E-06	1.575E-06	4.910E-07	2.613E-07	1.673E-07	8.737E-08	5.487E-08	3.850E-08
SSW	435	1.230E-05	3.647E-06	1.099E-06	5.797E-07	3.693E-07	1.921E-07	1.204E-07	8.425E-08
SW	445	1.511E-05	4.550E-06	1.418E-06	7.514E-07	4.769E-07	2.462E-07	1.534E-07	1.067E-07
WSW	377	1.608E-05	4.820E-06	1.497E-06	7.880E-07	4.980E-07	2.564E-07	1.599E-07	1.114E-07
W	366	2.050E-05	6.069E-06	1.837E-06	1.069E-06	6.798E-07	3.564E-07	2.041E-07	1.432E-07
WNW	248	1.569E-05	4.565E-06	1.530E-06	8.219E-07	5.275E-07	2.781E-07	1.929E-07	1.355E-07
NW	319	2.231E-05	6.500E-06	2.231E-06	1.198E-06	7.662E-07	4.006E-07	2.515E-07	1.761E-07
NNW	288	2.379E-05	6.873E-06	2.278E-06	1.243E-06	8.057E-07	4.277E-07	2.700E-07	1.899E-07
AVERAGE	8472	2.639E-05	7.673E-06	2.483E-06	1.335E-06	8.562E-07	4.539E-07	2.873E-07	2.025E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	694	2.342E-07	1.849E-07	1.507E-07	1.256E-07	1.068E-07	5.747E-08	3.716E-08	2.010E-08
NNE	1408	3.316E-07	2.621E-07	2.137E-07	1.785E-07	1.519E-07	8.209E-08	5.321E-08	2.886E-08
NE	875	3.110E-07	2.475E-07	2.032E-07	1.708E-07	1.463E-07	8.054E-08	5.290E-08	2.929E-08
ENE	765	2.748E-07	2.178E-07	1.781E-07	1.491E-07	1.272E-07	6.916E-08	4.506E-08	2.465E-08
E	803	2.328E-07	1.841E-07	1.503E-07	1.255E-07	1.068E-07	5.774E-08	3.745E-08	2.036E-08
ESE	550	1.546E-07	1.220E-07	9.941E-08	8.286E-08	7.041E-08	3.784E-08	2.444E-08	1.321E-08
SE	456	1.151E-07	9.062E-08	8.100E-08	6.733E-08	5.707E-08	2.765E-08	1.775E-08	9.509E-09
SSE	244	5.637E-08	4.450E-08	3.626E-08	3.022E-08	2.566E-08	1.378E-08	8.896E-09	4.806E-09
S	199	2.910E-08	2.295E-08	1.867E-08	1.554E-08	1.317E-08	7.027E-09	4.520E-09	2.432E-09
SSW	435	6.337E-08	4.984E-08	4.049E-08	3.370E-08	2.859E-08	1.529E-08	9.829E-09	5.260E-09
SW	445	7.982E-08	6.244E-08	5.051E-08	4.185E-08	3.537E-08	1.870E-08	1.190E-08	6.264E-09
WSW	377	8.348E-08	6.540E-08	5.825E-08	4.829E-08	4.084E-08	1.966E-08	1.254E-08	6.646E-09
W	366	1.078E-07	8.482E-08	6.893E-08	5.738E-08	4.870E-08	2.607E-08	1.677E-08	8.999E-09
WNW	248	1.023E-07	8.068E-08	5.969E-08	4.971E-08	4.222E-08	2.264E-08	1.461E-08	7.869E-09
NW	319	1.328E-07	1.045E-07	8.490E-08	7.054E-08	5.979E-08	3.186E-08	2.046E-08	1.096E-08
NNW	288	1.438E-07	1.136E-07	9.262E-08	7.724E-08	6.569E-08	3.542E-08	2.293E-08	1.239E-08
AVERAGE	8472	1.533E-07	1.211E-07	9.917E-08	8.276E-08	7.042E-08	3.768E-08	2.440E-08	1.322E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	694	1.283E-08	9.079E-09	6.879E-09	5.442E-09	4.414E-09	3.685E-09	3.126E-09
NNE	1408	1.846E-08	1.308E-08	9.927E-09	7.862E-09	6.382E-09	5.331E-09	4.525E-09
NE	875	1.894E-08	1.354E-08	1.035E-08	8.240E-09	6.721E-09	5.630E-09	4.793E-09
ENE	765	1.583E-08	1.125E-08	8.557E-09	6.789E-09	5.520E-09	4.614E-09	3.920E-09
E	803	1.304E-08	9.253E-09	7.027E-09	5.569E-09	4.525E-09	3.783E-09	3.214E-09
ESE	550	8.435E-09	5.970E-09	4.525E-09	3.581E-09	2.906E-09	2.428E-09	2.062E-09
SE	456	6.043E-09	4.262E-09	3.221E-09	2.543E-09	2.061E-09	1.721E-09	1.460E-09
SSE	244	3.072E-09	2.177E-09	1.650E-09	1.307E-09	1.062E-09	8.882E-10	7.551E-10
S	199	1.552E-09	1.098E-09	8.319E-10	6.585E-10	5.349E-10	4.480E-10	3.811E-10
SSW	435	3.351E-09	2.369E-09	1.793E-09	1.417E-09	1.150E-09	9.612E-10	8.167E-10
SW	445	3.949E-09	2.769E-09	2.082E-09	1.638E-09	1.323E-09	1.102E-09	9.333E-10
WSW	377	4.206E-09	2.958E-09	2.230E-09	1.758E-09	1.423E-09	1.187E-09	1.007E-09
W	366	5.730E-09	4.048E-09	3.064E-09	2.422E-09	1.964E-09	1.641E-09	1.393E-09
WNW	248	5.015E-09	3.544E-09	2.682E-09	2.120E-09	1.719E-09	1.435E-09	1.217E-09
NW	319	6.959E-09	4.905E-09	3.704E-09	2.923E-09	2.367E-09	1.975E-09	1.674E-09
NNW	288	7.906E-09	5.588E-09	4.230E-09	3.343E-09	2.708E-09	2.257E-09	1.912E-09
AVERAGE	8472	8.458E-09	5.993E-09	4.547E-09	3.601E-09	2.924E-09	2.443E-09	2.074E-09

Table B-7
Gamma χ/Q Factors for Reactor Building Vent

PNPS 1ST QUARTER 1998 GENERAL X/QS: GROUND-LEVEL
GROUND RELEASE
AVERAGE GAMMA DILUTION FACTORS (MET. AND ATOMIC ENERGY 1968 FINITE CLOUD SECTOR AVERAGE MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	151	7.355E-06	3.105E-06	1.327E-06	8.081E-07	5.711E-07	3.461E-07	2.415E-07	1.827E-07
NNE	237	8.939E-06	3.801E-06	1.657E-06	1.018E-06	7.192E-07	4.357E-07	3.040E-07	2.302E-07
NE	121	5.059E-06	2.174E-06	9.445E-07	5.836E-07	4.138E-07	2.508E-07	1.765E-07	1.339E-07
ENE	107	5.216E-06	2.230E-06	9.698E-07	5.967E-07	4.220E-07	2.557E-07	1.783E-07	1.348E-07
E	189	7.934E-06	3.353E-06	1.455E-06	8.873E-07	6.250E-07	3.761E-07	2.610E-07	1.966E-07
ESE	179	6.981E-06	2.937E-06	1.270E-06	7.694E-07	5.400E-07	3.232E-07	2.236E-07	1.681E-07
SE	189	7.319E-06	3.091E-06	1.352E-06	8.222E-07	5.761E-07	3.433E-07	2.367E-07	1.773E-07
SSE	77	2.981E-06	1.241E-06	5.384E-07	3.278E-07	2.315E-07	1.395E-07	9.691E-08	7.304E-08
S	84	2.669E-06	1.101E-06	4.215E-07	2.520E-07	1.772E-07	1.062E-07	7.349E-08	5.523E-08
SSW	200	5.991E-06	2.455E-06	8.978E-07	5.190E-07	3.595E-07	2.111E-07	1.443E-07	1.074E-07
SW	179	6.648E-06	1.964E-06	7.604E-07	4.531E-07	3.140E-07	1.842E-07	1.257E-07	9.336E-08
WSW	93	3.070E-06	1.279E-06	4.821E-07	2.824E-07	1.945E-07	1.135E-07	7.740E-08	5.771E-08
W	103	4.198E-06	1.795E-06	7.105E-07	4.740E-07	3.307E-07	1.959E-07	1.223E-07	9.126E-08
WNW	45	2.241E-06	9.604E-07	4.242E-07	2.605E-07	1.833E-07	1.102E-07	8.408E-08	6.321E-08
NW	39	2.716E-06	1.151E-06	5.027E-07	3.078E-07	2.171E-07	1.306E-07	9.058E-08	6.812E-08
NNW	88	4.401E-06	1.877E-06	8.411E-07	5.213E-07	3.682E-07	2.219E-07	1.541E-07	1.160E-07
AVERAGE	2081	5.107E-06	2.157E-06	9.096E-07	5.552E-07	3.902E-07	2.341E-07	1.619E-07	1.218E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	151	1.456E-07	1.202E-07	1.017E-07	8.757E-08	7.666E-08	4.632E-08	3.245E-08	1.963E-08
NNE	237	1.839E-07	1.519E-07	1.286E-07	1.109E-07	9.708E-08	5.872E-08	4.120E-08	2.500E-08
NE	121	1.071E-07	8.855E-08	7.509E-08	6.484E-08	5.689E-08	3.466E-08	2.442E-08	1.488E-08
ENE	107	1.074E-07	8.864E-08	7.500E-08	6.462E-08	5.657E-08	3.421E-08	2.398E-08	1.452E-08
E	189	1.563E-07	1.285E-07	1.084E-07	9.312E-08	8.130E-08	4.864E-08	3.383E-08	2.024E-08
ESE	179	1.333E-07	1.095E-07	9.222E-08	7.907E-08	6.892E-08	4.100E-08	2.840E-08	1.691E-08
SE	189	1.403E-07	1.149E-07	1.062E-07	9.086E-08	7.905E-08	4.245E-08	2.923E-08	1.723E-08
SSE	77	5.814E-08	4.785E-08	4.038E-08	3.465E-08	3.022E-08	1.801E-08	1.251E-08	7.489E-09
S	84	4.380E-08	3.595E-08	3.027E-08	2.594E-08	2.260E-08	1.342E-08	9.279E-09	5.504E-09
SSW	200	8.435E-08	6.871E-08	5.751E-08	4.906E-08	4.258E-08	2.496E-08	1.704E-08	9.883E-09
SW	179	7.319E-08	5.951E-08	4.973E-08	4.236E-08	3.672E-08	2.142E-08	1.456E-08	8.384E-09
WSW	93	4.542E-08	3.705E-08	3.415E-08	2.915E-08	2.532E-08	1.352E-08	9.246E-09	5.373E-09
W	103	7.186E-08	5.866E-08	4.918E-08	4.202E-08	3.652E-08	2.152E-08	1.475E-08	8.610E-09
WNW	45	5.008E-08	4.108E-08	3.145E-08	2.697E-08	2.352E-08	1.401E-08	9.699E-09	5.751E-09
NW	39	5.405E-08	4.439E-08	3.741E-08	3.209E-08	2.799E-08	1.669E-08	1.157E-08	6.884E-09
NNW	88	9.229E-08	7.592E-08	6.404E-08	5.496E-08	4.795E-08	2.861E-08	1.988E-08	1.188E-08
AVERAGE	2081	9.669E-08	7.945E-08	6.759E-08	5.801E-08	5.062E-08	2.989E-08	2.075E-08	1.239E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	151	1.377E-08	1.049E-08	8.443E-09	7.033E-09	5.978E-09	5.196E-09	4.576E-09
NNE	237	1.756E-08	1.339E-08	1.078E-08	8.986E-09	7.641E-09	6.645E-09	5.854E-09
NE	121	1.048E-08	8.012E-09	6.462E-09	5.392E-09	4.589E-09	3.990E-09	3.515E-09
ENE	107	1.019E-08	7.767E-09	6.253E-09	5.210E-09	4.429E-09	3.849E-09	3.389E-09
E	189	1.410E-08	1.069E-08	8.564E-09	7.111E-09	6.027E-09	5.229E-09	4.597E-09
ESE	179	1.174E-08	8.879E-09	7.104E-09	5.892E-09	4.990E-09	4.328E-09	3.804E-09
SE	189	1.189E-08	8.952E-09	7.136E-09	5.899E-09	4.983E-09	4.313E-09	3.784E-09
SSE	77	5.212E-09	3.947E-09	3.160E-09	2.622E-09	2.221E-09	1.928E-09	1.696E-09
S	84	3.814E-09	2.879E-09	2.300E-09	1.904E-09	1.611E-09	1.396E-09	1.226E-09
SSW	200	6.770E-09	5.070E-09	4.028E-09	3.321E-09	2.799E-09	2.417E-09	2.117E-09
SW	179	5.714E-09	4.262E-09	3.376E-09	2.776E-09	2.333E-09	2.011E-09	1.757E-09
WSW	93	3.682E-09	2.758E-09	2.190E-09	1.804E-09	1.520E-09	1.312E-09	1.148E-09
W	103	5.916E-09	4.438E-09	3.531E-09	2.913E-09	2.456E-09	2.121E-09	1.857E-09
WNW	45	3.988E-09	3.013E-09	2.408E-09	1.995E-09	1.688E-09	1.462E-09	1.283E-09
NW	39	4.779E-09	3.613E-09	2.889E-09	2.394E-09	2.026E-09	1.755E-09	1.541E-09
NNW	88	8.264E-09	6.256E-09	5.007E-09	4.153E-09	3.517E-09	3.050E-09	2.680E-09
AVERAGE	2081	8.618E-09	6.526E-09	5.227E-09	4.338E-09	3.675E-09	3.188E-09	2.802E-09

Table B-7
Gamma χ/Q Factors for Reactor Building Vent

PNPS 2ND QUARTER 1998 GENERAL X/QS: GROUND-LEVEL
GROUND RELEASE
AVERAGE GAMMA DILUTION FACTORS (MET. AND ATOMIC ENERGY 1968 FINITE CLOUD SECTOR AVERAGE MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	196	1.253E-05	5.308E-06	2.288E-06	1.399E-06	9.677E-07	5.971E-07	4.157E-07	3.140E-07
NNE	286	1.214E-05	5.166E-06	2.229E-06	1.362E-06	9.617E-07	5.837E-07	4.080E-07	3.091E-07
NE	167	7.869E-06	3.378E-06	1.459E-06	8.947E-07	6.329E-07	3.896E-07	2.754E-07	2.106E-07
ENE	134	7.691E-06	3.275E-06	1.414E-06	8.690E-07	6.158E-07	3.747E-07	2.621E-07	1.987E-07
E	157	8.308E-06	3.445E-06	1.428E-06	8.522E-07	5.999E-07	3.623E-07	2.523E-07	1.907E-07
ESE	87	5.497E-06	2.317E-06	9.932E-07	6.057E-07	4.280E-07	2.588E-07	1.802E-07	1.361E-07
SE	70	4.862E-06	2.045E-06	9.674E-07	5.908E-07	4.181E-07	2.543E-07	1.617E-07	1.227E-07
SSE	60	3.854E-06	1.604E-06	6.618E-07	3.584E-07	2.530E-07	1.519E-07	1.057E-07	7.985E-08
S	59	2.577E-06	1.016E-06	3.238E-07	1.834E-07	1.288E-07	7.727E-08	5.350E-08	4.021E-08
SSW	106	4.308E-06	1.788E-06	6.722E-07	4.007E-07	2.821E-07	1.695E-07	1.175E-07	8.840E-08
SW	162	7.588E-06	3.211E-06	1.238E-06	7.427E-07	5.190E-07	3.083E-07	2.121E-07	1.585E-07
WSW	133	7.833E-06	3.298E-06	1.271E-06	7.599E-07	5.288E-07	3.130E-07	2.150E-07	1.609E-07
W	82	6.686E-06	2.831E-06	1.111E-06	7.416E-07	5.210E-07	3.154E-07	2.004E-07	1.519E-07
WNW	96	6.514E-06	2.742E-06	1.183E-06	7.221E-07	5.101E-07	3.090E-07	2.372E-07	1.795E-07
NW	127	9.500E-06	4.030E-06	1.773E-06	1.088E-06	7.668E-07	4.618E-07	3.209E-07	2.422E-07
NNW	92	8.419E-06	3.618E-06	1.559E-06	9.679E-07	6.902E-07	4.232E-07	2.972E-07	2.261E-07
AVERAGE	2014	7.261E-06	3.067E-06	1.286E-06	7.837E-07	5.527E-07	3.344E-07	2.322E-07	1.756E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	196	2.502E-07	2.063E-07	1.744E-07	1.501E-07	1.314E-07	7.920E-08	5.541E-08	3.346E-08
NNE	286	2.466E-07	2.036E-07	1.724E-07	1.487E-07	1.302E-07	7.892E-08	5.539E-08	3.361E-08
NE	167	1.693E-07	1.406E-07	1.197E-07	1.038E-07	9.139E-08	5.629E-08	4.003E-08	2.479E-08
ENE	134	1.587E-07	1.312E-07	1.112E-07	9.591E-08	8.407E-08	5.106E-08	3.590E-08	2.183E-08
E	157	1.520E-07	1.253E-07	1.060E-07	9.126E-08	7.985E-08	4.817E-08	3.371E-08	2.038E-08
ESE	87	1.086E-07	8.957E-08	7.577E-08	6.524E-08	5.708E-08	3.444E-08	2.412E-08	1.458E-08
SE	70	9.821E-08	8.124E-08	7.57/E-08	6.536E-08	5.728E-08	3.474E-08	2.443E-08	1.488E-08
SSE	60	6.357E-08	5.239E-08	4.430E-08	3.814E-08	3.338E-08	2.015E-08	1.411E-08	8.517E-09
S	59	3.189E-08	2.618E-08	2.205E-08	1.890E-08	1.647E-08	9.799E-09	6.787E-09	4.041E-09
SSW	106	7.011E-08	5.759E-08	4.855E-08	4.168E-08	3.639E-08	2.179E-08	1.514E-08	9.024E-09
SW	162	1.249E-07	1.020E-07	8.559E-08	7.321E-08	6.369E-08	3.769E-08	2.590E-08	1.515E-08
WSW	133	1.272E-07	1.041E-07	9.624E-08	8.240E-08	7.174E-08	3.866E-08	2.667E-08	1.575E-08
W	82	1.213E-07	1.002E-07	8.489E-08	7.318E-08	6.410E-08	3.879E-08	2.724E-08	1.658E-08
WNW	96	1.433E-07	1.183E-07	9.107E-08	7.843E-08	6.864E-08	4.142E-08	2.903E-08	1.760E-08
NW	127	1.929E-07	1.589E-07	1.343E-07	1.154E-07	1.008E-07	6.045E-08	4.216E-08	2.537E-08
NNW	92	1.812E-07	1.502E-07	1.276E-07	1.104E-07	9.708E-08	5.956E-08	4.217E-08	2.586E-08
AVERAGE	2014	1.400E-07	1.155E-07	9.812E-08	8.451E-08	7.398E-08	4.445E-08	3.114E-08	1.884E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	196	2.344E-08	1.784E-08	1.434E-08	1.194E-08	1.014E-08	8.809E-09	7.754E-09
NNE	286	2.363E-08	1.803E-08	1.453E-08	1.212E-08	1.031E-08	8.969E-09	7.907E-09
NE	167	1.765E-08	1.360E-08	1.104E-08	9.268E-09	7.932E-09	6.929E-09	6.134E-09
ENE	134	1.536E-08	1.173E-08	9.455E-09	7.886E-09	6.709E-09	5.833E-09	5.140E-09
E	157	1.430E-08	1.089E-08	8.767E-09	7.306E-09	6.213E-09	5.404E-09	4.762E-09
ESE	87	1.022E-08	7.779E-09	6.255E-09	5.207E-09	4.423E-09	3.842E-09	3.382E-09
SE	70	1.048E-08	8.005E-09	6.452E-09	5.383E-09	4.581E-09	3.987E-09	3.516E-09
SSE	60	5.974E-09	4.552E-09	3.664E-09	3.053E-09	2.596E-09	2.257E-09	1.988E-09
S	59	2.809E-09	2.126E-09	1.703E-09	1.413E-09	1.198E-09	1.040E-09	9.154E-10
SSW	106	6.280E-09	4.757E-09	3.810E-09	3.162E-09	2.679E-09	2.322E-09	2.040E-09
SW	162	1.043E-08	7.836E-09	6.239E-09	5.152E-09	4.345E-09	3.752E-09	3.285E-09
WSW	133	1.090E-08	8.223E-09	6.571E-09	5.442E-09	4.604E-09	3.988E-09	3.501E-09
W	82	1.168E-08	8.925E-09	7.202E-09	6.017E-09	5.128E-09	4.470E-09	3.947E-09
WNW	96	1.236E-08	9.419E-09	7.582E-09	6.318E-09	5.373E-09	4.674E-09	4.120E-09
NW	127	1.772E-08	1.346E-08	1.080E-08	8.981E-09	7.622E-09	6.621E-09	5.828E-09
NNW	92	1.829E-08	1.401E-08	1.132E-08	9.459E-09	8.056E-09	7.005E-09	6.173E-09
AVERAGE	2014	1.322E-08	1.007E-08	8.109E-09	6.757E-09	5.745E-09	4.994E-09	4.400E-09

Table B-7
Gamma χ/Q Factors for Reactor Building Vent

PNPS 3RD QUARTER 1998 GENERAL X/QS: GROUND-LEVEL
GROUND RELEASE
AVERAGE GAMMA DILUTION FACTORS (MET. AND ATOMIC ENERGY 1968 FINITE CLOUD SECTOR AVERAGE MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	217	1.818E-05	7.231E-06	2.980E-06	1.768E-06	1.217E-06	7.083E-07	4.801E-07	3.556E-07
NNE	638	3.430E-05	1.365E-05	5.555E-06	3.285E-06	2.260E-06	1.314E-06	8.904E-07	6.598E-07
NE	336	2.784E-05	1.142E-05	4.646E-06	2.789E-06	1.941E-06	1.175E-06	8.197E-07	6.202E-07
ENE	185	2.002E-05	8.181E-06	3.371E-06	2.034E-06	1.417E-06	8.495E-07	5.884E-07	4.429E-07
E	152	1.752E-05	6.990E-06	2.801E-06	1.664E-06	1.154E-06	6.842E-07	4.699E-07	3.518E-07
ESE	97	1.110E-05	4.341E-06	1.746E-06	1.033E-06	7.163E-07	4.244E-07	2.915E-07	2.181E-07
SE	57	5.049E-06	1.935E-06	8.302E-07	4.768E-07	3.257E-07	1.873E-07	1.146E-07	8.447E-08
SSE	49	4.371E-06	1.626E-06	6.026E-07	3.060E-07	2.084E-07	1.195E-07	8.030E-08	5.917E-08
S	14	7.007E-07	2.270E-07	5.231E-08	2.411E-08	1.634E-08	9.409E-09	6.340E-09	4.689E-09
SSW	45	3.476E-06	1.252E-06	3.882E-07	2.094E-07	1.427E-07	8.257E-08	5.600E-08	4.176E-08
SW	48	5.021E-06	1.956E-06	7.264E-07	4.235E-07	2.890E-07	1.653E-07	1.107E-07	8.122E-08
WSW	115	9.850E-06	3.831E-06	1.366E-06	7.737E-07	5.195E-07	2.917E-07	1.929E-07	1.405E-07
W	100	9.897E-06	3.872E-06	1.387E-06	8.746E-07	5.924E-07	3.362E-07	2.038E-07	1.491E-07
WNW	42	4.705E-06	1.856E-06	7.418E-07	4.352E-07	2.996E-07	1.739E-07	1.293E-07	9.550E-08
NW	54	7.849E-06	3.121E-06	1.270E-06	7.460E-07	5.098E-07	2.935E-07	1.976E-07	1.459E-07
NNW	44	6.788E-06	2.717E-06	1.147E-06	6.873E-07	4.736E-07	2.749E-07	1.860E-07	1.375E-07
AVERAGE	2193	1.167E-05	4.638E-06	1.851E-06	1.096E-06	7.552E-07	4.430E-07	3.011E-07	2.243E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	217	2.792E-07	2.274E-07	1.903E-07	1.623E-07	1.409E-07	8.270E-08	5.690E-08	3.363E-08
NNE	638	5.182E-07	4.222E-07	3.535E-07	3.017E-07	2.621E-07	1.544E-07	1.064E-07	6.294E-08
NE	336	4.943E-07	4.079E-07	3.455E-07	2.984E-07	2.619E-07	1.597E-07	1.128E-07	6.924E-08
ENE	185	3.520E-07	2.897E-07	2.448E-07	2.108E-07	1.845E-07	1.116E-07	7.839E-08	4.773E-08
E	152	2.786E-07	2.286E-07	1.926E-07	1.654E-07	1.444E-07	8.669E-08	6.058E-08	3.658E-08
ESE	97	1.727E-07	1.416E-07	1.192E-07	1.022E-07	8.912E-08	5.316E-08	3.703E-08	2.230E-08
SE	57	6.604E-08	5.360E-08	4.919E-08	4.184E-08	3.622E-08	2.111E-08	1.443E-08	8.434E-09
SSE	49	4.625E-08	3.753E-08	3.131E-08	2.663E-08	2.305E-08	1.344E-08	9.188E-09	5.380E-09
S	14	3.688E-09	3.010E-09	2.525E-09	2.158E-09	1.877E-09	1.111E-09	7.737E-10	4.701E-10
SSW	45	3.304E-08	2.708E-08	2.280E-08	1.955E-08	1.705E-08	1.020E-08	7.116E-09	4.295E-09
SW	48	6.321E-08	5.109E-08	4.246E-08	3.596E-08	3.102E-08	1.782E-08	1.206E-08	6.948E-09
WSW	115	1.085E-07	8.720E-08	7.938E-08	6.705E-08	5.771E-08	2.994E-08	2.009E-08	1.140E-08
W	100	1.156E-07	9.317E-08	7.734E-08	6.552E-08	5.654E-08	3.258E-08	2.204E-08	1.265E-08
WNW	42	7.473E-08	6.072E-08	4.613E-08	3.931E-08	3.410E-08	2.001E-08	1.373E-08	8.066E-09
NW	54	1.143E-07	9.293E-08	7.766E-08	6.614E-08	5.734E-08	3.356E-08	2.302E-08	1.353E-08
NNW	44	1.078E-07	8.770E-08	7.330E-08	6.239E-08	5.406E-08	3.157E-08	2.163E-08	1.270E-08
AVERAGE	2193	1.768E-07	1.445E-07	1.218E-07	1.042E-07	9.074E-08	5.372E-08	3.726E-08	2.227E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	217	2.525E-08	1.753E-08	1.401E-08	1.161E-08	9.815E-09	8.497E-09	7.456E-09
NNE	638	4.356E-08	3.287E-08	2.628E-08	2.178E-08	1.842E-08	1.594E-08	1.398E-08
NE	336	4.898E-08	3.758E-08	3.044E-08	2.549E-08	2.176E-08	1.895E-08	1.673E-08
ENE	185	3.359E-08	2.566E-08	2.072E-08	1.730E-08	1.473E-08	1.280E-08	1.128E-08
E	152	2.562E-08	1.951E-08	1.571E-08	1.308E-08	1.112E-08	9.652E-09	8.494E-09
ESE	97	1.559E-08	1.186E-08	9.534E-09	7.937E-09	6.743E-09	5.857E-09	5.157E-09
SE	57	5.800E-09	4.358E-09	3.472E-09	2.869E-09	2.422E-09	2.095E-09	1.837E-09
SSE	49	3.706E-09	2.789E-09	2.225E-09	1.842E-09	1.557E-09	1.348E-09	1.183E-09
S	14	3.321E-10	2.549E-10	2.072E-10	1.743E-10	1.495E-10	1.311E-10	1.165E-10
SSW	45	3.010E-09	2.294E-09	1.848E-09	1.541E-09	1.311E-09	1.140E-09	1.004E-09
SW	48	4.734E-09	3.533E-09	2.800E-09	2.305E-09	1.940E-09	1.674E-09	1.465E-09
WSW	115	7.711E-09	5.726E-09	4.525E-09	3.715E-09	3.119E-09	2.686E-09	2.346E-09
W	100	8.615E-09	6.428E-09	5.099E-09	4.198E-09	3.532E-09	3.045E-09	2.663E-09
WNW	42	5.562E-09	4.187E-09	3.342E-09	2.765E-09	2.335E-09	2.018E-09	1.768E-09
NW	54	9.329E-09	7.022E-09	5.604E-09	4.635E-09	3.916E-09	3.387E-09	2.969E-09
NNW	44	8.741E-09	6.570E-09	5.234E-09	4.324E-09	3.649E-09	3.154E-09	2.764E-09
AVERAGE	2193	1.551E-08	1.176E-08	9.440E-09	7.847E-09	6.657E-09	5.773E-09	5.076E-09

Table B-7
Gamma χ/Q Factors for Reactor Building Vent

PNPS 4TH QUARTER 1998 GENERAL X/QS: GROUND-LEVEL
GROUND RELEASE
AVERAGE GAMMA DILUTION FACTORS (MET. AND ATOMIC ENERGY 1968 FINITE CLOUD SECTOR AVERAGE MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	130	6.522E-06	2.762E-06	1.199E-06	7.323E-07	5.159E-07	3.102E-07	2.151E-07	1.620E-07
NNE	247	9.091E-06	3.898E-06	1.694E-06	1.037E-06	7.300E-07	4.409E-07	3.070E-07	2.317E-07
NE	251	9.727E-06	4.190E-06	1.835E-06	1.136E-06	8.053E-07	4.922E-07	3.454E-07	2.624E-07
ENE	339	1.378E-05	5.855E-06	2.555E-06	1.566E-06	1.104E-06	6.671E-07	4.646E-07	3.513E-07
E	305	1.123E-05	4.656E-06	1.949E-06	1.163E-06	8.163E-07	4.889E-07	3.384E-07	2.544E-07
ESE	187	6.938E-06	2.886E-06	1.200E-06	7.105E-07	4.959E-07	2.942E-07	2.022E-07	1.512E-07
SE	140	5.538E-06	2.289E-06	9.499E-07	5.611E-07	3.917E-07	2.324E-07	1.598E-07	1.196E-07
SSE	58	1.930E-06	7.733E-07	2.980E-07	1.680E-07	1.163E-07	6.840E-08	4.685E-08	3.501E-08
S	42	1.524E-06	6.151E-07	2.235E-07	1.296E-07	9.087E-08	5.423E-08	3.742E-08	2.802E-08
SSW	84	2.848E-06	1.167E-06	4.214E-07	2.415E-07	1.669E-07	9.759E-08	6.636E-08	4.912E-08
SW	56	2.351E-06	9.739E-07	3.604E-07	2.095E-07	1.449E-07	8.485E-08	5.778E-08	4.283E-08
WSW	36	1.876E-06	7.894E-07	3.057E-07	1.825E-07	1.269E-07	7.475E-08	5.112E-08	3.804E-08
W	81	3.921E-06	1.668E-06	6.463E-07	4.291E-07	3.008E-07	1.794E-07	1.125E-07	8.420E-08
WNW	65	3.694E-06	1.585E-06	6.960E-07	4.259E-07	2.986E-07	1.781E-07	1.351E-07	1.012E-07
NW	99	5.412E-06	2.318E-06	1.025E-06	6.250E-07	4.360E-07	2.580E-07	1.771E-07	1.322E-07
NNW	64	4.625E-06	1.975E-06	8.752E-07	5.414E-07	3.826E-07	2.310E-07	1.607E-07	1.213E-07
AVERAGE	2184	5.688E-06	2.400E-06	1.015E-06	6.161E-07	4.327E-07	2.595E-07	1.798E-07	1.353E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	130	1.287E-07	1.059E-07	8.931E-08	7.670E-08	6.696E-08	4.007E-08	2.786E-08	1.666E-08
NNE	247	1.842E-07	1.516E-07	1.281E-07	1.102E-07	9.637E-08	5.806E-08	4.053E-08	2.435E-08
NE	251	2.099E-07	1.737E-07	1.474E-07	1.274E-07	1.118E-07	6.817E-08	4.810E-08	2.940E-08
ENE	339	2.802E-07	2.311E-07	1.955E-07	1.683E-07	1.472E-07	8.875E-08	6.211E-08	3.754E-08
E	305	2.019E-07	1.659E-07	1.398E-07	1.200E-07	1.046E-07	6.241E-08	4.331E-08	2.584E-08
ESE	187	1.192E-07	9.742E-08	8.177E-08	6.992E-08	6.082E-08	3.593E-08	2.469E-08	1.448E-08
SE	140	9.436E-08	7.715E-08	7.124E-08	6.091E-08	5.296E-08	2.841E-08	1.952E-08	1.143E-08
SSE	58	2.760E-08	2.255E-08	1.892E-08	1.617E-08	1.406E-08	8.302E-09	5.701E-09	3.337E-09
S	42	2.214E-08	1.812E-08	1.523E-08	1.303E-08	1.133E-08	6.698E-09	4.611E-09	2.716E-09
SSW	84	3.833E-08	3.106E-08	2.589E-08	2.201E-08	1.905E-08	1.107E-08	7.487E-09	4.270E-09
SW	56	3.347E-08	2.715E-08	2.265E-08	1.927E-08	1.669E-08	9.709E-09	6.576E-09	3.756E-09
WSW	36	2.987E-08	2.432E-08	2.238E-08	1.908E-08	1.655E-08	8.795E-09	5.994E-09	3.468E-09
W	81	6.641E-08	5.430E-08	4.561E-08	3.906E-08	3.402E-08	2.022E-08	1.393E-08	8.175E-09
WNW	65	8.001E-08	6.553E-08	5.009E-08	4.290E-08	3.737E-08	2.219E-08	1.532E-08	9.053E-09
NW	99	1.042E-07	8.504E-08	7.130E-08	6.089E-08	5.280E-08	3.108E-08	2.128E-08	1.241E-08
NNW	64	9.661E-08	7.960E-08	6.726E-08	5.783E-08	5.054E-08	3.035E-08	2.117E-08	1.273E-08
AVERAGE	2184	1.073E-07	8.816E-08	7.453E-08	6.398E-08	5.583E-08	3.314E-08	2.301E-08	1.373E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	130	1.161E-08	8.794E-09	7.045E-09	5.848E-09	4.955E-09	4.297E-09	3.776E-09
NNE	247	1.703E-08	1.295E-08	1.040E-08	8.655E-09	7.349E-09	6.380E-09	5.615E-09
NE	251	2.076E-08	1.590E-08	1.284E-08	1.073E-08	9.147E-09	7.963E-09	7.026E-09
ENE	339	2.631E-08	2.003E-08	1.611E-08	1.341E-08	1.140E-08	9.905E-09	8.724E-09
E	305	1.798E-08	1.362E-08	1.091E-08	9.054E-09	7.674E-09	6.659E-09	5.856E-09
ESE	187	9.973E-09	7.499E-09	5.975E-09	4.937E-09	4.167E-09	3.603E-09	3.158E-09
SE	140	7.873E-09	5.916E-09	4.710E-09	3.889E-09	3.281E-09	2.838E-09	2.487E-09
SSE	58	2.299E-09	1.729E-09	1.378E-09	1.139E-09	9.617E-10	8.322E-10	7.301E-10
S	42	1.876E-09	1.413E-09	1.127E-09	9.325E-10	7.883E-10	6.828E-10	5.994E-10
SSW	84	2.899E-09	2.157E-09	1.706E-09	1.402E-09	1.177E-09	1.014E-09	8.855E-10
SW	56	2.551E-09	1.898E-09	1.500E-09	1.232E-09	1.034E-09	8.902E-10	7.771E-10
WSW	36	2.370E-09	1.771E-09	1.405E-09	1.156E-09	9.732E-10	8.397E-10	7.345E-10
W	81	5.640E-09	4.244E-09	3.383E-09	2.796E-09	2.359E-09	2.037E-09	1.784E-09
WNW	65	6.263E-09	4.723E-09	3.773E-09	3.123E-09	2.640E-09	2.285E-09	2.004E-09
NW	99	8.519E-09	6.385E-09	5.073E-09	4.183E-09	3.524E-09	3.044E-09	2.664E-09
NNW	64	8.890E-09	6.749E-09	5.414E-09	4.498E-09	3.815E-09	3.310E-09	2.911E-09
AVERAGE	2184	9.552E-09	7.235E-09	5.797E-09	4.812E-09	4.078E-09	3.536E-09	3.108E-09

Table B-7
Gamma χ/Q Factors for Reactor Building Vent

PNPS 1998 GENERAL X/QS: GROUND-LEVEL
GROUND RELEASE
AVERAGE GAMMA DILUTION FACTORS (MET. AND ATOMIC ENERGY 1968 FINITE CLOUD SECTOR AVERAGE MODEL) -- (SEC/M3)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .13	.25	.50	.75	1.00	1.50	2.00	2.50
N	694	1.492E-05	5.952E-06	2.445E-06	1.455E-06	1.004E-06	5.863E-07	3.982E-07	2.953E-07
NNE	1408	2.069E-05	8.274E-06	3.401E-06	2.022E-06	1.394E-06	8.150E-07	5.546E-07	4.120E-07
NE	875	1.629E-05	6.600E-06	2.727E-06	1.638E-06	1.138E-06	6.825E-07	4.730E-07	3.560E-07
ENE	765	1.578E-05	6.358E-06	2.633E-06	1.580E-06	1.096E-06	6.477E-07	4.440E-07	3.316E-07
E	803	1.517E-05	5.965E-06	2.410E-06	1.421E-06	9.799E-07	5.730E-07	3.899E-07	2.897E-07
ESE	550	1.036E-05	4.066E-06	1.653E-06	9.736E-07	6.702E-07	3.900E-07	2.645E-07	1.960E-07
SE	456	8.132E-06	3.179E-06	1.298E-06	7.616E-07	5.221E-07	3.013E-07	2.033E-07	1.500E-07
SSE	244	4.220E-06	1.614E-06	6.334E-07	3.654E-07	2.505E-07	1.448E-07	9.786E-08	7.233E-08
S	199	2.620E-06	9.778E-07	3.420E-07	1.948E-07	1.336E-07	7.704E-08	5.191E-08	3.825E-08
SSW	435	5.809E-06	2.215E-06	7.709E-07	4.371E-07	2.973E-07	1.698E-07	1.138E-07	8.350E-08
SW	445	6.754E-06	2.665E-06	9.815E-07	5.701E-07	3.876E-07	2.208E-07	1.475E-07	1.079E-07
WSW	377	7.323E-06	2.870E-06	1.044E-06	6.010E-07	4.064E-07	2.302E-07	1.534E-07	1.123E-07
W	366	8.264E-06	3.282E-06	1.214E-06	7.808E-07	5.331E-07	3.072E-07	1.883E-07	1.388E-07
WNW	248	6.035E-06	2.402E-06	9.929E-07	5.897E-07	4.062E-07	2.363E-07	1.762E-07	1.304E-07
NW	319	8.832E-06	3.521E-06	1.472E-06	8.739E-07	5.994E-07	3.463E-07	2.336E-07	1.725E-07
NNW	288	8.598E-06	3.458E-06	1.448E-06	8.735E-07	6.064E-07	3.560E-07	2.424E-07	1.802E-07
AVERAGE	8472	9.987E-06	3.964E-06	1.592E-06	9.461E-07	6.516E-07	3.803E-07	2.583E-07	1.917E-07

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	694	2.321E-07	1.892E-07	1.585E-07	1.353E-07	1.174E-07	6.911E-08	4.763E-08	2.820E-08
NNE	1408	3.241E-07	2.644E-07	2.217E-07	1.894E-07	1.647E-07	9.730E-08	6.721E-08	3.992E-08
NE	875	2.828E-07	2.327E-07	1.966E-07	1.692E-07	1.481E-07	8.953E-08	6.287E-08	3.828E-08
ENE	765	2.621E-07	2.147E-07	1.806E-07	1.548E-07	1.349E-07	8.042E-08	5.595E-08	3.360E-08
E	803	2.280E-07	1.860E-07	1.560E-07	1.332E-07	1.158E-07	6.836E-08	4.722E-08	2.807E-08
ESE	550	1.539E-07	1.253E-07	1.048E-07	8.938E-08	7.755E-08	4.550E-08	3.129E-08	1.847E-08
SE	456	1.173E-07	9.526E-08	8.744E-08	7.433E-08	6.433E-08	3.401E-08	2.322E-08	1.357E-08
SSE	244	5.668E-08	4.609E-08	3.851E-08	3.278E-08	2.841E-08	1.660E-08	1.138E-08	6.689E-09
S	199	2.990E-08	2.426E-08	2.022E-08	1.717E-08	1.485E-08	8.601E-09	5.861E-09	3.419E-09
SSW	435	6.497E-08	5.253E-08	4.371E-08	3.710E-08	3.206E-08	1.858E-08	1.263E-08	7.309E-09
SW	445	8.363E-08	6.741E-08	5.593E-08	4.734E-08	4.083E-08	2.346E-08	1.583E-08	9.049E-09
WSW	377	8.713E-08	7.029E-08	6.419E-08	5.436E-08	4.689E-08	2.450E-08	1.656E-08	9.504E-09
W	366	1.084E-07	8.790E-08	7.331E-08	6.236E-08	5.401E-08	3.149E-08	2.151E-08	1.256E-08
WNW	248	1.023E-07	8.322E-08	6.327E-08	5.392E-08	4.677E-08	2.741E-08	1.883E-08	1.109E-08
NW	319	1.350E-07	1.097E-07	9.159E-08	7.790E-08	6.746E-08	3.929E-08	2.687E-08	1.573E-08
NNW	288	1.419E-07	1.159E-07	9.722E-08	8.306E-08	7.221E-08	4.267E-08	2.950E-08	1.753E-08
AVERAGE	8472	1.506E-07	1.228E-07	1.033E-07	8.823E-08	7.665E-08	4.480E-08	3.090E-08	1.831E-08

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	694	1.952E-08	1.473E-08	1.178E-08	9.756E-09	8.253E-09	7.145E-09	6.269E-09
NNE	1408	2.769E-08	2.094E-08	1.676E-08	1.390E-08	1.177E-08	1.020E-08	8.954E-09
NE	875	2.694E-08	2.059E-08	1.663E-08	1.389E-08	1.183E-08	1.029E-08	9.075E-09
ENE	765	2.344E-08	1.780E-08	1.430E-08	1.189E-08	1.009E-08	8.757E-09	7.701E-09
E	803	1.947E-08	1.473E-08	1.179E-08	9.786E-09	8.289E-09	7.184E-09	6.311E-09
ESE	550	1.276E-08	9.625E-09	7.690E-09	6.369E-09	5.386E-09	4.664E-09	4.093E-09
SE	456	9.322E-09	6.999E-09	5.571E-09	4.601E-09	3.882E-09	3.357E-09	2.942E-09
SSE	244	4.613E-09	3.473E-09	2.772E-09	2.294E-09	1.939E-09	1.679E-09	1.474E-09
S	199	2.347E-09	1.762E-09	1.402E-09	1.158E-09	9.775E-10	8.461E-10	7.421E-10
SSW	435	5.002E-09	3.746E-09	2.978E-09	2.457E-09	2.071E-09	1.788E-09	1.566E-09
SW	445	6.144E-09	4.574E-09	3.619E-09	2.973E-09	2.497E-09	2.151E-09	1.878E-09
WSW	377	6.468E-09	4.824E-09	3.823E-09	3.146E-09	2.646E-09	2.282E-09	1.996E-09
W	366	8.638E-09	6.490E-09	5.174E-09	4.277E-09	3.612E-09	3.123E-09	2.738E-09
WNW	248	7.656E-09	5.767E-09	4.605E-09	3.811E-09	3.221E-09	2.787E-09	2.444E-09
NW	319	1.082E-08	8.126E-09	6.472E-09	5.347E-09	4.512E-09	3.901E-09	3.419E-09
NNW	288	1.215E-08	9.174E-09	7.337E-09	6.079E-09	5.141E-09	4.448E-09	3.901E-09
AVERAGE	8472	1.269E-08	9.584E-09	7.669E-09	6.359E-09	5.383E-09	4.663E-09	4.094E-09

Table B-8
Deposition D/Q Factors for Reactor Building Vent

PNPS 1ST QUARTER 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
AVERAGE DEPOSITION RATES (REGULATORY GUIDE 1.111 MODEL) -- (1/M2)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	151	1.227E-07	4.127E-08	1.394E-08	7.355E-09	4.551E-09	2.201E-09	1.343E-09	9.149E-10
NNE	237	1.926E-07	6.478E-08	2.188E-08	1.154E-08	7.143E-09	3.454E-09	2.107E-09	1.436E-09
NE	121	9.835E-08	3.307E-08	1.117E-08	5.894E-09	3.647E-09	1.763E-09	1.076E-09	7.332E-10
ENE	107	8.697E-08	2.925E-08	9.877E-09	5.212E-09	3.225E-09	1.559E-09	9.514E-10	6.483E-10
E	189	1.536E-07	5.166E-08	1.745E-08	9.206E-09	5.696E-09	2.754E-09	1.681E-09	1.145E-09
ESE	179	1.455E-07	4.893E-08	1.652E-08	8.719E-09	5.395E-09	2.609E-09	1.592E-09	1.085E-09
SE	189	1.536E-07	5.166E-08	1.745E-08	9.206E-09	5.696E-09	2.754E-09	1.681E-09	1.145E-09
SSE	77	6.259E-08	2.105E-08	7.108E-09	3.751E-09	2.321E-09	1.122E-09	6.847E-10	4.666E-10
S	84	7.510E-08	2.526E-08	7.754E-09	4.092E-09	2.532E-09	1.224E-09	7.469E-10	5.090E-10
SSW	200	1.788E-07	6.014E-08	1.846E-08	9.742E-09	6.028E-09	2.915E-09	1.778E-09	1.212E-09
SW	179	1.600E-07	5.382E-08	1.652E-08	8.719E-09	5.395E-09	2.609E-09	1.592E-09	1.085E-09
WSW	93	8.315E-08	2.796E-08	8.585E-09	4.530E-09	2.803E-09	1.355E-09	8.269E-10	5.635E-10
W	103	9.209E-08	3.097E-08	9.508E-09	5.519E-09	3.415E-09	1.651E-09	9.158E-10	6.241E-10
WNW	45	3.658E-08	1.230E-08	4.154E-09	2.192E-09	1.356E-09	6.558E-10	4.401E-10	2.999E-10
NW	39	3.170E-08	1.066E-08	3.600E-09	1.900E-09	1.175E-09	5.684E-10	3.468E-10	2.363E-10
NNW	88	7.153E-08	2.405E-08	8.123E-09	4.287E-09	2.652E-09	1.283E-09	7.825E-10	5.332E-10
AVERAGE	2081	1.091E-07	3.668E-08	1.201E-08	6.367E-09	3.939E-09	1.905E-09	1.159E-09	7.898E-10

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	151	6.695E-10	5.121E-10	4.049E-10	3.254E-10	2.685E-10	1.346E-10	8.277E-11	4.084E-11
NNE	237	1.051E-09	8.037E-10	6.355E-10	5.107E-10	4.214E-10	2.113E-10	1.299E-10	6.410E-11
NE	121	5.365E-10	4.103E-10	3.245E-10	2.607E-10	2.151E-10	1.079E-10	6.633E-11	3.272E-11
ENE	107	4.744E-10	3.629E-10	2.869E-10	2.306E-10	1.902E-10	9.538E-11	5.865E-11	2.894E-11
E	189	8.379E-10	6.409E-10	5.068E-10	4.073E-10	3.360E-10	1.685E-10	1.036E-10	5.112E-11
ESE	179	7.936E-10	6.070E-10	4.800E-10	3.857E-10	3.182E-10	1.596E-10	9.812E-11	4.841E-11
SE	189	8.379E-10	6.409E-10	5.575E-10	4.480E-10	3.696E-10	1.685E-10	1.036E-10	5.112E-11
SSE	77	3.414E-10	2.611E-10	2.065E-10	1.659E-10	1.369E-10	6.864E-11	4.221E-11	2.082E-11
S	84	3.724E-10	2.849E-10	2.252E-10	1.810E-10	1.493E-10	7.488E-11	4.604E-11	2.272E-11
SSW	200	8.867E-10	6.782E-10	5.363E-10	4.310E-10	3.556E-10	1.783E-10	1.096E-10	5.409E-11
SW	179	7.936E-10	6.070E-10	4.800E-10	3.857E-10	3.182E-10	1.596E-10	9.812E-11	4.841E-11
WSW	93	4.123E-10	3.154E-10	2.743E-10	2.204E-10	1.819E-10	8.290E-11	5.098E-11	2.515E-11
W	103	4.567E-10	3.493E-10	2.762E-10	2.219E-10	1.831E-10	9.182E-11	5.646E-11	2.786E-11
WNW	45	2.195E-10	1.679E-10	1.207E-10	9.697E-11	8.001E-11	4.011E-11	2.467E-11	1.217E-11
NW	39	1.729E-10	1.323E-10	1.046E-10	8.404E-11	6.934E-11	3.476E-11	2.138E-11	1.055E-11
NNW	88	3.902E-10	2.984E-10	2.360E-10	1.896E-10	1.565E-10	7.844E-11	4.824E-11	2.380E-11
AVERAGE	2081	5.779E-10	4.420E-10	3.535E-10	2.841E-10	2.344E-10	1.159E-10	7.129E-11	3.518E-11

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	151	2.510E-11	1.690E-11	1.191E-11	8.928E-12	6.945E-12	5.680E-12	4.716E-12
NNE	237	3.940E-11	2.652E-11	1.869E-11	1.401E-11	1.090E-11	8.915E-12	7.403E-12
NE	121	2.011E-11	1.354E-11	9.542E-12	7.155E-12	5.565E-12	4.552E-12	3.779E-12
ENE	107	1.779E-11	1.198E-11	8.438E-12	6.327E-12	4.922E-12	4.025E-12	3.342E-12
E	189	3.142E-11	2.115E-11	1.490E-11	1.118E-11	8.693E-12	7.110E-12	5.903E-12
ESE	179	2.976E-11	2.003E-11	1.412E-11	1.058E-11	8.233E-12	6.733E-12	5.591E-12
SE	189	3.142E-11	2.115E-11	1.490E-11	1.118E-11	8.693E-12	7.110E-12	5.903E-12
SSE	77	1.280E-11	8.618E-12	6.072E-12	4.553E-12	3.542E-12	2.896E-12	2.405E-12
S	84	1.396E-11	9.401E-12	6.624E-12	4.967E-12	3.864E-12	3.160E-12	2.624E-12
SSW	200	3.325E-11	2.238E-11	1.577E-11	1.183E-11	9.199E-12	7.523E-12	6.247E-12
SW	179	2.976E-11	2.003E-11	1.412E-11	1.058E-11	8.233E-12	6.733E-12	5.591E-12
WSW	93	1.546E-11	1.041E-11	7.334E-12	5.499E-12	4.278E-12	3.498E-12	2.905E-12
W	103	1.712E-11	1.153E-11	8.122E-12	6.090E-12	4.738E-12	3.874E-12	3.217E-12
WNW	45	7.480E-12	5.036E-12	3.549E-12	2.661E-12	2.070E-12	1.693E-12	1.406E-12
NW	39	6.483E-12	4.365E-12	3.075E-12	2.306E-12	1.794E-12	1.467E-12	1.218E-12
NNW	88	1.463E-11	9.849E-12	6.939E-12	5.203E-12	4.048E-12	3.310E-12	2.749E-12
AVERAGE	2081	2.162E-11	1.456E-11	1.026E-11	7.690E-12	5.982E-12	4.892E-12	4.062E-12

Table B-8
Deposition D/Q Factors for Reactor Building Vent

PNPS 2ND QUARTER 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
AVERAGE DEPOSITION RATES (REGULATORY GUIDE 1.111 MODEL) -- (1/M2)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	196	1.646E-07	5.536E-08	1.869E-08	9.865E-09	6.104E-09	2.952E-09	1.801E-09	1.227E-09
NNE	286	2.402E-07	8.078E-08	2.728E-08	1.439E-08	8.906E-09	4.307E-09	2.628E-09	1.791E-09
NE	167	1.403E-07	4.717E-08	1.593E-08	8.405E-09	5.200E-09	2.515E-09	1.534E-09	1.046E-09
ENE	134	1.125E-07	3.785E-08	1.278E-08	6.744E-09	4.173E-09	2.018E-09	1.231E-09	8.389E-10
E	157	1.319E-07	4.434E-08	1.497E-08	7.902E-09	4.889E-09	2.364E-09	1.442E-09	9.829E-10
ESE	87	7.307E-08	2.457E-08	8.298E-09	4.379E-09	2.709E-09	1.310E-09	7.993E-10	5.447E-10
SE	70	5.879E-08	1.977E-08	7.344E-09	3.875E-09	2.398E-09	1.160E-09	6.431E-10	4.382E-10
SSE	60	5.543E-08	1.864E-08	6.295E-09	3.020E-09	1.868E-09	9.035E-10	5.512E-10	3.756E-10
S	59	5.946E-08	2.000E-08	5.627E-09	2.970E-09	1.837E-09	8.885E-10	5.421E-10	3.694E-10
SSW	106	9.793E-08	3.293E-08	1.011E-08	5.335E-09	3.301E-09	1.596E-09	9.739E-10	6.636E-10
SW	162	1.497E-07	5.033E-08	1.545E-08	8.154E-09	5.045E-09	2.440E-09	1.488E-09	1.014E-09
WSW	133	1.229E-07	4.132E-08	1.269E-08	6.694E-09	4.142E-09	2.003E-09	1.222E-09	8.327E-10
W	82	7.576E-08	2.548E-08	7.821E-09	4.540E-09	2.809E-09	1.358E-09	7.534E-10	5.134E-10
WNW	96	8.063E-08	2.711E-08	9.157E-09	4.832E-09	2.989E-09	1.446E-09	9.702E-10	6.611E-10
NW	127	1.067E-07	3.587E-08	1.211E-08	6.392E-09	3.955E-09	1.912E-09	1.167E-09	7.951E-10
NNW	92	7.727E-08	2.598E-08	8.775E-09	4.630E-09	2.865E-09	1.385E-09	8.452E-10	5.760E-10
AVERAGE	2014	1.092E-07	3.672E-08	1.208E-08	6.383E-09	3.949E-09	1.910E-09	1.162E-09	7.918E-10

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	196	8.979E-10	6.868E-10	5.431E-10	4.364E-10	3.601E-10	1.805E-10	1.110E-10	5.477E-11
NNE	286	1.310E-09	1.002E-09	7.924E-10	6.368E-10	5.254E-10	2.634E-10	1.620E-10	7.992E-11
NE	167	7.650E-10	5.852E-10	4.627E-10	3.718E-10	3.068E-10	1.538E-10	9.459E-11	4.667E-11
ENE	134	6.139E-10	4.695E-10	3.713E-10	2.984E-10	2.462E-10	1.234E-10	7.589E-11	3.745E-11
E	157	7.192E-10	5.501E-10	4.350E-10	3.496E-10	2.884E-10	1.446E-10	8.892E-11	4.387E-11
ESE	87	3.986E-10	3.048E-10	2.410E-10	1.937E-10	1.598E-10	8.013E-11	4.927E-11	2.431E-11
SE	70	3.207E-10	2.453E-10	2.133E-10	1.714E-10	1.415E-10	7.092E-11	4.361E-11	2.152E-11
SSE	60	2.749E-10	2.102E-10	1.662E-10	1.336E-10	1.102E-10	5.526E-11	3.398E-11	1.677E-11
S	59	2.703E-10	2.067E-10	1.635E-10	1.314E-10	1.084E-10	5.434E-11	3.342E-11	1.649E-11
SSW	106	4.856E-10	3.714E-10	2.937E-10	2.360E-10	1.947E-10	9.763E-11	6.004E-11	2.962E-11
SW	162	7.421E-10	5.676E-10	4.488E-10	3.607E-10	2.976E-10	1.492E-10	9.175E-11	4.527E-11
WSW	133	6.093E-10	4.660E-10	4.053E-10	3.257E-10	2.688E-10	1.225E-10	7.533E-11	3.717E-11
W	82	3.756E-10	2.873E-10	2.272E-10	1.826E-10	1.506E-10	7.553E-11	4.644E-11	2.291E-11
WNW	96	4.838E-10	3.700E-10	2.660E-10	2.137E-10	1.764E-10	8.842E-11	5.437E-11	2.683E-11
NW	127	5.818E-10	4.450E-10	3.519E-10	2.828E-10	2.333E-10	1.170E-10	7.193E-11	3.549E-11
NNW	92	4.215E-10	3.224E-10	2.549E-10	2.048E-10	1.690E-10	8.474E-11	5.211E-11	2.571E-11
AVERAGE	2014	5.794E-10	4.432E-10	3.523E-10	2.831E-10	2.336E-10	1.163E-10	7.154E-11	3.530E-11

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	196	3.366E-11	2.267E-11	1.597E-11	1.197E-11	9.315E-12	7.618E-12	6.326E-12
NNE	286	4.912E-11	3.307E-11	2.330E-11	1.747E-11	1.359E-11	1.112E-11	9.230E-12
NE	167	2.868E-11	1.931E-11	1.361E-11	1.020E-11	7.937E-12	6.491E-12	5.390E-12
ENE	134	2.302E-11	1.550E-11	1.092E-11	8.187E-12	6.368E-12	5.208E-12	4.325E-12
E	157	2.697E-11	1.816E-11	1.279E-11	9.592E-12	7.462E-12	6.102E-12	5.067E-12
ESE	87	1.494E-11	1.006E-11	7.089E-12	5.315E-12	4.135E-12	3.382E-12	2.808E-12
SE	70	1.323E-11	8.904E-12	6.274E-12	4.704E-12	3.659E-12	2.993E-12	2.485E-12
SSE	60	1.031E-11	6.938E-12	4.889E-12	3.666E-12	2.852E-12	2.332E-12	1.936E-12
S	59	1.013E-11	6.823E-12	4.807E-12	3.605E-12	2.804E-12	2.293E-12	1.904E-12
SSW	106	1.821E-11	1.226E-11	8.637E-12	6.476E-12	5.038E-12	4.120E-12	3.421E-12
SW	162	2.783E-11	1.873E-11	1.320E-11	9.898E-12	7.699E-12	6.297E-12	5.228E-12
WSW	133	2.284E-11	1.538E-11	1.084E-11	8.126E-12	6.321E-12	5.169E-12	4.292E-12
W	82	1.408E-11	9.482E-12	6.681E-12	5.010E-12	3.897E-12	3.187E-12	2.646E-12
WNW	96	1.649E-11	1.110E-11	7.822E-12	5.865E-12	4.562E-12	3.731E-12	3.098E-12
NW	127	2.181E-11	1.469E-11	1.035E-11	7.759E-12	6.036E-12	4.936E-12	4.099E-12
NNW	92	1.580E-11	1.064E-11	7.496E-12	5.621E-12	4.372E-12	3.576E-12	2.969E-12
AVERAGE	2014	2.170E-11	1.461E-11	1.029E-11	7.717E-12	6.003E-12	4.909E-12	4.077E-12

Table B-8
Deposition D/Q Factors for Reactor Building Vent

PNPS 3RD QUARTER 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
AVERAGE DEPOSITION RATES (REGULATORY GUIDE 1.111 MODEL) -- (1/M2)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	217	1.674E-07	5.629E-08	1.901E-08	1.003E-08	6.206E-09	3.001E-09	1.831E-09	1.248E-09
NNE	638	4.921E-07	1.655E-07	5.589E-08	2.949E-08	1.825E-08	8.823E-09	5.383E-09	3.668E-09
NE	336	2.592E-07	8.715E-08	2.943E-08	1.553E-08	9.609E-09	4.647E-09	2.835E-09	1.932E-09
ENE	185	1.427E-07	4.799E-08	1.621E-08	8.551E-09	5.291E-09	2.559E-09	1.561E-09	1.064E-09
E	152	1.172E-07	3.943E-08	1.331E-08	7.026E-09	4.347E-09	2.102E-09	1.283E-09	8.739E-10
ESE	97	7.482E-08	2.516E-08	8.497E-09	4.484E-09	2.774E-09	1.341E-09	8.184E-10	5.577E-10
SE	57	4.396E-08	1.478E-08	5.492E-09	2.898E-09	1.793E-09	8.671E-10	4.809E-10	3.277E-10
SSE	49	4.157E-08	1.398E-08	4.721E-09	2.265E-09	1.401E-09	6.777E-10	4.134E-10	2.817E-10
S	14	1.296E-08	4.358E-09	1.226E-09	6.471E-10	4.004E-10	1.936E-10	1.181E-10	8.050E-11
SSW	45	3.818E-08	1.284E-08	3.942E-09	2.080E-09	1.287E-09	6.223E-10	3.797E-10	2.587E-10
SW	48	4.072E-08	1.370E-08	4.205E-09	2.219E-09	1.373E-09	6.638E-10	4.050E-10	2.760E-10
WSW	115	9.757E-08	3.281E-08	1.007E-08	5.316E-09	3.289E-09	1.590E-09	9.703E-10	6.612E-10
W	100	8.484E-08	2.853E-08	8.760E-09	5.085E-09	3.146E-09	1.521E-09	8.438E-10	5.750E-10
WNW	42	3.239E-08	1.089E-08	3.679E-09	1.941E-09	1.201E-09	5.808E-10	3.898E-10	2.656E-10
NW	54	4.165E-08	1.401E-08	4.730E-09	2.496E-09	1.544E-09	7.468E-10	4.556E-10	3.105E-10
NNW	44	3.394E-08	1.141E-08	3.854E-09	2.034E-09	1.258E-09	6.085E-10	3.713E-10	2.530E-10
AVERAGE	2193	1.076E-07	3.618E-08	1.206E-08	6.381E-09	3.948E-09	1.909E-09	1.159E-09	7.896E-10

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	217	9.130E-10	6.983E-10	5.522E-10	4.437E-10	3.661E-10	1.836E-10	1.129E-10	5.569E-11
NNE	638	2.684E-09	2.053E-09	1.623E-09	1.305E-09	1.076E-09	5.397E-10	3.319E-10	1.637E-10
NE	336	1.414E-09	1.081E-09	8.550E-10	6.870E-10	5.669E-10	2.842E-10	1.748E-10	8.623E-11
ENE	185	7.783E-10	5.953E-10	4.707E-10	3.783E-10	3.121E-10	1.565E-10	9.623E-11	4.748E-11
E	152	6.395E-10	4.891E-10	3.868E-10	3.108E-10	2.564E-10	1.286E-10	7.906E-11	3.901E-11
ESE	97	4.081E-10	3.121E-10	2.468E-10	1.983E-10	1.636E-10	8.205E-11	5.045E-11	2.489E-11
SE	57	2.398E-10	1.834E-10	1.595E-10	1.282E-10	1.058E-10	5.304E-11	3.261E-11	1.609E-11
SSE	49	2.062E-10	1.577E-10	1.247E-10	1.002E-10	8.267E-11	4.145E-11	2.549E-11	1.258E-11
S	14	5.890E-11	4.505E-11	3.562E-11	2.863E-11	2.362E-11	1.184E-11	7.282E-12	3.593E-12
SSW	45	1.893E-10	1.448E-10	1.145E-10	9.202E-11	7.592E-11	3.806E-11	2.341E-11	1.155E-11
SW	48	2.019E-10	1.545E-10	1.221E-10	9.815E-11	8.098E-11	4.060E-11	2.497E-11	1.232E-11
WSW	115	4.838E-10	3.701E-10	3.219E-10	2.587E-10	2.134E-10	9.728E-11	5.982E-11	2.951E-11
W	100	4.207E-10	3.218E-10	2.545E-10	2.045E-10	1.687E-10	8.459E-11	5.201E-11	2.566E-11
WNW	42	1.944E-10	1.487E-10	1.069E-10	8.588E-11	7.086E-11	3.553E-11	2.185E-11	1.078E-11
NW	54	2.272E-10	1.738E-10	1.374E-10	1.104E-10	9.110E-11	4.568E-11	2.809E-11	1.386E-11
NNW	44	1.851E-10	1.416E-10	1.120E-10	8.997E-11	7.423E-11	3.722E-11	2.289E-11	1.129E-11
AVERAGE	2193	5.777E-10	4.419E-10	3.515E-10	2.825E-10	2.331E-10	1.162E-10	7.148E-11	3.527E-11

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	217	3.423E-11	2.305E-11	1.624E-11	1.218E-11	9.471E-12	7.746E-12	6.432E-12
NNE	638	1.006E-10	6.776E-11	4.774E-11	3.580E-11	2.785E-11	2.277E-11	1.891E-11
NE	336	5.300E-11	3.568E-11	2.514E-11	1.885E-11	1.467E-11	1.199E-11	9.959E-12
ENE	185	2.918E-11	1.965E-11	1.384E-11	1.038E-11	8.075E-12	6.604E-12	5.483E-12
E	152	2.398E-11	1.614E-11	1.137E-11	8.529E-12	6.634E-12	5.426E-12	4.505E-12
ESE	97	1.530E-11	1.030E-11	7.258E-12	5.443E-12	4.234E-12	3.462E-12	2.875E-12
SE	57	9.890E-12	6.659E-12	4.692E-12	3.518E-12	2.737E-12	2.238E-12	1.858E-12
SSE	49	7.729E-12	5.204E-12	3.667E-12	2.749E-12	2.139E-12	1.749E-12	1.452E-12
S	14	2.208E-12	1.487E-12	1.048E-12	7.855E-13	6.111E-13	4.997E-13	4.149E-13
SSW	45	7.098E-12	4.779E-12	3.367E-12	2.525E-12	1.964E-12	1.606E-12	1.334E-12
SW	48	7.572E-12	5.098E-12	3.592E-12	2.693E-12	2.095E-12	1.713E-12	1.423E-12
WSW	115	1.814E-11	1.221E-11	8.605E-12	6.453E-12	5.019E-12	4.105E-12	3.408E-12
W	100	1.577E-11	1.062E-11	7.483E-12	5.611E-12	4.365E-12	3.570E-12	2.964E-12
WNW	42	6.625E-12	4.460E-12	3.143E-12	2.357E-12	1.833E-12	1.499E-12	1.245E-12
NW	54	8.518E-12	5.735E-12	4.041E-12	3.030E-12	2.357E-12	1.928E-12	1.601E-12
NNW	44	6.941E-12	4.673E-12	3.292E-12	2.469E-12	1.920E-12	1.571E-12	1.304E-12
AVERAGE	2193	2.168E-11	1.459E-11	1.028E-11	7.710E-12	5.998E-12	4.905E-12	4.073E-12

Table B-8
Deposition D/Q Factors for Reactor Building Vent

PNPS 4TH QUARTER 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
AVERAGE DEPOSITION RATES (REGULATORY GUIDE 1.111 MODEL) -- (1/M2)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	130	1.007E-07	3.386E-08	1.143E-08	6.034E-09	3.733E-09	1.805E-09	1.101E-09	7.505E-10
NNE	247	1.913E-07	6.433E-08	2.173E-08	1.146E-08	7.093E-09	3.430E-09	2.093E-09	1.426E-09
NE	251	1.944E-07	6.537E-08	2.208E-08	1.165E-08	7.208E-09	3.486E-09	2.127E-09	1.449E-09
ENE	339	2.626E-07	8.829E-08	2.982E-08	1.573E-08	9.735E-09	4.708E-09	2.872E-09	1.957E-09
E	305	2.362E-07	7.944E-08	2.683E-08	1.416E-08	8.759E-09	4.235E-09	2.584E-09	1.761E-09
ESE	187	1.448E-07	4.870E-08	1.645E-08	8.679E-09	5.370E-09	2.597E-09	1.584E-09	1.080E-09
SE	140	1.084E-07	3.646E-08	1.231E-08	6.498E-09	4.020E-09	1.944E-09	1.186E-09	8.083E-10
SSE	58	4.492E-08	1.511E-08	5.101E-09	2.692E-09	1.666E-09	8.054E-10	4.914E-10	3.349E-10
S	42	3.578E-08	1.203E-08	3.694E-09	1.949E-09	1.206E-09	5.832E-10	3.558E-10	2.425E-10
SSW	84	7.156E-08	2.407E-08	7.388E-09	3.899E-09	2.412E-09	1.166E-09	7.117E-10	4.850E-10
SW	56	4.771E-08	1.604E-08	4.926E-09	2.599E-09	1.608E-09	7.777E-10	4.744E-10	3.233E-10
WSW	36	3.067E-08	1.031E-08	3.166E-09	1.671E-09	1.034E-09	4.999E-10	3.050E-10	2.078E-10
W	81	6.901E-08	2.321E-08	7.124E-09	4.135E-09	2.559E-09	1.237E-09	6.863E-10	4.676E-10
WNW	65	5.034E-08	1.693E-08	5.717E-09	3.017E-09	1.867E-09	9.026E-10	6.058E-10	4.128E-10
NW	99	7.667E-08	2.578E-08	8.708E-09	4.595E-09	2.843E-09	1.375E-09	8.388E-10	5.716E-10
NNW	64	4.957E-08	1.667E-08	5.629E-09	2.970E-09	1.838E-09	8.888E-10	5.422E-10	3.695E-10
AVERAGE	2184	1.072E-07	3.604E-08	1.201E-08	6.359E-09	3.934E-09	1.903E-09	1.160E-09	7.904E-10

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	130	5.492E-10	4.201E-10	3.322E-10	2.669E-10	2.202E-10	1.104E-10	6.790E-11	3.350E-11
NNE	247	1.043E-09	7.981E-10	6.311E-10	5.071E-10	4.184E-10	2.098E-10	1.290E-10	6.365E-11
NE	251	1.060E-09	8.110E-10	6.413E-10	5.154E-10	4.252E-10	2.132E-10	1.311E-10	6.468E-11
ENE	339	1.432E-09	1.095E-09	8.661E-10	6.960E-10	5.743E-10	2.879E-10	1.771E-10	8.736E-11
E	305	1.288E-09	9.855E-10	7.793E-10	6.262E-10	5.167E-10	2.591E-10	1.593E-10	7.860E-11
ESE	187	7.900E-10	6.042E-10	4.778E-10	3.840E-10	3.168E-10	1.588E-10	9.767E-11	4.819E-11
SE	140	5.914E-10	4.524E-10	3.935E-10	3.162E-10	2.609E-10	1.189E-10	7.312E-11	3.608E-11
SSE	58	2.450E-10	1.874E-10	1.482E-10	1.191E-10	9.825E-11	4.926E-11	3.029E-11	1.495E-11
S	42	1.774E-10	1.357E-10	1.073E-10	8.623E-11	7.115E-11	3.567E-11	2.194E-11	1.082E-11
SSW	84	3.549E-10	2.714E-10	2.146E-10	1.725E-10	1.423E-10	7.135E-11	4.387E-11	2.165E-11
SW	56	2.366E-10	1.810E-10	1.431E-10	1.150E-10	9.487E-11	4.756E-11	2.925E-11	1.443E-11
WSW	36	1.521E-10	1.163E-10	1.012E-10	8.131E-11	6.708E-11	3.058E-11	1,880E-11	9.277E-12
W	81	3.422E-10	2.617E-10	2.070E-10	1.663E-10	1.372E-10	6.880E-11	4.231E-11	2.087E-11
WNW	65	3.021E-10	2.310E-10	1.661E-10	1.335E-10	1.101E-10	5.521E-11	3.395E-11	1.675E-11
NW	99	4.182E-10	3.199E-10	2.529E-10	2.033E-10	1.677E-10	8.409E-11	5.171E-11	2.551E-11
NNW	64	2.704E-10	2.068E-10	1.635E-10	1.314E-10	1.084E-10	5.436E-11	3.343E-11	1.649E-11
AVERAGE	2184	5.784E-10	4.424E-10	3.516E-10	2.825E-10	2.331E-10	1.159E-10	7.129E-11	3.518E-11

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	130	2.059E-11	1.386E-11	9.768E-12	7.324E-12	5.697E-12	4.660E-12	3.869E-12
NNE	247	3.912E-11	2.634E-11	1.856E-11	1.392E-11	1.083E-11	8.853E-12	7.351E-12
NE	251	3.976E-11	2.677E-11	1.886E-11	1.414E-11	1.100E-11	8.996E-12	7.470E-12
ENE	339	5.369E-11	3.615E-11	2.547E-11	1.910E-11	1.486E-11	1.215E-11	1.009E-11
E	305	4.831E-11	3.252E-11	2.292E-11	1.718E-11	1.337E-11	1.093E-11	9.077E-12
ESE	187	2.962E-11	1.994E-11	1.405E-11	1.054E-11	8.196E-12	6.703E-12	5.565E-12
SE	140	2.217E-11	1.493E-11	1.052E-11	7.889E-12	6.136E-12	5.018E-12	4.167E-12
SSE	58	9.187E-12	6.185E-12	4.358E-12	3.268E-12	2.542E-12	2.079E-12	1.726E-12
S	42	6.652E-12	4.479E-12	3.156E-12	2.366E-12	1.841E-12	1.505E-12	1.250E-12
SSW	84	1.330E-11	8.958E-12	6.312E-12	4.733E-12	3.681E-12	3.011E-12	2.500E-12
SW	56	8.870E-12	5.972E-12	4.208E-12	3.155E-12	2.454E-12	2.007E-12	1.667E-12
WSW	36	5.704E-12	3.839E-12	2.705E-12	2.028E-12	1.578E-12	1.290E-12	1.071E-12
W	81	1.283E-11	8.638E-12	6.086E-12	4.564E-12	3.550E-12	2.903E-12	2.411E-12
WNW	65	1.030E-11	6.932E-12	4.884E-12	3.662E-12	2.849E-12	2.330E-12	1.934E-12
NW	99	1.568E-11	1.056E-11	7.439E-12	5.578E-12	4.339E-12	3.548E-12	2.946E-12
NNW	64	1.014E-11	6.825E-12	4.809E-12	3.606E-12	2.805E-12	2.294E-12	1.905E-12
AVERAGE	2184	2.162E-11	1.456E-11	1.026E-11	7.690E-12	5.982E-12	4.892E-12	4.062E-12

Table B-8
Deposition D/Q Factors for Reactor Building Vent

PNPS 1998 GENERAL X/QS: GROUND-LEVEL -- SECTOR AVERAGE MODEL
GROUND RELEASE
AVERAGE DEPOSITION RATES (REGULATORY GUIDE 1.111 MODEL) -- (1/M2)

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) .12	.25	.50	.75	1.00	1.50	2.00	2.50
N	694	1.386E-07	4.660E-08	1.574E-08	8.304E-09	5.138E-09	2.484E-09	1.516E-09	1.033E-09
NNE	1408	2.811E-07	9.454E-08	3.193E-08	1.685E-08	1.042E-08	5.040E-09	3.075E-09	2.096E-09
NE	875	1.747E-07	5.875E-08	1.984E-08	1.047E-08	6.478E-09	3.132E-09	1.911E-09	1.302E-09
ENE	765	1.527E-07	5.136E-08	1.735E-08	9.153E-09	5.663E-09	2.739E-09	1.671E-09	1.139E-09
E	803	1.603E-07	5.391E-08	1.821E-08	9.608E-09	5.944E-09	2.875E-09	1.754E-09	1.195E-09
ESE	550	1.098E-07	3.693E-08	1.247E-08	6.581E-09	4.072E-09	1.969E-09	1.201E-09	8.186E-10
SE	456	9.104E-08	3.062E-08	1.034E-08	5.456E-09	3.376E-09	1.632E-09	9.959E-10	6.787E-10
SSE	244	4.872E-08	1.638E-08	5.533E-09	2.919E-09	1.806E-09	8.735E-10	5.329E-10	3.631E-10
S	199	4.370E-08	1.470E-08	4.512E-09	2.381E-09	1.473E-09	7.124E-10	4.346E-10	2.962E-10
SSW	435	9.553E-08	3.213E-08	9.863E-09	5.205E-09	3.220E-09	1.557E-09	9.501E-10	6.474E-10
SW	445	9.773E-08	3.287E-08	1.009E-08	5.324E-09	3.294E-09	1.593E-09	9.719E-10	6.623E-10
WSW	377	8.280E-08	2.784E-08	8.548E-09	4.511E-09	2.791E-09	1.350E-09	8.234E-10	5.611E-10
W	366	8.038E-08	2.703E-08	8.299E-09	4.817E-09	2.980E-09	1.441E-09	7.994E-10	5.447E-10
WNW	248	4.951E-08	1.665E-08	5.623E-09	2.967E-09	1.836E-09	8.878E-10	5.958E-10	4.060E-10
NW	319	6.369E-08	2.142E-08	7.233E-09	3.817E-09	2.362E-09	1.142E-09	6.967E-10	4.748E-10
NNW	288	5.750E-08	1.934E-08	6.530E-09	3.446E-09	2.132E-09	1.031E-09	6.290E-10	4.286E-10
AVERAGE	8472	1.080E-07	3.632E-08	1.201E-08	6.363E-09	3.937E-09	1.904E-09	1.160E-09	7.904E-10

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 3.00	3.50	4.00	4.50	5.00	7.50	10.00	15.00
N	694	7.558E-10	5.781E-10	4.571E-10	3.673E-10	3.031E-10	1.520E-10	9.044E-11	4.610E-11
NNE	1408	1.533E-09	1.173E-09	9.274E-10	7.453E-10	6.149E-10	3.083E-10	1.896E-10	9.354E-11
NE	875	9.529E-10	7.289E-10	5.763E-10	4.631E-10	3.821E-10	1.916E-10	1.178E-10	5.813E-11
ENE	765	8.331E-10	6.372E-10	5.039E-10	4.049E-10	3.341E-10	1.675E-10	1.030E-10	5.082E-11
E	803	8.745E-10	6.689E-10	5.289E-10	4.250E-10	3.507E-10	1.758E-10	1.081E-10	5.334E-11
ESE	550	5.990E-10	4.581E-10	3.623E-10	2.911E-10	2.402E-10	1.204E-10	7.405E-11	3.654E-11
SE	456	4.966E-10	3.798E-10	3.304E-10	2.655E-10	2.191E-10	9.985E-11	6.140E-11	3.029E-11
SSE	244	2.657E-10	2.032E-10	1.607E-10	1.291E-10	1.066E-10	5.343E-11	3.285E-11	1.621E-11
S	199	2.167E-10	1.658E-10	1.311E-10	1.053E-10	8.691E-11	4.357E-11	2.679E-11	1.322E-11
SSW	435	4.737E-10	3.623E-10	2.865E-10	2.302E-10	1.900E-10	9.525E-11	5.857E-11	2.890E-11
SW	445	4.846E-10	3.707E-10	2.931E-10	2.355E-10	1.943E-10	9.744E-11	5.992E-11	2.956E-11
WSW	377	4.106E-10	3.140E-10	2.731E-10	2.195E-10	1.811E-10	8.255E-11	5.076E-11	2.504E-11
W	366	3.986E-10	3.049E-10	2.411E-10	1.937E-10	1.598E-10	8.014E-11	4.928E-11	2.431E-11
WNW	248	2.971E-10	2.272E-10	1.633E-10	1.313E-10	1.083E-10	5.430E-11	3.339E-11	1.648E-11
NW	319	3.474E-10	2.657E-10	2.101E-10	1.688E-10	1.393E-10	6.985E-11	4.295E-11	2.119E-11
NNW	288	3.136E-10	2.399E-10	1.897E-10	1.524E-10	1.258E-10	6.306E-11	3.878E-11	1.913E-11
AVERAGE	8472	5.783E-10	4.424E-10	3.522E-10	2.830E-10	2.335E-10	1.159E-10	7.129E-11	3.518E-11

DOWNWIND SECTOR	NO. OBS	DISTANCE FROM RELEASE POINT (MILES) 20.00	25.00	30.00	34.95	40.00	45.00	50.00
N	694	2.634E-11	1.908E-11	1.344E-11	1.008E-11	7.841E-12	6.412E-12	5.324E-12
NNE	1408	5.749E-11	3.871E-11	2.727E-11	2.045E-11	1.591E-11	1.301E-11	1.080E-11
NE	875	3.573E-11	2.405E-11	1.695E-11	1.271E-11	9.886E-12	8.085E-12	6.713E-12
ENE	765	3.124E-11	2.103E-11	1.482E-11	1.111E-11	8.643E-12	7.068E-12	5.869E-12
E	803	3.279E-11	2.207E-11	1.555E-11	1.166E-11	9.072E-12	7.420E-12	6.161E-12
ESE	550	2.246E-11	1.512E-11	1.065E-11	7.988E-12	6.214E-12	5.082E-12	4.220E-12
SE	456	1.862E-11	1.254E-11	8.833E-12	6.623E-12	5.152E-12	4.213E-12	3.499E-12
SSE	244	9.963E-12	6.708E-12	4.726E-12	3.544E-12	2.757E-12	2.255E-12	1.872E-12
S	199	8.125E-12	5.471E-12	3.855E-12	2.890E-12	2.248E-12	1.839E-12	1.527E-12
SSW	435	1.776E-11	1.196E-11	8.426E-12	6.318E-12	4.915E-12	4.019E-12	3.337E-12
SW	445	1.817E-11	1.223E-11	8.620E-12	6.463E-12	5.028E-12	4.112E-12	3.414E-12
WSW	377	1.539E-11	1.036E-11	7.302E-12	5.476E-12	4.259E-12	3.483E-12	2.892E-12
W	366	1.494E-11	1.006E-11	7.089E-12	5.316E-12	4.135E-12	3.382E-12	2.808E-12
WNW	248	1.013E-11	6.818E-12	4.804E-12	3.602E-12	2.802E-12	2.291E-12	1.903E-12
NW	319	1.303E-11	8.769E-12	6.179E-12	4.633E-12	3.604E-12	2.948E-12	2.447E-12
NNW	288	1.176E-11	7.917E-12	5.578E-12	4.183E-12	3.254E-12	2.661E-12	2.210E-12
AVERAGE	8472	2.162E-11	1.456E-11	1.026E-11	7.690E-12	5.982E-12	4.892E-12	4.062E-12

APPENDIX C

PILGRIM NUCLEAR POWER STATION
OFFSITE DOSE CALCULATION MANUAL

The PNPS Offsite Dose Calculation Manual (ODCM) was revised in August 1998 to incorporate changes recommended by the NRC in Generic Letter 89-01. This changed relocated the effluent control and environmental monitoring programs from the Technical Specifications to the ODCM. A copy of the revised ODCM follows.

PILGRIM NUCLEAR POWER STATION
OFFSITE DOSE CALCULATION MANUAL

APPROVED BY: _____ 8/26/98
CHEMISTRY DEPARTMENT MANAGER — Date

APPROVED BY: _____ 8/26/98
RADIATION PROTECTION MANAGER — Date

REVIEWED BY: _____ 8/27/98
ORC CHAIRMAN — Date

Rev. 0 was originally reviewed by ORC on June 10, 1983.

ORC REVIEW REQUIRED

RECORD OF DOCUMENT CHANGES

REV. NO.	IDENTIFICATION OF CHANGE	DATE APPROVED	DOCUMENT SECTION AND PAGE
0	Original Submittal	06/10/1983	All Sections
1	Update of TLD and Air Sample Locations	05/01/1987	7.0/7-7 & 7-8
2	Changes in response to NRC questions on PNPS ODCM (TAC #63012). Changes in response to technical review performed by BECo Radiological Section.	07/15/1988	All Sections
3	Changes in response to NRC comments on PNPS ODCM Rev. 2 (TAC #69867). Correct typographical error in Table A-3. Incorporate new TLD locations. Change responsible division.	07/12/1989	Preliminary pages, 3.3, 4.2, 6.1, 7.0 (7-3 & 7-5), 8.1, A-3
4	Update signature page to reflect new responsible organization. Update record of document changes. Renumber pages iii through vii to include list of effective page revisions. Revise pages containing equations and definitions to include machine-generated scientific characters. Address gardens identified during 1990 garden census in Table 7-5 in accordance with Technical Specification 7.1.B.2. Expand definition of Lower Limit of detection in Appendix B.	09/27/1991	Page i through vii; pages 13-15, 17-23, 25-28, 30-32, 49, and A-4; Appendix B.
5	Add Steam Jet Air Ejector Monitor to section addressing monitor setpoints.	10/30/1991	Pages i, ii, iii, v, 34a
6	Update revision Log; renumber pages ii through viii; clarify definition of dilution flow used for liquid effluent discharges; clarify assumptions used in gaseous effluent dose calculations and SJAE monitor setpoints.	08/11/1994	Pages i through viii; 14, 17, 33, 34a, A-35
7	Reference NRC Safety Evaluation and 10CFR20.302 permit for onsite disposal of slightly contaminated construction soil; repaginate preliminary pages.	11/22/1995	Pages i through vi, Appendix C, page C-1
8	Relocate Effluent Controls from PNPS Technical Specifications to the ODCM in accordance with Generic Letter 89-01; Repaginate and sectionalize entire ODCM; update distance and direction information for environmental sampling locations.	08/27/1998	Entire document

LIST OF EFFECTIVE PAGE REVISIONS

Page	Rev.	Page	Rev.	Page	Rev.	Page	Rev.	Page	Rev.	Page	Rev.
i	8	3/4-16	8	5-1	8	9-1	8	A-1	8	B-1	8
ii	8	3/4-17	8	5-2	8	9-2	8	A-2	8	B-2	8
iii	8	3/4-18	8			9-3	8	A-3	8	B-3	8
iv	8	3/4-19	8			9-4	8	A-4	8		
v	8	3/4-20	8			9-5	8	A-5	8		
vi	8	3/4-21	8			9-6	8	A-6	8		
vii	8	3/4-22	8			9-7	8	A-7	8		
viii	8	3/4-23	8			9-8	8	A-8	8		
ix	8	3/4-24	8	6-1	8	9-9	8	A-9	8	C-1	8
		3/4-25	8	6-2	8	9-10	8	A-10	8		
		3/4-26	8			9-11	8	A-11	8		
		3/4-27	8			9-12	8	A-12	8		
		3/4-28	8			9-13	8	A-13	8		
		3/4-29	8			9-14	8	A-14	8		
I-1	8	3/4-30	8			9-15	8	A-15	8		
I-2	8	3/4-31	8					A-16	8		
I-3	8	3/4-32	8	7-1	8			A-17	8		
		3/4-33	8	7-2	8			A-18	8		
		3/4-34	8	7-3	8			A-19	8		
		3/4-35	8	7-4	8			A-20	8		
		3/4-36	8	7-5	8			A-21	8		
		3/4-37	8	7-6	8	10-1	8	A-22	8		
		3/4-38	8			10-2	8	A-23	8		
2-1	8	3/4-39	8					A-24	8		
		3/4-40	8					A-25	8		
		3/4-41	8					A-26	8		
		3/4-42	8					A-27	8		
		3/4-43	8					A-28	8		
		3/4-44	8	8-1	8			A-29	8		
		3/4-45	8	8-2	8	11-1	8	A-30	8		
3/4-1	8	3/4-46	8	8-3	8	11-2	8	A-31	8		
3/4-2	8	3/4-47	8	8-4	8			A-32	8		
3/4-3	8	3/4-48	8					A-33	8		
3/4-4	8	3/4-49	8					A-34	8		
3/4-5	8	3/4-50	8					A-35	8		
3/4-6	8	3/4-51	8					A-36	8		
3/4-7	8					12-1	8	A-37	8		
3/4-8	8							A-38	8		
3/4-9	8							A-39	8		
3/4-10	8							A-40	8		
3/4-11	8							A-41	8		
3/4-12	8					13-1	8	A-42	8		
3/4-13	8					13-2	8	A-43	8		
3/4-14	8										
3/4-15	8										

TABLE OF CONTENTS

SECTION	TITLE	PAGE
--	RECORD OF DOCUMENT CHANGES	ii
--	LIST OF EFFECTIVE PAGE REVISIONS	iii
--	TABLE OF CONTENTS	iv
--	LIST OF FIGURES	vii
--	LIST OF TABLES	viii
1.0	INTRODUCTION	1-1
2.0	DEFINITIONS	2-1
3/4.0	EFFLUENT AND ENVIRONMENTAL CONTROLS	3/4-1
3/4.1	INSTRUMENTATION	3/4-2
3/4.1.1	Radioactive Liquid Effluent Instrumentation	3/4-2
3/4.1.2	Radioactive Gaseous Effluent Instrumentation	3/4-5
3/4.2	RADIOACTIVE LIQUID EFFLUENTS	3/4-10
3/4.2.1	Liquid Effluents Concentration	3/4-10
3/4.2.2	Dose - Liquids	3/4-12
3/4.2.3	Liquid Radwaste Treatment	3/4-13
3/4.3	RADIOACTIVE GASEOUS EFFLUENTS	3/4-15
3/4.3.1	Gaseous Effluents Dose Rate	3/4-15
3/4.3.2	Dose - Noble Gases	3/4-17
3/4.3.3	Dose - Iodine-131, Iodine-133, Radioactive Material in Particulate Form, and Tritium	3/4-18
3/4.3.4	Gaseous Effluent Treatment	3/4-19
3/4.4	TOTAL DOSE	3/4-21
3/4.4.1	Total Dose	3/4-21
3/4.5	RADIOLOGICAL ENVIRONMENTAL MONITORING	3/4-22
3/4.5.1	Environmental Monitoring Program	3/4-22
3/4.5.2	Land Use Census	3/4-46
3/4.6	EFFLUENT CONTROLS BASES	3/4-47

TABLE OF CONTENTS (continued)

SECTION	TITLE	PAGE
5.0	RADIOLOGICAL EFFLUENT CONTROLS AND METHODOLOGY CROSS REFERENCE	5-1
6.0	DESCRIPTION OF RADWASTE SYSTEMS	6-1
6.1	Liquid Radwaste System	6-1
6.2	Treated Gaseous Radwaste System	6-1
7.0	RELEASE POINT AND MONITOR DESCRIPTION	7-1
7.1	Radioactive Effluent Release Point Description	7-1
7.1.1	Liquid Radioactive Waste Effluent Release	7-1
7.1.2	Main Stack Gas Release	7-1
7.1.3	Reactor Building Exhaust Vent Release	7-2
7.2	Radioactive Effluent Monitoring System Description	7-3
7.2.1	Liquid Radioactive Waste Effluent Monitoring System	7-3
7.2.2	Main Stack Gas Monitoring System	7-3
7.2.3	Reactor Building Exhaust Vent Monitoring System	7-4
7.3	Measurement Method During Release	7-6
7.3.1	Liquid Effluent	7-6
7.3.2	Gaseous Effluent	7-6
7.3.3	Limitations	7-6
8.0	MONITOR SETPOINTS	8-1
8.1	Liquid Effluent Monitor	8-1
8.2	Gaseous Effluent Monitors	8-2
8.3	Steam Jet Air Ejector Monitor	8-3
9.0	CALCULATIONAL METHODS	9-1
9.1	Concentrations of Liquid Effluents	9-1
9.2	Liquid Effluents Dose Assessment Methodology	9-2
9.2.1	Liquid Pathways Annual Dose Rates	9-2
9.2.1.1	Aquatic Foods Ingestion (Fish, shellfish)	9-2
9.2.1.2	Shoreline Deposits (Discharge Canal and Recreational Area)	9-3
9.2.1.3	Swimming (White Horse Beach)	9-3
9.2.1.4	Yachting/Boating (Cape Cod Bay)	9-3
9.2.2	Definitions	9-4

TABLE OF CONTENTS (continued)

SECTION	TITLE	PAGE
9.3	Gaseous Effluents Dose Assessment Methodology	9-6
9.3.1	Gaseous Pathways Annual Dose Rates from Noble Gases	9-6
9.3.1.1	Gamma Air Dose	9-6
9.3.1.2	Beta Air Dose	9-7
9.3.1.3	Total Body Dose	9-7
9.3.1.4	Skin Dose	9-7
9.3.2	Gaseous Pathways Annual Dose Rates from Iodine 131 and 133, Particulates with a Half-Life Greater Than 8 Days, and Tritium	9-8
9.3.2.1	Ground Plane Deposition	9-8
9.3.2.2	Breathing/Inhalation	9-8
9.3.2.3	Leafy Vegetation Ingestion	9-9
9.3.2.4	Root Crop/Non-Leafy Vegetation Ingestion	9-10
9.3.2.5	Milk Ingestion	9-10
9.3.2.6	Meat Ingestion	9-10
9.3.3	Definitions	9-11
9.4	Total Dose to a Member of the Public	9-15
10.0	RECEPTOR LOCATIONS, HYDROLOGY, AND METEOROLOGY	10-1
11.0	RADIOLOGICAL ENVIRONMENTAL SAMPLING AND MEASUREMENT LOCATIONS	11-1
12.0	ANNUAL REPORT PREPARATION	12-1
12.1	Annual Effluent and Waste Disposal Report	12-1
12.2	Annual Radiological Environmental Operating Report	12-1
13.0	REFERENCES	13-1
Appendix A	DATA REQUIRED FOR EFFLUENT CALCULATIONS	A-1
Appendix B	DEFINITION OF THE LOWER LIMIT OF DETECTION	B-1
Appendix C	NRC SAFETY EVALUATION FOR ONSITE DISPOSAL OF SLIGHTLY CONTAMINATED CONSTRUCTION SOIL	C-1

LIST OF FIGURES

FIGURE NUMBER	FIGURE TITLE	PAGE NUMBER
4.2-1	Liquid Radwaste Treatment System Schematic	3/4-14
4.3-1	Gaseous Effluent Treatment System Schematic	3/4-20
3.5-1	Environmental TLD Locations Within the PNPS Protected Area	3/4-32
3.5-2	TLD and Air/Soil Sampling Locations: Within 1 Kilometer	3/4-34
3.5-3	TLD and Air/Soil Sampling Locations: 1 to 5 Kilometers	3/4-36
3.5-4	TLD and Air/Soil Sampling Locations: Greater Than 5 Kilometers	3/4-38
3.5-5	Terrestrial and Marine/Aquatic Sampling Locations	3/4-40
3.5-6	Environmental Sampling and Measurement Control Locations	3/4-42

LIST OF TABLES

TABLE NUMBER	TABLE TITLE	PAGE NUMBER
1.1	Effluent Controls Cross-Reference	I-2
3.1-1	Radioactive Liquid Effluent Monitoring Instrumentation	3/4-3
4.1-1	Radioactive Liquid Effluent Monitoring Instrumentation Surveillance Requirements	3/4-4
3.1-2	Radioactive Gaseous Effluent Monitoring Instrumentation	3/4-6
4.1-2	Radioactive Gaseous Effluent Monitoring Instrumentation Surveillance Requirements	3/4-8
4.2-1	Radioactive Liquid Waste Sampling and Analysis Program	3/4-11
4.3-1	Radioactive Gaseous Waste Sampling and Analysis Program	3/4-16
3.5-1	Operational Radiological Environmental Monitoring Program	3/4-24
3.5-2	Environmental TLD Locations	3/4-29
3.5-3	Routine Radiological Environmental Sampling Locations	3/4-30
3.5-4	Reporting Levels for Radioactivity Concentrations in Environmental Samples	3/4-44
4.5-1	Detection Capabilities for Environmental Sample Analysis	3/4-45
5-1	PNPS Effluent Controls And Methodology Cross-Reference	5-2
7-1	Radioactive Effluent Monitor Data	7-5
10-1	Critical Receptor Locations and Atmospheric Dispersion Factors	10-2
A-1	Bioaccumulation Factors To Be Used In The Absence Of Site-Specific Data	A-1
A-2	Dose Factors For Immersion In Water	A-2
A-3	Recommended Values For Liquid Effluents	A-3
A-4	Dose Factors For Exposure To A Semi-Infinite Cloud Of Noble Gases	A-4
A-5	Stable Element Transfer Data	A-5
A-6	Nuclide Transfer Parameters For Goat's Milk	A-6
A-7	Animal Consumption Rates	A-6
A-8	Recommended Use Factors To Be Applied For The Average Individual	A-7
A-9	Recommended Use Factors To Be Applied For The Maximum Exposed Individual	A-8
A-10	External Dose Factors For Standing On Contaminated Ground	A-9
A-11	Inhalation Dose Factors For Adult	A-11
A-12	Inhalation Dose Factors For Teen	A-15
A-13	Inhalation Dose Factors For Child	A-19
A-14	Inhalation Dose Factors For Infant	A-23

LIST OF TABLES (continued)

TABLE NUMBER	TABLE TITLE	PAGE NUMBER
A-15	Ingestion Dose Factors For Adult	A-27
A-16	Ingestion Dose Factors For Teen	A-31
A-17	Ingestion Dose Factors For Child	A-35
A-18	Ingestion Dose Factors For Infant	A-39
A-19	Recommended Values For Gaseous Effluents	A-43

1.0 INTRODUCTION

This manual contains the current methodology, parameters, data, and information used in the calculation of offsite doses due to radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitor alarm/trip setpoints, and in the conduct of the radiological environmental monitoring program.

All effluent controls contained in the Offsite Dose Calculation Manual (ODCM) were originally part of the PNPS Technical Specifications (Reference 1). In response to Generic Letter 89-01 (Reference 2) from the Nuclear Regulatory Commission, these Radiological Effluent Technical Specifications (RETS) were removed from the main body of the Technical Specifications and relocated to the ODCM.

The effluent controls previously existed as parts of Section 3/4.8 and Section 7/8 of the PNPS Technical Specifications. In conjunction with the transfer of the effluent controls from the RETS to the ODCM, the numbering scheme for the individual effluent controls were changed to agree with the numbering scheme present in NUREG-1302, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors".

The original Technical Specification 3/4.8.F, "Gaseous Effluent Treatment", addressed both offgas treatment and explosive gas monitoring. In accordance with the guidance in Generic Letter 89-01, monitoring of explosive gas concentrations was to be retained in the main body of the Technical Specifications. Subsequent to GL89-01, the improved standard technical specifications removed the requirement for explosive gas monitoring, in accordance with NEDO-31466. Therefore, the original Technical Specification 3/4.8.F was partitioned and the portion addressing offgas treatment was relocated to the ODCM Effluent Controls (Control 3/4.3.4). The portion of the original Specification 3/4.8.F addressing explosive gas monitoring was relocated to the FSAR (Reference 3). A cross-reference of the original Technical Specification Section to the revised ODCM Effluent Control Section is included in Table 1.1.

In conjunction with the GL89-01 change, the ODCM was restructured from that which previously existed. None of the requirements or methodologies were changed. Rather, the various sections were reorganized to facilitate support of the effluent controls relocated from the Technical Specifications. Descriptions of effluent monitoring systems and setpoint calculations were moved to the sections immediately following the controls, followed by dose calculation methodologies, and finally by the environmental monitoring program section. Supporting information is listed in the appendices at the rear of the manual.

TABLE 1.1

EFFLUENT CONTROLS CROSS-REFERENCE

Effluent Control Topic	Original Technical Specification Section	Revised ODCM Control Section
Liquid Effluents Concentration	3.8.A.1 4.8.A.1 4.8.A.2 Table 4.8-1	3.2.1 4.2.1.a 4.2.1.b Table 4.2-1
Radioactive Liquid Effluent Instrumentation	3.8.B.1 4.8.B.1 4.8.B.2 Table 3.8-1 Table 4.8-2	3.1.1 4.1.1.a 4.1.1.b Table 3.1-1 Table 4.1-1
Liquid Radwaste Treatment	3.8.C.1 4.8.C.1 4.8.C.2 Figure 4.8-1	3.2.3 4.2.3.a 4.2.3.b Figure 4.2-1
Gaseous Effluents Dose Rate	3.8.D.1 4.8.D.1 4.8.D.2 Table 4.8-3	3.3.1 4.3.1.a 4.3.1.b Table 4.3-1
Radioactive Gaseous Effluent Instrumentation	3.8.E.1 4.8.E.1 4.8.E.2 Table 3.8-2 (partial) Table 4.8-4 (partial)	3.1.2 4.1.2.a 4.1.2.b Table 3.1-2 Table 4.1-2
Gaseous Effluent Treatment	3.8.F.a 3.8.F.1 4.8.F.1 4.8.F.2 Figure 4.8-2	3.3.4 Relocated to FSAR 4.3.4 Relocated to FSAR Figure 4.3-1
Environmental Monitoring	7.1.A 8.1.A Table 7.1-1 Table 8.1-1 Table 8.1-2 Table 8.1-3 Table 8.1-4	3.5.1 4.5.1 Table 3.5-4 Table 3.5-1 Table 3.5-3 Table 3.5-2 Table 4.5-1
Land Use Census	7.1.B 8.1.B	3.5.2 4.5.2

TABLE 1.1 (continued)

EFFLUENT CONTROLS CROSS-REFERENCE

Effluent Control Topic	Original Technical Specification Section	Revised ODCM Control Section
Dose - Liquids	7.2.A 8.2.A	3.2.2 4.2.2
Dose - Noble Gases	7.3.A 8.3.A	3.3.2 4.3.2
Dose - Iodine-131, Iodine-133, Radioactive Material in Particulate Form, and Tritium	7.4.A 8.4.A	3.3.3 4.3.3
Total Dose	7.5.A 8.5.A	3.4.1 4.4.1

2.0 DEFINITIONS

This section lists definitions which are unique to the ODCM. Other definitions pertaining to actions and surveillance requirements for the various controls can be found in the Technical Specifications (Reference 1).

2.1 Member(s) of the Public - Member(s) of the public shall include all persons who are not occupationally associated with the plant. This category does not include employees of the utility, its contractors, or vendors. Also excluded from this category are persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational or other purposes not associated with the site.

2.2 Offsite Dose Calculation Manual (ODCM) - The Offsite Dose Calculation Manual (ODCM) shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring Alarm/Trip Setpoints, and in the conduct of the Radiological Environmental Monitoring Program. The ODCM shall also contain: (1) the Radioactive Effluent Controls and Radiological Environmental Monitoring Programs required by Technical Specifications Administrative Controls 5.5.1 and 5.5.4; and, (2) descriptions of the information that should be included in the Annual Radiological Environmental Operating and Annual Radioactive Effluent Release Reports required by Technical Specifications Administrative Controls 5.6.2 and 5.6.3.

2.3 Radwaste Treatment System

a. Gaseous Radwaste Treatment System - The gaseous radwaste treatment system is that system identified in Figure 4.3-1.

b. Liquid Radwaste Treatment System - The liquid radwaste treatment system is that system identified in Figure 4.2-1.

2.4 Site Boundary - The site boundary is shown in Figure 1.6-1 in the FSAR (Reference 3).

3/4.0 EFFLUENT AND ENVIRONMENTAL CONTROLS

This section includes the effluent and environmental controls that were originally part of the PNPS Technical Specifications. With the exception of the environmental monitoring program previously listed in the Technical Specifications (Reference 1), these controls were relocated into the ODCM without any substantial changes, in accordance with Generic Letter 89-01 (Reference 2). Text and tables were reformatted to the style of the ODCM. The various controls were renumbered from the original numbering scheme of the Technical Specifications. A cross-reference of the old Technical Specifications section to the new ODCM section is presented in Table 1.1.

Prior to the Generic Letter 89-01 change to the ODCM (Revision 8), the ODCM contained an enhanced radiological environmental monitoring program (REMP), above that required by the Technical Specifications. To prevent confusion and capture the more inclusive monitoring program that existed in the ODCM, the original Technical Specification REMP was replaced with the REMP described in the ODCM. Therefore, the monitoring program listed in section 3/4.5 contains more samples and monitoring locations than existed in the Technical Specifications REMP prior to the Generic Letter 89-01 change.

In addition to the changes in the REMP program described above, all of the tables were revised with the latest distance and direction information available. The global positioning system (GPS) was used to verify the locations of the various sampling and monitoring stations, and the tables were updated accordingly. In keeping with governmental efforts to adopt the metric system of measurement, all distances have been listed in metric units (meters and/or kilometers) in the various tables and figures.

Any changes in distances and directions to the various monitoring locations from those originally listed in the Technical Specifications REMP are corrections based on new information. None of the locations of the sampling stations were actually changed. Some of the verbal descriptions, especially those for near-plant TLDs, have been updated to reflect current names of buildings and other areas near Pilgrim Station. Again, none of the physical locations were altered, and the change merely reflects up-to-date place names adopted by station management.

3/4.1 INSTRUMENTATION

3/4.1.1 Radioactive Liquid Effluent Instrumentation

CONTROLS

3.1.1 The radioactive liquid effluent monitoring instrumentation channels shown in Table 3.1-1 shall be operable with their alarm/trip setpoints set to ensure that the limits of Controls 3.2.1 are not exceeded during periods when liquid wastes are being discharged via the radwaste discharge header.

For releases other than the radwaste discharge header, the above specification does not apply, these releases shall be made in accordance with Action 1 of Table 3.1-1.

APPLICABILITY: As shown in Table 3.1-1.

ACTION:

a. With a radioactive liquid effluent monitoring instrumentation channel alarm/trip setpoint less conservative than a value which will ensure that the limits of Control 3.2.1 are met, without delay suspend the release of radioactive liquid effluents monitored by the affected channel or change the setpoint so that it is acceptably conservative or declare the channel inoperable.

b. With one or more radioactive liquid effluent monitoring instrumentation channels inoperable, take the action shown in Table 3.1-1.

SURVEILLANCE REQUIREMENTS

4.1.1.a The setpoints for monitoring instrumentation shall be determined in accordance with the ODCM.

4.1.1.b Each radioactive liquid effluent monitoring instrumentation channel shall be demonstrated operable at the frequencies shown in Table 4.1-1.

TABLE 3.1-1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

Instrument	Minimum Channels Operable	Applicability	Action[1]
1. GROSS RADIOACTIVITY MONITORS PROVIDING AUTOMATIC TERMINATION OF RELEASE:			
a. Liquid Radwaste Effluent Line	1	During actual discharge of liquid wastes	1
2. FLOW RATE MEASUREMENT DEVICES:			
a. Liquid Radwaste Effluent Line	1	During actual discharge of liquid wastes	2
b. Discharge Canal[2]	N/A	During actual discharge of liquid wastes	3

[1] Actions Required --

ACTION 1: With the number of operable channels less than required by the minimum channels operable requirement, effluent releases may be resumed provided that prior to initiating a release:
a. At least two independent samples are analyzed in accordance with Control 4.2.1.a; and,
b. An independent verification of the release rate calculations is performed; and,
c. An independent verification of the discharge valving is performed.

ACTION 2: With the number of operable channels less than required by the minimum channels operable requirement, effluent releases via this pathway may continue provided that the flow rate is verified at least once per 4 hours during actual releases.

ACTION 3: Suspend all radioactive liquid effluent discharges if no dilution water is available.

[2] Flow will be estimated based on design flow rate of the operating circulating water pumps and/or operating salt service water pumps.

TABLE 4.1-1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Instrument	Instrument Check	Source Check	Channel Calibration	Channel Functional Test
1. GROSS BETA OR GAMMA RADIOACTIVITY MONITORS PROVIDING ALARM AND AUTOMATIC ISOLATION				
a. Liquid Radwaste Effluents Line	(1)	N/A	Once per 18 months[2]	Quarterly
2. FLOW RATE MEASUREMENT DEVICES				
a. Liquid Radwaste Effluents Line	(1)	N/A	Once per 18 months	Quarterly

(1) During or prior to release via this pathway.

(2) Previously established calibration procedures will be used for these requirements.

3/4.1 INSTRUMENTATION

3/4.1.2 Radioactive Gaseous Effluent Instrumentation

CONTROLS

3.1.2 The radioactive gaseous effluent monitoring instrumentation channels shown in Table 3.1-2 shall be operable with their alarm/trip setpoints set to ensure that the limits of Control 3.3.1 are not exceeded.

APPLICABILITY: As shown in Table 3.1-2

ACTION:

a. With a radioactive gaseous effluent monitoring instrumentation channel alarm/trip setpoint less conservative than a value which will ensure that the limits of Control 3.3.1 are met, change the setpoint so that it is acceptably conservative or declare the channel inoperable.

b. With one or more radioactive gaseous effluent monitoring instrumentation channels inoperable, take the action shown in Table 3.1-2.

SURVEILLANCE REQUIREMENTS

4.1.2.a The setpoints shall be determined in accordance with ODCM.

4.1.2.b Each radioactive gaseous effluent monitoring instrumentation channel shall be demonstrated operable at the frequencies shown in Table 4.1-2.

TABLE 3.1-2

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

Instrument	Minimum Channels Operable	Applicability	Parameter	Action[1]
1. MAIN STACK EFFLUENT MONITORING SYSTEM				
a. Noble Gas Activity Monitor Providing Alarm	1	[2]	Radioactivity Rate Measurement	1
b. Iodine Sampler Cartridge	1	[2]	Collect Halogen Sample	2
c. Particulate Sampler Filter	1	[2]	Collect Particulate Sample	2
d. Effluent System Flow Rate Measuring Device	1	[2]	System Flow Rate Measurement	3
e. Sampler Flow Rate Measuring Device	1	[2]	Sampler Flow Rate Measurement	3
2. REACTOR BUILDING VENTILATION EFFLUENT MONITORING SYSTEM				
a. Noble Gas Activity Monitor Providing Alarm	1	[2]	Radioactivity Rate Measurement	1
b. Iodine Sampler Cartridge	1	[2]	Collect Halogen Sample	2
c. Particulate Sampler Filter	1	[2]	Collect Particulate Sample	2
d. Effluent System Flow Rate Measuring Device	1	[2]	System Flow Rate Measurement	3
e. Sampler Flow Rate Measuring Device	1	[2]	Sampler Flow Rate Measurement	3

TABLE 3.1-2 (continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

Instrument	Minimum Channels Operable	Applicability	Parameter	Action[1]
3. STEAM JET AIR EJECTOR RADIOACTIVITY MONITOR				
a. Noble Gas Activity Monitor (Providing Alarm and Auto-isolation of Stack)	1	[3]	Noble Gas Radioactivity Rate Measurement	4

[1] Actions Required --

ACTION 1*: With the number of operable channels less than required by the minimum channels operable requirement, effluent releases via this pathway may continue provided grab samples are taken at least once per 12 hours and these samples are analyzed for activity within 24 hours.

ACTION 2*: With the number of operable channels less than required by the minimum channels operable requirement, effluent releases via this pathway may continue provided samples are continuously collected with auxiliary sampling equipment as required in Table 4.3-1.

ACTION 3*: With the number of operable channels less than required by the minimum channels operable requirement, effluent releases via this pathway may continue provided the flow rate is estimated at least once per 4 hours.

ACTION 4: With the number of operable channels less than required by the minimum channels operable requirement, gases from the steam jet air ejector may be released to the offgas system for up to 72 hours provided:

a. The augmented offgas treatment system is not bypassed; and,
b. The offgas holdup system noble gas activity effluent monitor (downstream) is operable.

* Note: (For Actions 1, 2, and 3) If the instruments are not returned to operable status within 30 days, explain in the next Annual Radioactive Effluent Release Report why the inoperability was not corrected in a timely manner.

[2] During releases via this pathway.

[3] During operation of steam jet air ejector.

TABLE 4.1-2

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Instrument	Instrument Check	Source Check	Instrument Calibration	Instrument Functional Test
1. MAIN STACK EFFLUENT MONITORING SYSTEM				
a. Noble Gas Activity Monitor (2 channels)	Daily[1]	Monthly	Once per 18 months [2]	Quarterly
b. Iodine Sampler Cartridge	N/A	N/A	N/A	N/A
c. Particulate Sampler Filter	N/A	N/A	N/A	N/A
d. Effluent System Flow Rate Measuring Device	Daily[1]	N/A	Once per 18 months	Quarterly
e. Sampler Flow Rate Measuring Device	Daily[1]	N/A	Once per 18 months	Quarterly
2. REACTOR BUILDING VENTILATION EFFLUENT MONITORING SYSTEM				
a. Noble Gas Activity Monitor (2 channels)	Daily[1]	Monthly	Once per 18 months [2]	Quarterly
b. Iodine Sampler Cartridge	N/A	N/A	N/A	N/A
c. Particulate Sampler Filter	N/A	N/A	N/A	N/A
d. Effluent System Flow Rate Measuring Device	Daily[1]	N/A	Once per 18 months	Quarterly
e. Sampler Flow Rate Measuring Device	Daily[1]	N/A	Once per 18 months	Quarterly

TABLE 4.1-2 (continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

Instrument	Instrument Check	Source Check	Instrument Calibration	Instrument Functional Test
3. STEAM JET AIR EJECTOR RADIOACTIVITY MONITOR				
a. Noble Gas Activity Monitor	Daily[3]	N/A	Once per 24 months[2]	Quarterly

[1] During releases via this pathway.

[2] Previously established calibration procedures will be used for these requirements.

[3] During operation of the steam jet air ejector.

3/4.2 RADIOACTIVE LIQUID EFFLUENTS

3/4.2.1 Liquid Effluents Concentration

CONTROLS

3.2.1 The concentration of radioactive material released at any time from the site to areas at and beyond the site boundary shall be limited to the concentrations specified in 10CFR20, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration of individual isotopes shall be limited to 2E-04 μCi/mL.

APPLICABILITY: At all times.

ACTION:

With the concentration of radioactive material released from the site to areas at and beyond the site boundary exceeding the above limits, without delay restore concentration within the above limits.

SURVEILLANCE REQUIREMENTS

4.2.1.a The radioactivity content of each batch of radioactive liquid waste to be discharged shall be determined prior to release by sampling and analysis in accordance with Table 4.2-1.

4.2.1.b The results of pre-release analyses shall be used with calculational methods in the Offsite Dose Calculation Manual (ODCM) to assure that the concentration at the point of release is limited to the values in Control 3.2.1.

TABLE 4.2-1

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

Liquid Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection[1] µCi/mL
1. Batch Waste Release Tanks[2] a. Non-treatable Releases (e.g., Neutralizer Sumps), AND b. Treatable Releases (e.g., Radwaste Tanks)	Each Batch	Prior to Each Batch Release	Principal Gamma Emitters[3]	5E-07
			I-131	1E-06
			Dissolved and Entrained Gases	1E-05
	Composite from Each Batch	Monthly Composite[4]	H-3	1E-05
			Gross Alpha	1E-07
		Quarterly Composite[4]	Sr-89, Sr-90	5E-08
			Fe-55	1E-06
2. Continuous Releases a. Salt Service Water	Weekly Grab Sample	Weekly	Principal Gamma Emitters[3]	5E-07

(1) Refer to Appendix B of the ODCM for definition of lower limit of detection (LLD).

(2) A batch release is the discharge of liquid wastes of a discrete volume.

(3) The principal gamma emitters for which the LLD control applies exclusively are 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 be analyzed and reported in the Annual Radioactive Effluent Release Report.

(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 which is representative of the liquids released.

3/4.2 RADIOACTIVE LIQUID EFFLUENTS

3/4.2.2 Dose - Liquids

CONTROLS

3.2.2 The dose or dose commitment to a member of the public from radioactive materials in liquid effluents released at and beyond the site boundary shall be limited:

a. During any calendar quarter to $\leq$ 1.5 mrem to the total body and to $\leq$ 5 mrem to any organ; and,

b. During any calendar year to $\leq$ 3 mrem to the total body and to $\leq$ 10 mrem to any organ.

APPLICABILITY: At all times

ACTION:

With the calculated dose from the release of radioactive materials in liquid effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, a special report that identifies the cause(s), corrective actions taken, and corrective actions to be taken.

SURVEILLANCE REQUIREMENTS

4.2.2 Dose Calculations - Cumulative dose contributions from liquid effluents shall be determined in accordance with the ODCM for each calendar month during which releases occurred.

3/4.2 RADIOACTIVE LIQUID EFFLUENTS

3/4.2.3 Liquid Radwaste Treatment

CONTROLS

3.2.3 The liquid radwaste treatment system shall be maintained and used to reduce the radioactive materials in liquid wastes prior to their discharge when the dose due to liquid effluent releases to areas at and beyond the site boundary averaged over a 31-day period would exceed 0.06 mrem to the total body or 0.20 mrem to any organ.

APPLICABILITY: At all times.

ACTION:

With radioactive liquid waste being discharged without treatment and in excess of the above limits, prepare and submit to the Commission within 30 days a special report which includes the following information:

1. Explanation of why liquid radwaste was being discharged without treatment, identification of any inoperable equipment or subsystems, and the reason for the inoperability; and,

2. Action(s) taken to restore the inoperable equipment to operable status; and,

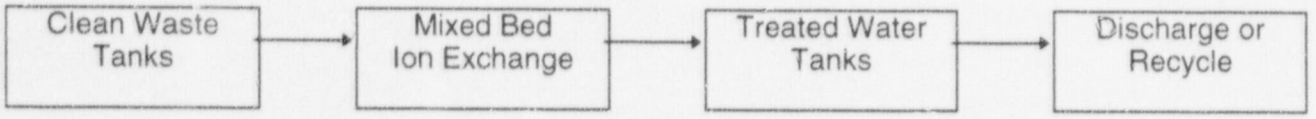
3. Summary description of action(s) taken to prevent a recurrence.

SURVEILLANCE REQUIREMENTS

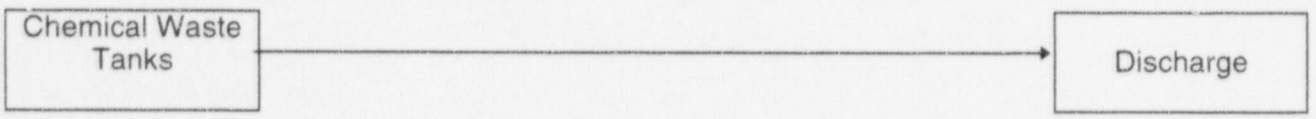
4.2.3.a Doses due to liquid releases at and beyond the site boundary shall be calculated at least once per 31-day period in accordance with the ODCM, only if releases in that period have occurred.

4.2.3.b The liquid radwaste treatment system schematic is shown in Figure 4.2-1.

HIGH PURITY WASTE SYSTEM



LOW PURITY WASTE SYSTEM



DETERGENT WASTE SYSTEM (Decon Areas)

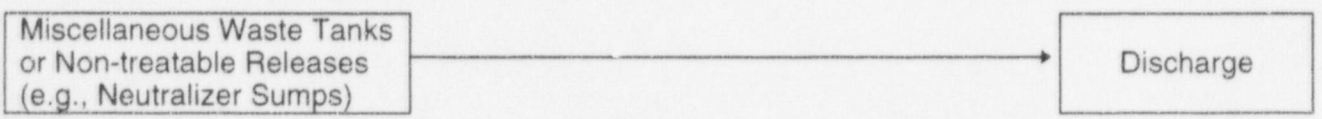


Figure 4.2-1
Liquid Radwaste Treatment System Schematic

3/4.3 RADIOACTIVE GASEOUS EFFLUENTS

3/4.3.1 Gaseous Effluents Dose Rate

CONTROLS

3.3.1 The instantaneous dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site boundary (see FSAR Figure 1.6-1) shall be limited to the following:

a. For noble gases: Less than or equal to 500 mrem/yr to the total body and less than or equal to 3000 mrem/yr to the skin; and,

b. For iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days: Less than or equal to 1500 mrem/yr to any organ.

APPLICABILITY: At all times.

ACTION:

With the instantaneous dose rate(s) exceeding the above limits, without delay restore the release rate to within the above limit(s).

SURVEILLANCE REQUIREMENTS

4.3.1.a The instantaneous dose rate due to noble gases in gaseous effluents shall be determined to be within the limits of Control 3.3.1.a on a continuous basis using the noble gas activity monitors with appropriate setpoints and in accordance with the ODCM.

4.3.1.b The instantaneous dose rate due to iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents shall be determined to be within the limits of Control 3.3.1.b in accordance with the ODCM by obtaining representative samples and performing analyses in accordance with the sampling and analysis program specified in Table 4.3-1.

TABLE 4.3-1

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

Gaseous Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection[1] µCi/mL
Main Stack and Reactor Building Vent	Monthly Grab Sample	Monthly	Principal Gamma Emitters[2]	1E-04
			H-3	1E-06
	Continuous[3]	Weekly[4] Charcoal Sample	I-131	1E-12
	Continuous[3]	Weekly[4] Particulate Sample	Principal Gamma Emitters[2]	1E-11
	Continuous[3]	Monthly Composite Particulate Sample	Gross Alpha	1E-11
	Continuous[3]	Quarterly Composite Particulate Sample	Sr-89, Sr-90	1E-11
	Continuous[3]	Continuous Noble Gas Monitor	Noble Gas Gross Gamma	1E-06

(1) Refer to Appendix B of the ODCM for definition of lower limit of detection (LLD).

(2) The principal gamma emitters for which the LLD control applies exclusively are 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 be analyzed and reported in the Annual Radioactive Effluent Release Report.

(3) 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 Controls 3.3.1, 3.3.2, and 3.3.3.

(4) When the average daily gross radioactivity release rate increases by 50 percent over the previous day (after factoring out power level changes and/or changes in hydrogen injection rate), the iodine and particulate filters shall be analyzed to determine the release rate for iodines and particulates.

3/4.3 RADIOACTIVE GASEOUS EFFLUENTS

3/4.3.2 Dose - Noble Gases

CONTROLS

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

a. During any calendar quarter, to ≤ 5 mrad for gamma radiation and ≤ 10 mrad for beta radiation; and,

b. During any calendar year, to ≤ 10 mrad for gamma radiation and ≤ 20 mrad for beta radiation.

APPLICABILITY: At all times

ACTION:

With the calculated air dose from radioactive noble gases in gaseous effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, a special report which identifies the cause(s), the corrective actions taken, and corrective actions to be taken.

SURVEILLANCE REQUIREMENTS

4.3.2 Dose Calculations - Cumulative dose contributions for the total time period shall be determined in accordance with the ODCM for each calendar month during which releases occurred.

3/4.3 RADIOACTIVE GASEOUS EFFLUENTS

3/4.3.3 Dose - Iodine-131, Iodine-133, Radioactive Material in Particulate Form, and Tritium

CONTROLS

3.3.3 The dose to a member of the public from iodine-131, iodine-133, radioactive materials in particulate form with half-lives greater than 8 days, and tritium in gaseous effluents released to areas at and beyond the site boundary shall be limited to the following:

a. During any calendar quarter to $\leq$ 7.5 mrem to any organ; and,

b. During any calendar year to $\leq$ 15 mrem to any organ.

APPLICABILITY: At all times

ACTION:

With the calculated dose from the release of iodine-131, iodine-133, radioactive materials in particulate form, and tritium in gaseous effluents exceeding any of the above limits; prepare and submit to the Commission within 30 days, a special report which identifies the cause(s), corrective actions taken, and the corrective actions to be taken.

SURVEILLANCE REQUIREMENTS

4.3.3 Dose Calculations - Cumulative dose contributions for the total time period shall be determined for iodine-131, iodine-133, radioactive material in particulate form with half-lives greater than 8 days, and tritium in accordance with the ODCM for each calendar month during which releases occurred.

3/4.3 RADIOACTIVE GASEOUS EFFLUENTS

3/4.3.4 Gaseous Effluent Treatment

CONTROLS

3.3.4 The augmented offgas system shall be put into service prior to reaching 50 percent reactor power during startup.

APPLICABILITY: Whenever the plant is operating at or above 50 percent reactor power.

ACTION:

With gaseous effluents being discharged for more than 14 days without treatment, prepare and submit to the Commission within 30 days, a special report which includes the following information:

1. Identification of any inoperable equipment or subsystems, and the reason for the inoperability; and,

2. Action(s) taken tc restore the inoperable equipment to operable status; and,

3. Summary description of action(s) taken to prevent a recurrence.

SURVEILLANCE REQUIREMENTS

4.3.4.a Augmented offgas annunciator operability shall be verified once per 12 hours when the augmented offgas system is in use.

4.3.4.b The gaseous effluent treatment system schematic is shown in Figure 4.3-1.



(1) No significant effect in reducing offsite doses when compared to transit time required for releases to reach site boundary.

Figure 4.3-1
Gaseous Effluent Treatment System Schematic

3/4.4 TOTAL DOSE

3/4.4.1 Total Dose

CONTROLS

3.4.1 The dose or dose commitment to any member of the public from Pilgrim Station sources is limited to ≤ 25 mrem to the total body or any organ (except the thyroid, which is limited to ≤ 75 mrem) over a period of any calendar year.

APPLICABILITY: At all times

ACTION:

With the calculated dose from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of Controls 3.2.2, 3.3.2 or 3.3.3; prepare and submit a special report to the Commission and limit the subsequent releases such that the dose or dose commitment to any member of the public from all uranium fuel cycle sources is limited to ≤ 25 mrem to the total body or any organ (except thyroid, which is limited to ≤ 75 mrem) over any calendar year. This special report shall include an analysis which demonstrates that radiation exposures to all members of the public from all uranium fuel cycle sources (including all effluent pathways and direct radiation) are less than the 40CFR190 standard. Otherwise, obtain a variance from the Commission to permit releases which exceed the 40CFR190 standard.

SURVEILLANCE REQUIREMENTS

4.4.1 Dose Calculations - Cumulative dose contributions from liquid and gaseous effluents shall be determined in accordance with Controls 3.2.2, 3.3.2, and 3.3.3; and in accordance with the ODCM.

3/4.5 RADIOLOGICAL ENVIRONMENTAL MONITORING

3/4.5.1 Environmental Monitoring Program

CONTROLS

3.5.1 An environmental monitoring program shall be conducted to evaluate the effects of station operation on the environs and to verify the effectiveness of the source controls on radioactive materials

The radiological environmental monitoring program shall be conducted as specified in Tables 3.5-1 through 3.5-3.

APPLICABILITY: At all times.

ACTION:

a. With the radiological environmental monitoring program not being conducted as specified in Tables 3.5-1 through 3.5-3, prepare and submit to the Commission, in the Annual Radiological Environmental Monitoring Report required by Technical Specifications Administrative Control 5.6.2, a description of the reasons for not conducting the program as required and the plans for preventing a recurrence.

b. With the level of radioactivity as the result of plant effluents in an environmental sampling medium at a specified location exceeding the reporting levels of Table 3.5-4 when averaged over any calendar quarter, prepare and submit to the Commission within 30 days, a special report that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose to a member of the public is less than the calendar year limits of Controls 3.2.2, 3.3.2, or 3.3.3. When more than one of the radionuclides in Table 3.5-4 are detected in the sampling medium, this report shall be submitted if:

$$\frac{\text{Concentration (1)}}{\text{Reporting Level (1)}} + \frac{\text{Concentration (2)}}{\text{Reporting Level (2)}} + \ldots\ldots \geq 1.0$$

When radionuclides other than those in Table 3.5-4 are detected and are the result of plant effluents, this report shall be submitted if the potential annual dose to a member of the public is equal to or greater than the calendar year limits of Controls 3.2.2, 3.3.2, or 3.3.3. This report is not required if the measured level of radioactivity was not the result of plant effluents; however, in such an event, the condition shall be reported and described in the Annual Radiological Environmental Monitoring Report.

3/4.5 RADIOLOGICAL ENVIRONMENTAL MONITORING

3/4.5.1 Environmental Monitoring Program (Continued)

CONTROLS

ACTION: (continued)

c. With milk or fresh leafy vegetable samples unavailable from one or more of the sample locations required by Table 3.5-1, identify locations for obtaining replacement samples and add them to the Radiological Environmental Monitoring Program within 30 days. The specific locations from which samples were unavailable may then be deleted from the monitoring program. Pursuant to Technical Specifications Administrative Control 5.6.2, identify the cause of the unavailability of samples and identify the new location(s) obtaining replacement samples in the next Annual Radiological Environmental Monitoring Report and also include in the report the table for the ODCM reflecting the new location(s).

SURVEILLANCE REQUIREMENTS

4.5.1 The radiological environmental monitoring samples shall be collected pursuant to Tables 3.5-1 through 3.5-3 in the Offsite Dose Calculation Manual (ODCM) and shall be analyzed pursuant to the requirements of Table 3.5-1 and the detection capabilities required by Table 4.5-1.

1. Cumulative dose contributions from the current calendar year from radionuclides detected in environmental samples shall be determined in accordance with the methodology and parameters in the ODCM. These results will be reported in the Annual Radiological Environmental Monitoring Report.

TABLE 3.5-1

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway, Sample, or Measurement Type	Sampling, Measurement, and/or Collection Locations	Sampling, Measurement, and/or Collection Frequency	Type and Frequency of Analysis or Measurement
DIRECT RADIATION			
Environmental TLD	110 Locations, See Table 3.5-2	Quarterly Collection	Gamma exposure [1]; Quarterly
Exposure Rate Survey	Priscilla Beach, White Horse Beach, Plymouth Beach, Duxbury Beach [2]	Annual Measurement	Gamma exposure rate survey [1]; Annually
Soil	11 Locations, See Table 3.5-3	Once per 3-year Measurement	Gamma isotopic and exposure rate survey [1]; 3-year interval
AIRBORNE			
Particulates	11 Locations, See Table 3.5-3	Continuous sampling with particulate filter; Weekly Collection	Gross beta radioactivity analysis 24 hours or more after weekly filter change [3]; Weekly AND Gamma isotopic [4] of composite by location; Quarterly
Radioiodines	11 Locations, See Table 3.5-3	Continuous sampling with charcoal cartridge; Weekly Collection	I-131 analysis; Weekly

TABLE 3.5-1 (continued)

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway, Sample, or Measurement Type	Sampling, Measurement, and/or Collection Locations	Sampling, Measurement, and/or Collection Frequency	Type and Frequency of Analysis or Measurement
MARINE/AQUATIC			
Surface Water	Discharge Canal, --- Bartlett Pond, Powder Point Control [2]	Continuous Composite Sample --- Weekly grab sample	Gamma isotopic [4], [5] analysis of monthly composite samples; AND H-3 analysis of quarterly composite samples
Sediment	Discharge Canal Outfall, Manomet Point, Plymouth Beach, Plymouth Harbor, Duxbury Bay Control [2], Green Harbor Control [2]	Semiannual Collection [6]	Gamma isotopic analysis [4], [5], [6]
Irish Moss (Algae)	Discharge Canal Outfall, Manomet Point, Ellisville, Brant Rock Control [2]	Quarterly Collection (at approximately 3-month intervals)	Gamma isotopic analysis [4]
Shellfish (clams, mussels or quahogs as available)	Discharge Canal Outfall, Manomet Point, Plymouth Harbor, Duxbury Bay Control [2], Green Harbor Control [2]	Quarterly Collection (at approximately 3-month intervals)	Gamma isotopic analysis [4], [7] of all samples
Lobster	Discharge Canal Outfall --- Offshore Control [2]	Four times per season --- Once per season	Gamma isotopic analysis [4] on edible portions
Fishes	Discharge Canal Outfall --- Offshore Control [2]	Quarterly (when particular species are available) for Groups I and II [8]; in season for Groups III and IV [8]; --- Annually for each group [8];	Gamma isotopic analysis [4] on edible portions [8]

TABLE 3.5-1 (continued)

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway, Sample, or Measurement Type	Sampling, Measurement, and/or Collection Locations	Sampling, Measurement, and/or Collection Frequency	Type and Frequency of Analysis or Measurement
TERRESTRIAL			
Milk	Plymouth County Farm[3] (when available), Whitman Farm Control [2]	Bimonthly during periods when animals are on pasture, otherwise monthly	Gamma isotopic analysis [4], AND radioiodine analysis on all samples
Forage	Plymouth County Farm[3], Whitman Farm Control [2]	Annually	Gamma isotopic analysis [4]
Tuberous and Green Leafy Vegetables	Plymouth County Farm[3], Bridgewater Farm Control [2]	At time of harvest	Gamma isotopic analysis [4] on edible portions
Cranberries	Manomet Point Bog, Bartlett Rd. Bog, Pine St. Bog Control [2]	At time of harvest	Gamma isotopic analysis [4] on edible portions

NOTES

(1) Minimum sensitivities for gamma exposure/exposure rate measurements are as follows:
Gamma exposure (TLD): 1 μR/hr average quarterly exposure rate.
Gamma exposure rate survey: 1 μR/hr exposure rate.

(2) Indicates control location.

(3) If gross beta radioactivity is greater than 10 times the control value, gamma isotopic analysis will be performed on the sample.

(4) Gamma isotopic analysis means the identification and quantification of gamma-emitting radionuclides that may be attributable to the effluents from the facility.

(5) If integrated gamma activity (less K-40) is greater than 10 times the control value (less K-40), strontium-90 analysis will be performed on the sample.

TABLE 3.5-1 (Continued)

NOTES

(6) Sediment samples from four locations (Discharge Canal Outfall, Manomet Point, Plymouth Harbor, and head of Duxbury Bay) will be analyzed once per year (preferably early summer) as follows:

Cores will be taken to depths of 30-cm minimum depth, wherever sediment conditions permit, by a hand-coring sampling device. If sediment conditions do not permit 30-cm deep cores, the deepest cores achievable with a hand-coring device will be taken. In any case, core depths will not be less than 14-cm. Core samples will be sectioned into 2-cm increments, and surface and alternate increments analyzed, other reserved. Sediment sample volumes (determined by core diameter and/or number of individual cores taken from any single location) and counting technique will be sufficient to achieve sensitivities of 50 pCi/kg dry sediment for Co-60, Zn-65, Zr-95, Cs-134, and Cs-137; and 150 pCi/kg for Ce-144. In any case, individual core diameters will not be less than 2 inches.

The top 2-cm section from each core will be analyzed for Pu isotopes (Pu-238, Pu-239/240) using radiochemical separations, electrodeposition, and alpha spectroscopy with target sensitivity of 25 pCi/kg dry sediment. Two additional core slices per year (mid-depth slice from two core samples) will be similarly analyzed.

(7) Mussel samples from four locations (Discharge Canal Outfall, Manomet Point, Plymouth Harbor, and Green Harbor in Marshfield) will be analyzed quarterly as follows:

One kilogram wet weight of mussel bodies, including fluid within shells will be collected. Bodies will be reduced in volume by drying at about 100°C. Sample will be compacted and analyzed by Ge(Li) gamma spectrometry or alternate technique, if necessary, to achieve a sensitivity of 5 pCi/kg for Co-60, Zn-65, Zr-95, Cs-134, and Cs-137; and 15 pCi/kg for Ce-144. Sensitivity values are to be determined in accordance with a 95% confidence level on k_a, and a 50% confidence level on k_b (See HASL-300 for definitions).

The mussel shell sample from one location will be analyzed each quarter. One additional mussel shell sample will be analyzed semiannually. Unscrubbed shells to be analyzed will be dried, processed, and analyzed similarly to the mussel bodies.

Because of the small volume reduction in pre-processing of shells, sensitivities attained will be less than that for mussel bodies. The equipment and counting times to be employed for analyses of shells will be the same or comparable to that employed for mussel bodies so that the reduction in sensitivities (relative to those for mussel bodies) will be strictly limited to the effects of poorer geometry related to lower sample volume reduction. Shell samples not scheduled for analysis will be reserved (unscrubbed) for possible later analysis.

If radiocesium (Cs-134 and Cs-137) activity exceeds 200 pCi/kg (wet) in mussel bodies, these samples will be analyzed by radiochemical separation, electrodeposition, and alpha spectroscopy for radioisotopes of plutonium, with a sensitivity of 0.4 pCi/kg.

TABLE 3.5-1 (Continued)

NOTES

(8) Fish analyses will be performed on a minimum of 2 sub-samples, consisting of approximately 400 grams each from each of the following groups:

I. Bottom Oriented	II. Near Bottom Distribution	III. Anadromous	IV. Coastal Migratory
Winter Flounder	Tautog	Alewife	Bluefish
Yellowtail Flounder	Cunner	Rainbow Smelt	Atlantic Herring
	Atlantic Cod	Striped Bass	Atlantic Menhaden
	Pollock		Atlantic Mackerel
	Hakes		

(9) These locations may be altered in accordance with results of land use census surveys discussed in Effluent Control 4.5.2.

TABLE 3.5-2

ENVIRONMENTAL TLD LOCATIONS

TLD Station		Location[1]	TLD Station		Location[1]
Description	Code	Distance/Direction	Description	Code	Distance/Direction
TLDs Within Protected Area			Zone 1 TLDs: 0-3 km		
O&M/RXB. BREEZEWAY	P21	50 m SE	EMERSON ROAD	EM	1.53 km SSE
EXEC.BUILDING	P24	57 m W	EMERSON/PRISCILLA	EP	1.55 km SE
FENCE-R SCREENHOUSE	P04	66 m N	EDISON ACCESS ROAD	AR	1.59 km SSE
O&M - 2ND W WALL	P20	67 m SE	BAYSHORE	BS	1.76 km W
EXEC.BUILDING LAWN	P25	76 m WNW	STATION E	E	1.86 km S
FENCE-WATER TANK	P05	81 m NNE	JOHN GAULEY	JG	1.99 km W
FENCE-OIL STORAGE	P06	85 m NE	STATION J	J	2.04 km SSE
O&M - 2ND SW CORNER	P19	86 m S	WHITEHORSE ROAD	WH	2.09 km SSE
O&M - 1ST SW CORNER	P18	90 m S	PLYMOUTH YMCA	RC	2.09 km WSW
COMPRESSED GAS STOR	P08	92 m E	STATION K	K	2.17 km S
FENCE-L SCREENHOUSE	P03	100 m NW	TAYLOR/THOMAS	TT	2.26 km SE
FENCE-EXEC.BUILDING	P17	107 m W	YANKEE VILLAGE	YV	2.28 km WSW
O&M - 2ND S WALL	P23	121 m ENE	GOODWIN PROPERTY	GN	2.38 km SW
FENCE-INTAKE BAY	P07	121 m SSE	RIGHT OF WAY	RW	2.83 km S
FENCE-WAREHOUSE	P26	134 m ESE	TAYLOR/PEARL	TP	2.98 km SE
FENCE-SHOREFRONT	P02	135 m NW			
FENCE-W BOAT RAMP	P09	136 m E	Zone 2 TLDs: 3-8 km		
O&M - 2ND N WALL	P22	137 m SE	VALLEY ROAD	VR	3.26 km SSW
FENCE-W SWITCHYARD	P16	172 m SW	MANOMET ELEM	ME	3.29 km SE
FENCE-TCF GATE	P11	183 m ESE	WARREN/CLIFFORD	WC	3.31 km W
FENCE-TCF/BOAT RAMP	P27	185 m ESE	RT.3A/BARTLETT RD	BB	3.33 km SSE
FENCE-ACCESS GATE	P12	202 m SE	MANOMET POINT	MP	3.57 km SE
FENCE-E SWITCHYARD	P15	220 m S	MANOMET SUBSTATION	MS	3.60 km SSE
FENCE-TCF/INTAKE BAY	P10	223 m E	BEACHWOOD ROAD	BW	3.93 km SE
FENCE-MEDICAL BLDG.	P13	224 m SSE	PINES ESTATE	PT	4.44 km SSW
FENCE-BUTLER BLDG	P14	228 m S	EARL ROAD	EA	4.60 km SSE
FENCE-TCF/PRKNG LOT	P28	259 m ESE	S PLYMOUTH SUBST	SP	4.62 km W
			ROUTE 3 OVERPASS	RP	4.81 km SW
Zone 1 TLDs: 0-3 km			RUSSELL MILLS RD	RM	4.85 km WSW
BOAT LAUNCH WEST	BLW	0.11 km E	HILLDALE ROAD	HD	5.18 km W
OVERLOOK AREA	OA	0.15 km W	MANOMET BEACH	MB	5.43 km SSE
HEALTH CLUB	TC	0.15 km WSW	BEAVERDAM ROAD	BR	5.52 km S
BOAT LAUNCH EAST	BLE	0.16 km ESE	PLYMOUTH CENTER	PC	6.69 km W
PEDESTRIAN BRIDGE	PB	0.21 km N	LONG POND/DREW RD	LD	6.97 km WSW
SHOREFRONT SECURITY	P01	0.22 km NNW	HYANNIS ROAD	HR	7.33 km SSE
MEDICAL BUILDING	WS	0.23 km SSE	MEMORIAL HALL	MH	7.58 km WNW
PARKING LOT	CT	0.31 km SE	SAQUISH NECK	SN	7.58 km NNW
SHOREFRONT PARKING	PA	0.35 km NNW	COLLEGE POND	CP	7.59 km SW
STATION A	A	0.37 km WSW			
STATION F	F	0.43 km NW	Zone 3 TLDs: 8-15 km		
STATION B	B	0.44 km S	DEEP WATER POND	DW	8.59 km W
EAST BREAKWATER	EB	0.44 km ESE	LONG POND ROAD	LP	8.88 km SSW
PNPS MET TOWER	PMT	0.44 km WNW	NORTH PLYMOUTH	NP	9.38 km WNW
STATION H	H	0.47 km SW	STANDISH SHORES	SS	10.39 km NW
STATION I	I	0.48 km WNW	ELLISVILLE ROAD	EL	11.52 km SSE
STATION L	L	0.50 km ESE	UP COLLEGE POND RD	UC	11.78 km SW
STATION G	G	0.53 km W	SACRED HEART	SH	12.92 km W
STATION D	D	0.54 km NW	KING CAESAR ROAD	KC	13.11 km NNW
PROPERTY LINE	PL	0.54 km NNW	BOURNE ROAD	BE	13.37 km S
STATION C	C	0.57 km ESE	SHERMAN AIRPORT	SA	13.43 km WSW
HALL'S BOG	HB	0.63 km SE			
GREENWOOD HOUSE	GH	0.65 km ESE	Zone 4 TLDs: >15 km[2]		
W ROCKY HILL ROAD	WR	0.83 km WNW	CEDARVILLE SUBST	CS	15.93 km S
E ROCKY HILL ROAD	ER	0.89 km SE	KINGSTON SUBST	KS	16.15 km WNW
MICROWAVE TOWER	MT	1.03 km SSW	LANDING ROAD	LR	16.46 km NNW
CLEFT ROCK	CR	1.27 km SSW	CHURCH/WEST	CW	16.56 km NW
BAYSHORE/GATE RD	BD	1.34 km WNW	MAIN/MEADOW	MM	17.02 km WSW
MANOMET ROAD	MR	1.38 km S	DIV MARINE FISH	DMF	20.97 km SSE
DIRT ROAD	DR	1.48 km SW	EAST WEYMOUTH SUBST	EW	39.69 km NW

(1) Distance and direction are measured from the centerline of the Reactor Building to the monitoring location.
(2) Indicates control locations.

TABLE 3.5-3

ROUTINE RADIOLOGICAL ENVIRONMENTAL SAMPLING LOCATIONS

Description	No.	Code	Distance	Direction
Exposure Rate Survey				
Priscilla Beach	--	--	1.9 km	SE
Whitehorse Beach	--	--	2.6 km	SE
Plymouth Beach - Parking Lot	--	--	3.6 km	W
Plymouth Beach - Inner	--	--	6.0 km	WNW
Plymouth Beach - Outer	--	--	7.2 km	WNW
Duxbury Beach - Control	--	--	11.0 km	NNW
Air Particulate Filters, Charcoal Cartridges, Soil				
Overlook Area	08	OA	0.1 km	W
Pedestrian Bridge	07	PB	0.2 km	N
Medical Building	00	WS	0.2 km	SSE
East Breakwater	09	EB	0.5 km	ESE
Property Line	06	PL	0.5 km	NNW
West Rocky Hill Road	03	WR	0.8 km	WNW
East Rocky Hill Road	01	ER	0.9 km	SE
Cleft Rock	10	CR	1.3 km	SSW
Manomet Substation	17	MS	3.6 km	SSE
Plymouth Center	15	PC	6.7 km	W
East Weymouth Control	21	EW	40 km	NW
Milk				
Plymouth County Farm	11	CF	5.6 km	W
Whitman Farm Control	21	WF	34 km	WNW
Forage				
Whipple Farm	43	WH	2.9 km	SW
Plymouth County Farm	11	CF	5.6 km	W
Whitman Farm Control	12	WF	34 km	WNW
Vegetation [1]				
Plymouth County Farm	11	CF	5.6 km	W
Bridgewater Farm Control	27	BF	31 km	W
Cranberries				
Manomet Point Bog	13	MR	3.9 km	SE
Bartlett Road Bog	14	BT	4.3 km	SSE
Pine Street Bog Control	23	PS	26 km	WNW

TABLE 3.5-3 (CONTINUED)

ROUTINE RADIOLOGICAL ENVIRONMENTAL SAMPLING LOCATIONS

Description	No.	Code	Distance	Direction
Surface Water				
Discharge Canal	11	DIS	0.2 km	N
Bartlett Pond	17	BP	2.7 km	SE
Powder Point Control	23	PP	13 km	NNW
Sediment				
Discharge Canal Outfall	11	DIS	0.8 km	NE
Manomet Point	15	MP	3.3 km	ESE
Plymouth Beach	14	PLB	4.0 km	WNW
Plymouth Harbor	12	Ply-H	4.1 km	W
Duxbury Bay Control	13	Dux-Bay	14 km	NNW
Green Harbor Control	24	GH	16 km	NNW
Irish Moss				
Discharge Canal Outfall	11	DIS	0.7 km	NNE
Manomet Point	15	MP	4.0 km	ESE
Ellisville	22	EL	12 km	SSE
Brant Rock Control	34	BR	18 km	NNW
Shellfish				
Discharge Canal Outfall	11	DIS	0.7 km	NNE
Manomet Point	15	MP	4.0 km	ESE
Plymouth Harbor	12	Ply-H	4.1 km	W
Duxbury Bay Control	13	Dux-Bay	13 km	NNW
Green Harbor Control	24	GH	16 km	NNW
Lobster				
Discharge Canal Outfall	11	DIS	0.5 km	N
Duxbury Bay Control	13	Dux-Bay	11 km	NNW
Fishes				
Discharge Canal Outfall	11	DIS	0.5 km	N
Jones River Control	30	JR	13 km	WNW
Cape Cod Bay Control	98	CC-Bay	24 km	ESE
Buzzard's Bay Control	90	BB	40 km	SSW
Priest Cove Control	29	PC	48 km	SW
Vineyard Sound Control	92	MV	64 km	SSW

(1) Additional samples of vegetables/vegetation will be collected each year at or near selected gardens identified during the most recent land use census. The locations of these selected gardens are listed in the station procedure describing crop sampling.

Figure 3.5-1

Environmental TLD Locations Within the PNPS Protected Area

TLD Station		Location*
Description	Code	Distance/Direction
TLDs Within Protected Area		
O&M/RXB. BREEZEWAY	P21	50 m SE
EXEC.BUILDING	P24	57 m W
FENCE-R SCREENHOUSE	P04	66 m N
O&M - 2ND W WALL	P20	67 m SE
EXEC.BUILDING LAWN	P25	76 m WNW
FENCE-WATER TANK	P05	81 m NNE
FENCE-OIL STORAGE	P06	85 m NE
O&M - 2ND SW CORNER	P19	86 m S
O&M - 1ST SW CORNER	P18	90 m S
COMPRESSED GAS STOR	P08	92 m E
FENCE-L SCREENHOUSE	P03	100 m NW
FENCE-EXEC.BUILDING	P17	107 m W
O&M - 2ND S WALL	P23	121 m ENE
FENCE-INTAKE BAY	P07	121 m SSE
FENCE-WAREHOUSE	P26	134 m ESE
FENCE-SHOREFRONT	P02	135 m NW
FENCE-W BOAT RAMP	P09	136 m E
O&M - 2ND N WALL	P22	137 m SE
FENCE-W SWITCHYARD	P16	172 m SW
FENCE-TCF GATE	P11	183 m ESE
FENCE-TCF/BOAT RAMP	P27	185 m ESE
FENCE-ACCESS GATE	P12	202 m SE
FENCE-E SWITCHYARD	P15	220 m S
FENCE-TCF/INTAKE BAY	P10	223 m E
FENCE-MEDICAL BLDG.	P13	224 m SSE
FENCE-BUTLER BLDG	P14	228 m S
FENCE-TCF/PRKNG LOT	P28	259 m ESE

* Distance and direction are measured from the centerline of the Reactor Building to the monitoring location.

Figure 3.5-1 (continued)
Environmental TLD Locations Within the PNPS Protected Area

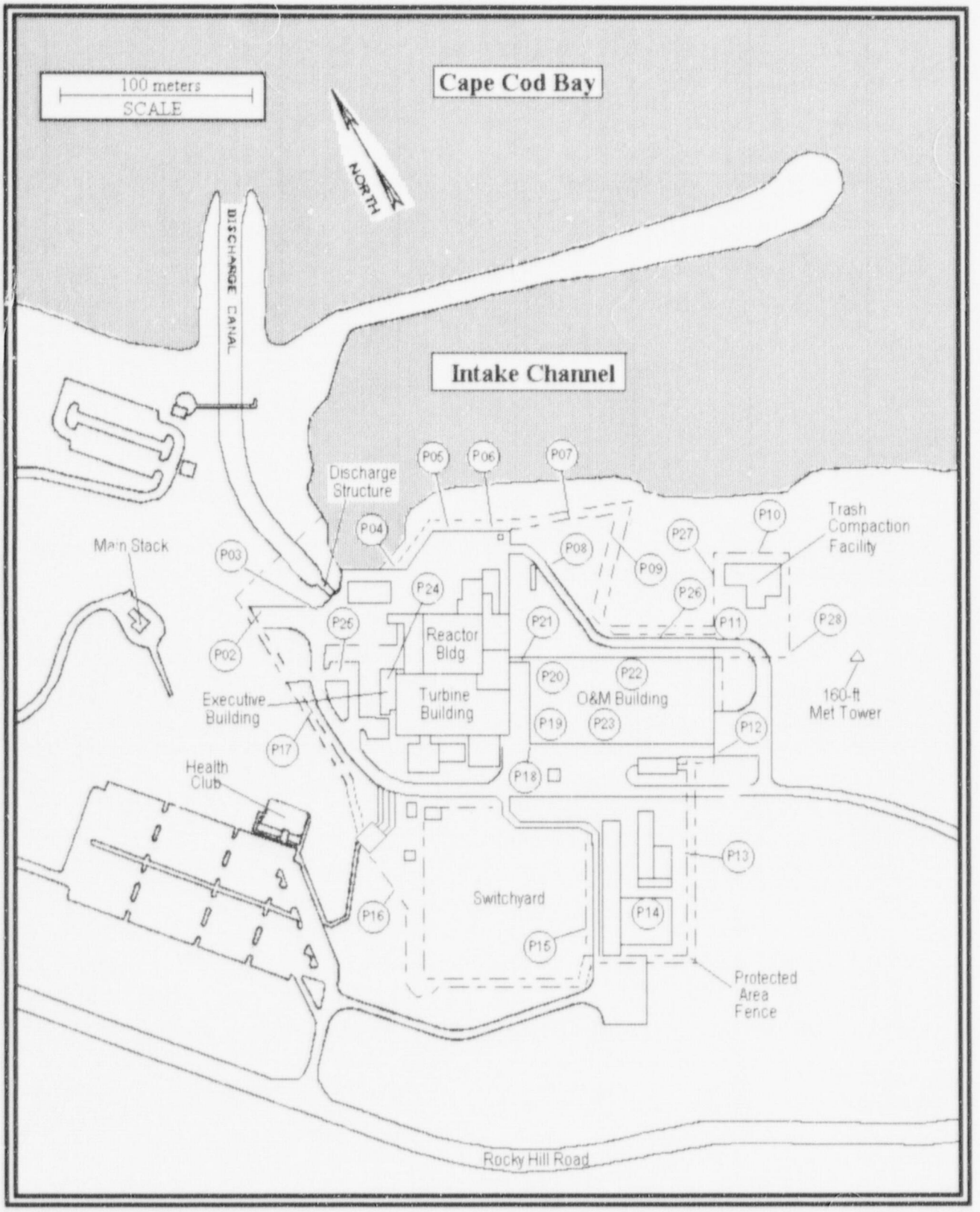


Figure 3.5-2

TLD and Air/Soil Sampling Locations: Within 1 Kilometer

TLD Station		Location*	Air/Soil Sampling Station		Location*
Description	Code	Distance/Direction	Description	Code	Distance/Direction
Zone 1 TLDs: 0-3 km					
BOAT LAUNCH WEST	BLW	0.11 km E	OVERLOOK AREA	OA	0.15 km W
OVERLOOK AREA	OA	0.15 km W	PEDESTRIAN BRIDGE	PB	0.21 km N
HEALTH CLUB	TC	0.15 km WSW	MEDICAL BUILDING	WS	0.23 km SSE
BOAT LAUNCH EAST	BLE	0.16 km ESE	EAST BREAKWATER	EB	0.44 km ESE
PEDESTRIAN BRIDGE	PB	0.21 km N	PROPERTY LINE	PL	0.54 km NNW
SHOREFRONT SECURITY	P01	0.22 km NNW	W ROCKY HILL ROAD	WR	0.83 km WNW
MEDICAL BUILDING	WS	0.23 km SSE	E ROCKY HILL ROAD	ER	0.89 km SE
PARKING LOT	CT	0.31 km SE			
SHOREFRONT PARKING	PA	0.35 km NNW			
STATION A	A	0.37 km WSW			
STATION F	F	0.43 km NW			
STATION B	B	0.44 km S			
EAST BREAKWATER	EB	0.44 km ESE			
PNPS MET TOWER	PMT	0.44 km WNW			
STATION H	H	0.47 km SW			
STATION I	I	0.48 km WNW			
STATION L	L	0.50 km ESE			
STATION G	G	0.53 km W			
STATION D	D	0.54 km NW			
PROPERTY LINE	PL	0.54 km NNW			
STATION C	C	0.57 km ESE			
HALL'S BOG	HB	0.63 km SE			
GREENWOOD HOUSE	GH	0.65 km ESE			
W ROCKY HILL ROAD	WR	0.83 km WNW			
E ROCKY HILL ROAD	ER	0.89 km SE			

* Distance and direction are measured from the centerline of the Reactor Building to the monitoring location.

Figure 3.5-2 (continued)

TLD and Air Sampling Locations: Within 1 Kilometer

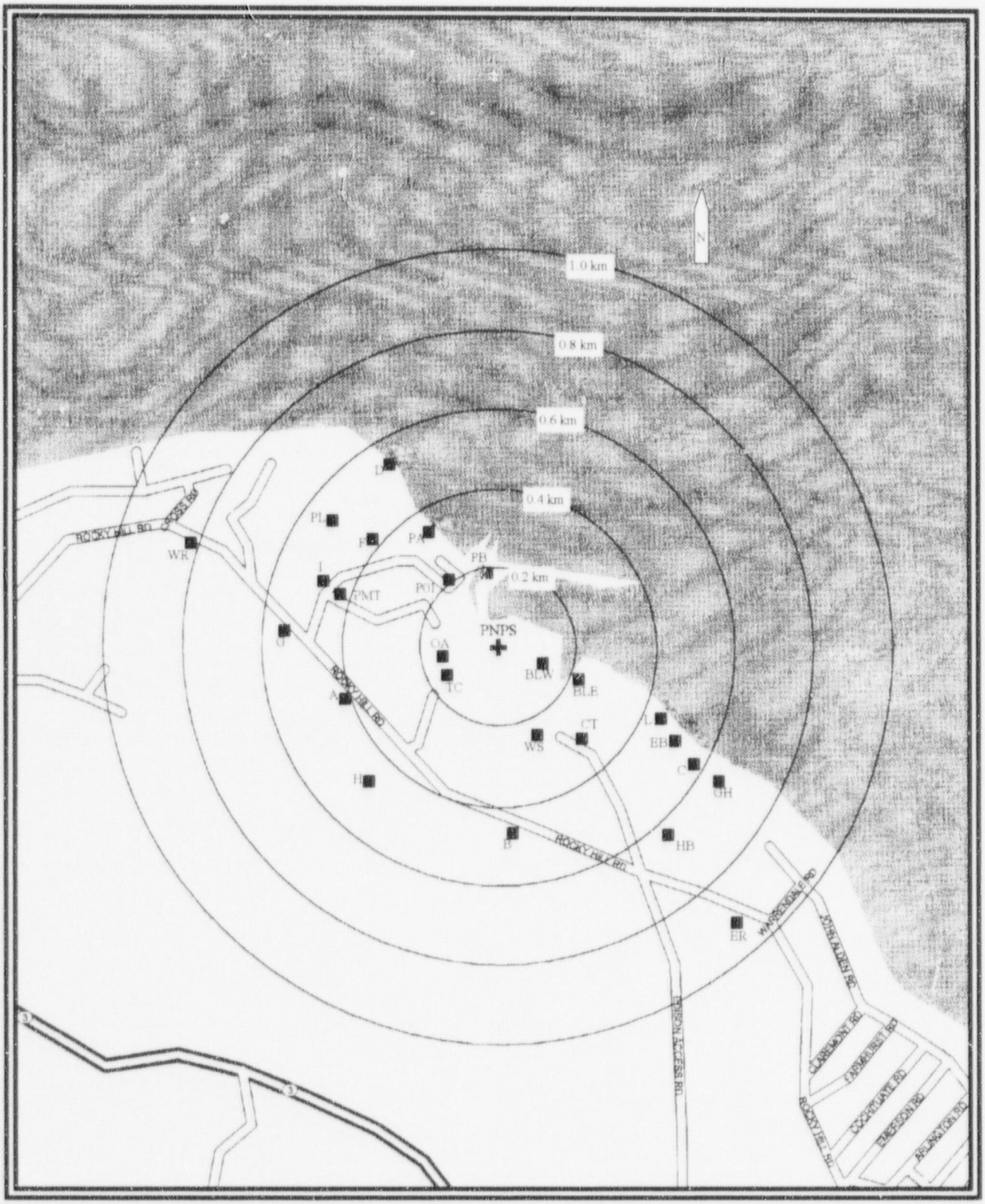


Figure 3.5-3

TLD and Air/Soil Sampling Locations: 1 to 5 Kilometers

TLD Station		Location*	Air/Soil Sampling Station		Location*
Description	Code	Distance/Direction	Description	Code	Distance/Direction
Zone 1 TLDs: 0-3 km					
MICROWAVE TOWER	MT	1.03 km SSW	CLEFT ROCK	CR	1.27 km SSW
CLEFT ROCK	CR	1.27 km SSW	MANOMET SUBSTATION	MS	3.60 km SSE
BAYSHORE/GATE RD	BD	1.34 km WNW			
MANOMET ROAD	MR	1.38 km S			
DIRT ROAD	DR	1.48 km SW			
EMERSON ROAD	EM	1.53 km SSE			
EMERSON/PRISCILLA	EP	1.55 km SE			
EDISON ACCESS ROAD	AR	1.59 km SSE			
BAYSHORE	BS	1.76 km W			
STATION E	E	1.86 km S			
JOHN GAULEY	JG	1.99 km W			
STATION J	J	2.04 km SSE			
WHITEHORSE ROAD	WH	2.09 km SSE			
PLYMOUTH YMCA	RC	2.09 km WSW			
STATION K	K	2.17 km S			
TAYLOR/THOMAS	TT	2.26 km SE			
YANKEE VILLAGE	YV	2.28 km WSW			
GOODWIN PROPERTY	GN	2.38 km SW			
RIGHT OF WAY	RW	2.83 km S			
TAYLOR/PEARL	TP	2.98 km SE			
Zone 2 TLDs: 3-8 km					
VALLEY ROAD	VR	3.26 km SSW			
MANOMET ELEM	ME	3.29 km SE			
WARREN/CLIFFORD	WC	3.31 km W			
RT.3A/BARTLETT RD	BB	3.33 km SSE			
MANOMET POINT	MP	3.57 km SE			
MANOMET SUBSTATION	MS	3.60 km SSE			
BEACHWOOD ROAD	BW	3.93 km SE			
PINES ESTATE	PT	4.44 km SSW			
EARL ROAD	EA	4.60 km SSE			
S PLYMOUTH SUBST	SP	4.62 km W			
ROUTE 3 OVERPASS	RP	4.81 km SW			
RUSSELL MILLS RD	RM	4.85 km WSW			

* Distance and direction are measured from the centerline of the Reactor Building to the monitoring location.

Figure 3.5-3 (continued)

TLD and Air/Soil Sampling Locations: 1 to 5 Kilometers

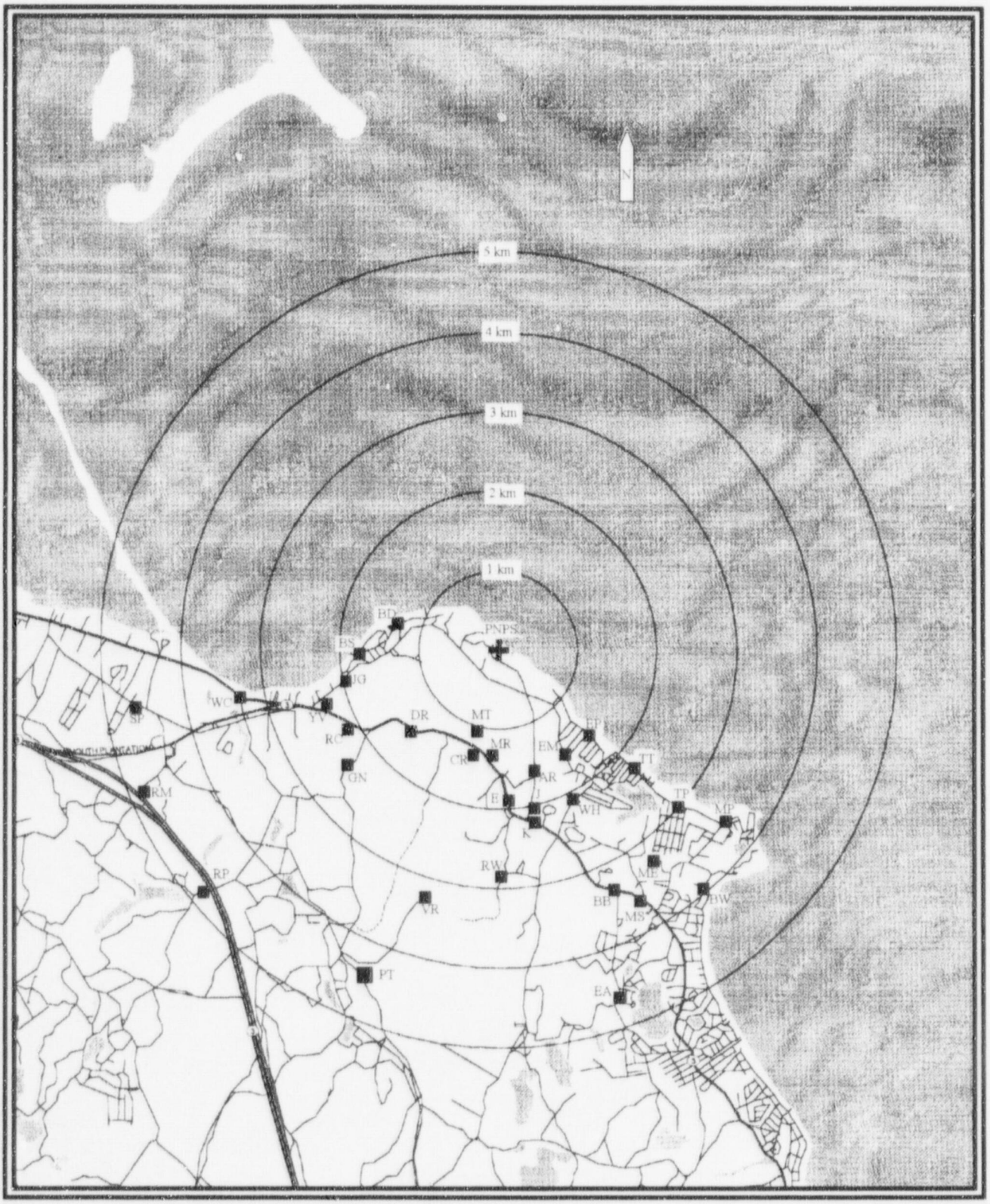


Figure 3.5-4

TLD and Air/Soil Sampling Locations: Greater Than 5 Kilometers

TLD Station		Location*	Air/Soil Sampling Station		Location*
Description	Code	Distance/Direction	Description	Code	Distance/Direction
Zone 2 TLDs: 3-8 km					
HILLDALE ROAD	HD	5.18 km W	PLYMOUTH CENTER	PC	6.69 km W
MANOMET BEACH	MB	5.43 km SSE	EAST WEYMOUTH SUBST	EW	39.69 km NW
BEAVERDAM ROAD	BR	5.52 km S			
PLYMOUTH CENTER	PC	6.69 km W			
LONG POND/DREW RD	LD	6.97 km WSW			
HYANNIS ROAD	HR	7.33 km SSE			
MEMORIAL HALL	MH	7.58 km WNW			
SAQUISH NECK	SN	7.58 km NNW			
COLLEGE POND	CP	7.59 km SW			
Zone 3 TLDs: 8-15 km					
DEEP WATER POND	DW	8.59 km W			
LONG POND ROAD	LP	8.88 km SSW			
NORTH PLYMOUTH	NP	9.38 km WNW			
STANDISH SHORES	SS	10.39 km NW			
ELLISVILLE ROAD	EL	11.52 km SSE			
UP COLLEGE POND RD	UC	11.78 km SW			
SACRED HEART	SH	12.92 km W			
KING CAESAR ROAD	KC	13.11 km NNW			
BOURNE ROAD	BE	13.37 km S			
SHERMAN AIRPORT	SA	13.43 km WSW			
Zone 4 TLDs: >15 km					
CEDARVILLE SUBST	CS	15.93 km S			
KINGSTON SUBST	KS	16.15 km WNW			
LANDING ROAD	LR	16.46 km NNW			
CHURCH/WEST	CW	16.56 km NW			
MAIN/MEADOW	MM	17.02 km WSW			
DIV MARINE FISH	DMF	20.97 km SSE			
EAST WEYMOUTH SUBST	EW	39.69 km NW			

* Distance and direction are measured from the centerline of the Reactor Building to the monitoring location.

Figure 3.5-4 (continued)

TLD and Air/Soil Sampling Locations: Greater Than 5 Kilometers

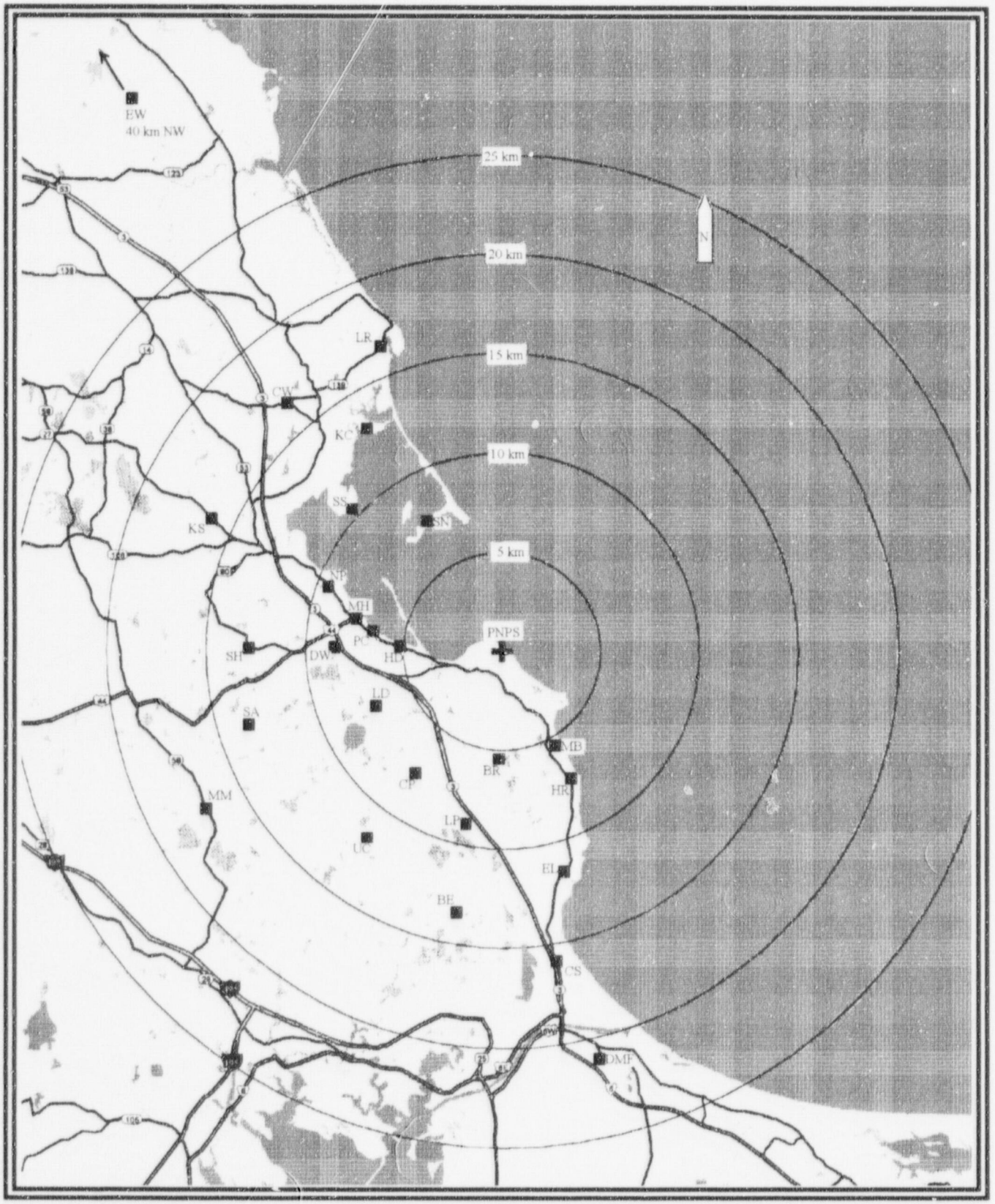


Figure 3.5-5

Terrestrial and Marine/Aquatic Sampling Locations

Description	Code	Distance/Direction*
MILK		
Plymouth County Farm	CF	5.6 km W
Whitman Farm Control	WF	34 km WNW
FORAGE		
Whipple Farm	WH	2.9 km SW
Plymouth County Farm	CF	5.6 km W
Whitman Farm Control	WF	34 km WNW
VEGETABLES/VEGETATION		
Plymouth County Farm	CF	5.6 km W
Bridgewater Farm Control	BF	31 km W
CRANBERRIES		
Manomet Point Bog	MR	3.9 km SE
Bartlett Road Bog	BT	4.3 km SSE
Pine Street Bog Control	PS	26 km WNW

Description	Code	Distance/Direction*
SURFACE WATER		
Discharge Canal	DIS	0.2 km N
Bartlett Pond	BP	2.7 km SE
Powder Point Control	PP	13 km NNW
SEDIMENT		
Discharge Canal Outfall	DIS	0.8 km NE
Manomet Point	MP	3.3 km ESE
Plymouth Beach	PLB	4.0 km WNW
Plymouth Harbor	PLY-H	4.1 km W
Duxbury Bay Control	DUX-BAY	14 km NNW
Green Harbor Control	GH	16 km NNW
IRISH MOSS		
Discharge Canal Outfall	DIS	0.7 km NNE
Manomet Point	MP	4.0 km ESE
Ellisville	EL	12 km SSE
Brant Rock Control	BK	18 km NNW
SHELLFISH		
Discharge Canal Outfall	DIS	0.7 km NNE
Manomet Point	MP	4.0 km ESE
Plymouth Harbor	PLY-H	4.1 km W
Duxbury Bay Control	DUX-BAY	13 km NNW
Green Harbor Control	GH	16 km NNW
LOBSTER		
Discharge Canal Outfall	DIS	0.5 km N
Duxbury Bay Control	DUX-BAY	11 km NNW
FISHES		
Discharge Canal Outfall	DIS	0.5 km N
Plymouth Beach	PLB	4.0 km W
Jones River Control	JR	13 km WNW
Cape Cod Bay Control	CC-BAY	24 km ESE
N River-Hanover Control	NR	24 km NNW
Cataumet Control	CA	32 km SSW
Provincetown Control	PT	32 km NE
Buzzards Bay Control	BB	40 km SSW
Priest Cove Control	PC	48 km SW
Nantucket Sound Control	NS	48 km SSE
Atlantic Ocean Control	AO	48 km E
Vineyard Sound Control	MV	64 km SSW

* Distance and direction are measured from the centerline of the Reactor Building to the sampling/monitoring location.

Figure 3.5-5 (continued)

Terrestrial and Marine/Aquatic Sampling Locations

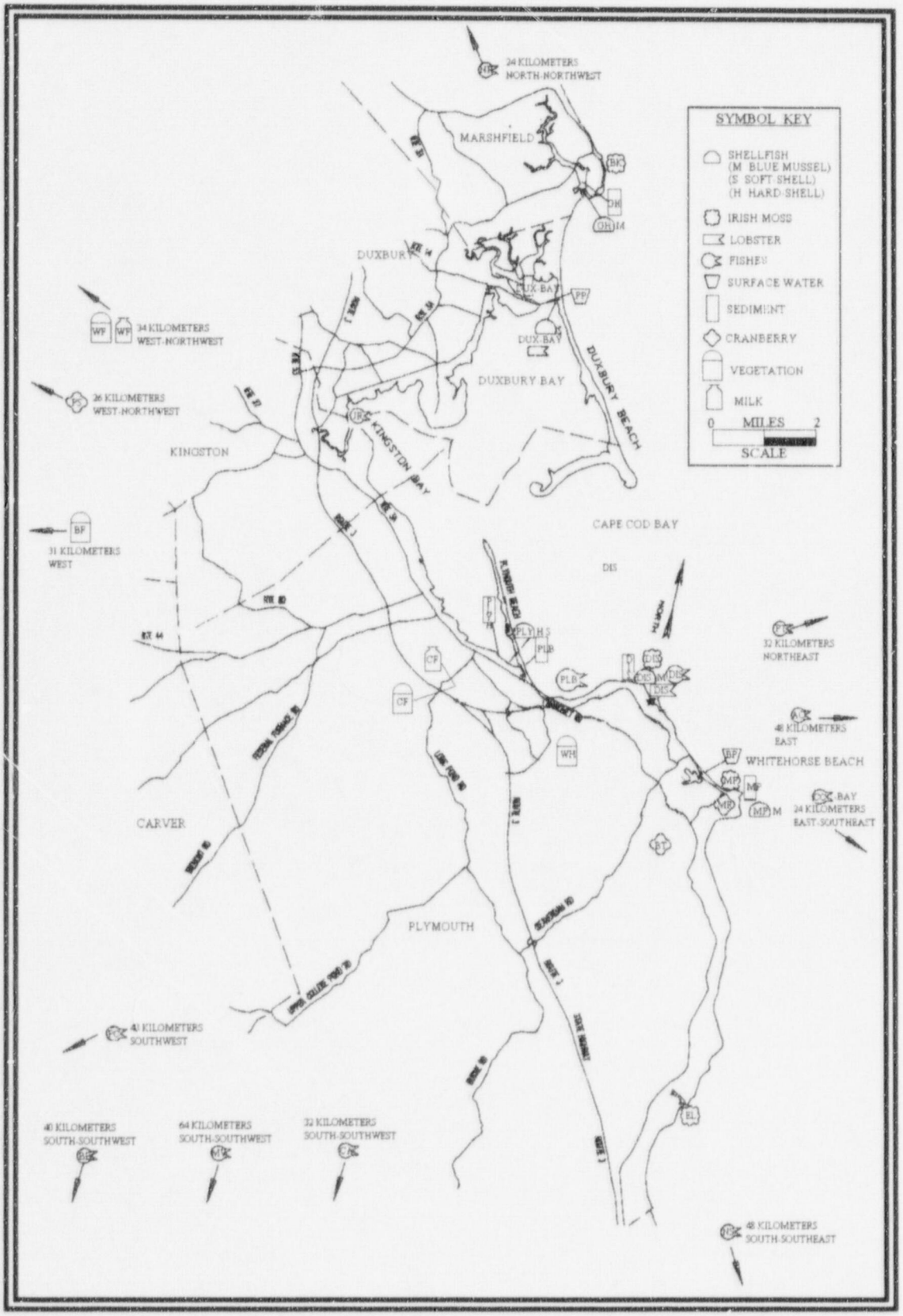


Figure 3.5-6

Environmental Sampling And Measurement Control Locations

Description	Code	Distance/Direction*
TLD		
Cedarville Substation	CS	16 km S
Kingston Substation	KS	16 km WNW
Landing Road	LR	16 km NNW
Church & West Street	CW	17 km NW
Main & Meadow Street	MM	17 km WSW
Div. Marine Fisheries	DMF	21 km SSE
East Weymouth Substation	EW	40 km NW
AIR/SOIL SAMPLING		
East Weymouth Substation	EW	40 km NW
MILK		
Whitman Farm Control	WF	34 km WNW
FORAGE		
Whitman Farm Control	WF	34 km WNW
VEGETABLES/VEGETATION		
Bridgewater Farm Control	BF	31 km W
CRANBERRIES		
Pine Street Bog Control	PS	26 km WNW

Description	Code	Distance/Direction*
SURFACE WATER		
Powder Point Control	PP	13 km NNW
SEDIMENT		
Duxbury Bay Control	DUX-BAY	14 km NNW
Green Harbor Control	GH	16 km NNW
IRISH MOSS		
Brant Rock Control	BK	18 km NNW
SHELLFISH		
Duxbury Bay Control	DUX-BAY	13 km NNW
Green Harbor Control	GH	16 km NNW
LOBSTER		
Duxbury Bay Control	DUX-BAY	11 km NNW
FISHES		
Jones River Control	JR	13 km WNW
Cape Cod Bay Control	CC-BAY	24 km ESE
N River-Hanover Control	NR	24 km NNW
Cataumet Control	CA	32 km SSW
Provincetown Control	PT	32 km NE
Buzzards Bay Control	BB	40 km SSW
Priest Cove Control	PC	48 km SW
Nantucket Sound Control	NS	48 km SSE
Atlantic Ocean Control	AO	48 km E
Vineyard Sound Control	MV	64 km SSW

* Distance and direction are measured from the centerline of the Reactor Building to the sampling/monitoring location.

Figure 3.5-6 (continued)

Environmental Sampling And Measurement Control Locations

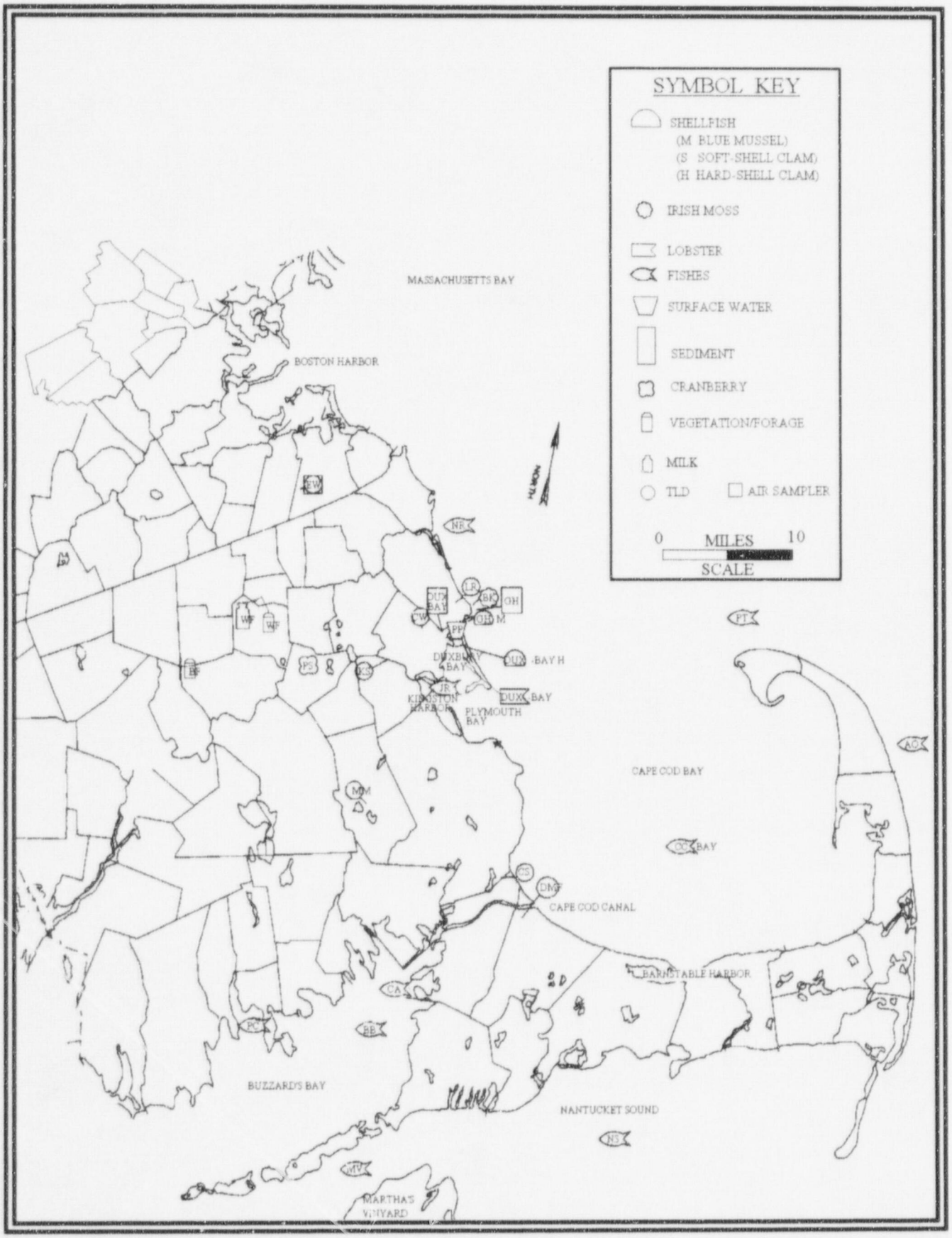


TABLE 3.5-4

REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

Analysis	Water pCi/L	Airborne Particulate or Gases pCi/m^3	Fish pCi/kg, wet	Milk pCi/L	Vegetables pCi/kg, wet
H-3	2E+04	--	--	--	--
Mn-54	1E+03	--	3E+04	--	--
Fe-59	4E+02	--	1E+04	--	--
Co-58	1E+03	--	3E+04	--	--
Co-60	3E+02	--	1E+04	--	--
Zn-65	3E+02	--	2E+04	--	--
Zr-95	4E+02	--	--	--	--
I-131	2E+00	9E-01	--	3E+00	1E+02
Cs-134	3E+01	1E+01	1E+03	6E+01	1E+03
Cs-137	5E+01	2E+01	2E+03	7E+01	2E+03
Ba-140	2E+02	--	--	3E+02	--

TABLE 4.5-1

DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS

LOWER LIMIT OF DETECTION (LLD)[1]

Analysis	Water pCi/L	Airborne Particulate or Gases pCi/m^3	Wet Solids pCi/kg,wet	Milk pCi/L	Food Products pCi/kg,wet	Dry Solids pCi/kg,dry
Gross Beta	4.0E+00[2]	1.0E-02	--	--	--	--
H-3	2.0E+03[3]	--	--	--	--	--
Mn-54	1.5E+01	--	1.3E+02	--	--	--
Fe-59	3.0E+01	--	2.6E+02	--	--	--
Co-58	1.5E+01	--	1.3E+02	--	--	5.0E+01
Co-60	1.5E+01	--	1.3E+02	--	--	5.0E+01
Zn-65	3.0E+01	--	2.6E+02	--	--	5.0E+01
Zr-95	1.5E+01	--	--	--	--	5.0E+01
I-131	1.0E+00	7.0E-02	--	1.0E+00	6.0E+01[4]	--
Cs-134	1.5E+01	1.0E-02	1.3E+02	1.5E+01	6.0E+01	5.0E+01
Cs-137	1.8E+01	1.0E-02	1.3E+02	1.5E+01	6.0E+01	5.0E+01
Ba-140	1.5E+01	--	--	1.5E+01	--	--
Ce-144	--	--	--	--	--	1.5E+02

(1) Refer to Appendix B of the ODCM for definition of lower limit of detection (LLD).

(2) LLD for surface water.

(3) If no drinking water pathway exists, a value of 3000 pCi/L may be used.

(4) LLD for leafy vegetables.

3/4.5 RADIOLOGICAL ENVIRONMENTAL MONITORING

3/4.5.2 Land Use Census

CONTROLS

3.5.2 A land use census shall be conducted and shall identify, within a distance of 8 km (5 miles), the location in each of the 16 meteorological sectors of the nearest milk animal, the nearest residence and the nearest garden of greater than 50 m^2 (500 ft^2) producing broad leaf vegetation. For elevated releases as defined in Regulatory Guide 1.111, Revision 1, July 1977, the land use census shall also identify, within a distance of 5 km (3 miles), the locations in each of the 16 meteorological sectors of all milk animals and all gardens of greater than 50 m^2 producing broad leaf vegetation.

APPLICABILITY: At all times.

ACTION:

a. With a land use census identifying a location(s) that yields a calculated dose or dose commitment greater than the values currently being calculated in Control 4.3.3, identify the new location(s) in the next Annual Radiological Environmental Monitoring Report.

b. With a land use census identifying a location(s) that yields a calculated dose or dose commitment (via the same exposure pathway) 20 percent greater than at a location from which samples are currently being obtained in accordance with Control 3.5.1, add the new location(s) to the Radiological Environmental Monitoring Program within 30 days. The sampling location(s), excluding the control station location, having the lowest calculated dose or dose commitment(s), via the same exposure pathway, may be deleted from this monitoring program after October 31 of the year in which this land use census was conducted. Identify the new location(s) in the next Annual Radiological Environmental Monitoring Report and also include in the report a revised figure(s) and table for the ODCM reflecting the new location(s).

SURVEILLANCE REQUIREMENTS

4.5.2 The land use census shall be conducted during the growing season, at least once per 12 months using that information that will provide the best results, such as by a door-to-door survey, aerial survey, or by consulting local agriculture authorities. The results of the land use census shall be included in the Annual Radiological Environmental Monitoring Report.

Broad leaf vegetation sampling of at least three different kinds of vegetation may be performed at the site boundary in each of the two different direction sectors with the highest predicted D/Qs, in lieu of the garden census. Specifications for broad leaf vegetation sampling in Table 3.5-1 shall be followed, including analysis of control samples.

3/4.6 EFFLUENT CONTROLS BASES

3/4.1.1 Radioactive Liquid Effluent Instrumentation

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with NRC approved methods in the Offsite Dose Calculation Manual (ODCM) to ensure that the alarm/trip will occur prior to exceeding the limits of 10CFR20. The operability and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10CFR50.

3/4.1.2 Radioactive Gaseous Effluent Instrumentation

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with NRC approved methods in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10CFR20. The operability and use of this instrumentation is consistent with the requirements of General design Criteria 60, 63, and 64 of Appendix A to 10CFR50.

3/4.2.1 Liquid Effluents Concentration

This control is provided to ensure that the concentration of radioactive materials released in liquid waste effluents at and beyond the site boundary will be less than the concentration levels specified in 10CFR20, Appendix B, Table 2. This limitation provides additional assurance that the levels of radioactive materials in bodies of water at and beyond the site boundary will not result in exposures within (1) the Section II.A design objectives of Appendix I, 10CFR50, to a member of the public and (2) restrictions authorized by 10 CFR 20.1301(e).

3/4.2.2 Dose - Liquids

This section is provided to implement the requirements of Sections II.A, III.A, and IV.A of 10CFR50, Appendix I, to assure that the releases of radioactive material in liquid effluents will be kept "as low as is reasonably achievable." Because Pilgrim is not a site where plant operations can conceivably affect drinking water, none of these requirements are intended to assure compliance with 40CFR141. The dose calculations in the ODCM implement the requirements of 10CFR50, Appendix I, Section III.A to ensure that the actual exposure of a member of the public through appropriate pathways is unlikely to be substantially underestimated. The equations specified in the ODCM for calculating the doses due to the actual release rates of radioactive materials in liquid effluents will be consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50, Appendix I," Revision 1, October 1977 and Regulatory Guide 1.113, "Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I," April 1977. NUREG-0133 provides methods for dose calculations consistent with Regulatory Guides 1.109 and 1.113.

3/4.2.3 Liquid Radwaste Treatment

The requirement that the appropriate portions of this system be used when specified provides assurance that the releases of radioactive materials in liquid effluents will be kept "as low as is reasonably achievable." This control implements the requirements of 10CFR50.36a, General Design Criteria 60 of Appendix A to 10CFR50 and design objective Section II.D of Appendix I to 10CFR50. The specified limits governing the use of appropriate portions of the liquid radwaste treatment system were specified as a suitable fraction of the guide set forth in Section II.A of Appendix I, 10CFR50, for liquid effluents.

3/4.3.1 Gaseous Effluents Dose Rate

This control is provided to ensure that the dose rate at anytime at and beyond the site boundary from gaseous effluents from all units on the site will be within the annual dose limits of 10CFR20. The annual dose limits are the doses associated with the concentration of 10CFR20, Appendix B, Table 2. These limits provide reasonable assurance that radioactive material discharged in gaseous effluents will not result in the exposure of a member of the public either within or outside the site boundary to annual average concentrations exceeding the limits specified in Appendix B, Table 2 of 10CFR20.1001-20.2401. For members of the public who may at times be within the site boundary, the occupancy of the individual will usually be sufficiently low to compensate for any increase in the atmospheric diffusion factor above that for the site boundary. The specified release rate limits restrict, at all times, the corresponding gamma and beta dose rates above background to a member of the public at or beyond the site boundary to $\leq$ 500 mrem/year to the total body or to $\leq$ 3000 mrem/year to the skin. These release rate limits also restrict, at all times, the corresponding thyroid dose rate above background to an infant via the cow-milk-infant pathway to $\leq$ 1500 mrem/year for the nearest cow to the plant.

3/4.3.2 Dose - Noble Gases

This section is provided to implement the requirements of 10CFR50, Appendix I, Sections II.B, III.A, and IV.A to ensure that the releases of radioactive material in gaseous effluents will be kept "as low as is reasonably achievable." The surveillance requirements implement the requirements of 10CFR50, Appendix I, Section III.A to ensure that the actual exposure of a member of the public through the appropriate pathways is unlikely to be substantially underestimated. The dose calculations established in the ODCM for calculating the doses due to the actual release rates of radioactive noble gases in gaseous effluents are consistent with the methodology provided in Regulatory Guide 1.109 and Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors," Revision 1, July 1977. The ODCM equations provided for determining the air doses at and beyond the site boundary will be based upon the historical average atmospheric conditions. NUREG-0133 provides methods for dose calculations consistent with Regulatory Guides 1.109 and 1.111.

3/4.3.3 Dose - Iodine-131, Iodine-133, Radioactive Material In Particulate Form, And Tritium

This section is provided to implement the requirements of Sections II.C, III.A and IV.A of 10CFR50, Appendix I, to assure that the releases of radioactive materials in gaseous effluents will be kept "as low as is reasonably achievable." The ODCM calculational methods specified in the surveillance requirements implement the requirements of 10CFR50, Appendix I, Section III.A to ensure that the actual exposure of a member of the public through appropriate pathways is unlikely to be substantially underestimated. The ODCM calculational methods approved by the NRC for calculating the doses due to the actual release rates of the subject materials are required to be consistent with the methodology provided in Regulatory Guides 1.109 and 1.111. These equations also provide for determining the actual doses based upon the historical average atmospheric conditions. The release rate specifications for iodine-131, radioactive material in particulate form with half-lives greater than 8 days, and radionuclides other than noble gases are dependent on the existing radionuclide pathways to man, in areas at and beyond the site boundary. The pathways which are examined in the development of these calculations are: 1) individual inhalation of airborne radionuclides, 2) deposition of radionuclides onto green leafy vegetation with subsequent consumption by man, 3) deposition onto grassy areas where milk animals and meat producing animals graze with consumption of the milk and meat by man, and 4) deposition on the ground with subsequent exposure of man.

3/4.3.4 Gaseous Effluent Treatment

The requirement that the appropriate portions of these systems be used when specified provides reasonable assurance that the releases of radioactive materials in gaseous effluents will be kept "as low as is reasonably achievable." This control implements the requirements of 10CFR50.36a, General Design Criterion 60 of Appendix A to 10CFR50, and design objective Section II.D of Appendix I to 10CFR50. The specified limits governing the use of appropriate portions of the systems were specified as a suitable fraction of the guide set forth in Sections II.B and II.C of Appendix I, 10CFR50, for gaseous effluents.

3/4.4.1 Total Dose

This section is provided to meet the dose limitations of 40CFR190 that have now been incorporated into 10CFR20 by 46FR18525. The control requires the preparation and submittal of a special report whenever the calculated doses from plant radioactive effluents exceed twice the design objective doses of 10CFR50, Appendix I. For sites containing up to 4 reactors, it is highly unlikely that the resultant dose to a member of the public will exceed the dose limits of 40CFR190 if the individual reactors remain within the reporting requirement level. The special report will describe a course of action that should result in the limitation of the annual dose to a member of the public to within the 40CFR190 limits. For the purposes of the special report, it may be assumed that the dose commitment to the member of the public from other uranium fuel cycle sources is negligible, except dose contributions from other nuclear fuel cycle facilities at the same site or within a radius of 8 km must be considered. If the dose to any member of the public is estimated to exceed the limits of 40CFR190, a request for a variance in a special report in accordance with 40CFR190.11 and 10CFR20.2203(a)(4) is considered to be a timely request and fulfills the requirements of 40CFR190 until NRC staff action is completed. This is provided that the release conditions resulting in violation of 40CFR190 have not already been corrected. The variance only relates to the limits of 40CFR190, and does not apply in any way to the other

3/4.4.1 Total Dose (continued)

requirements for dose limitation of 10CFR20. An individual is not considered a member of the public during any period in which he/she is engaged in any operation that is part of the nuclear fuel cycle.

3/4.5.1 Environmental Monitoring Program

An environmental radiological monitoring program is conducted to verify the adequacy of in-plant controls on the release of radioactive materials. The program is designed to detect radioactivity concentrations to ensure that radiation doses to individuals do not exceed the levels set forth in 10CFR50, Appendix I.

A supplemental monitoring program for sediments and mussels has been incorporated into the basic program (see Notes 6 and 7 to Table 3.5-1) as a result of an agreement with the Massachusetts Wildlife Federation. This supplemental program is designed to provide information on radioactivity levels at substantially higher sensitivity levels in selected samples to verify the adequacy (or, alternatively, to provide a basis for later modifications) of the long-term marine sampling schedules. As part of the supplemental program, analysis of mussels for isotopes of plutonium will be performed if radiocesium activity should exceed 200 pCi/kg in the edible portions.

The 200 pCi/kg radiocesium "action level" is based on calculations which show that if radiocesium from plant releases reached this level, plutonium could possibly appear at levels of potential interest. (1) The calculations also show that the dose delivered from these levels of plutonium would not be a significant portion of the total dose attributable to liquid effluents.

The program was also designed to be consistent, wherever applicable, with NUREG 0473.

Groundwater flow at the plant site is into Cape Cod Bay; therefore, terrestrial monitoring of groundwater is not included in this program.

Detection capabilities for environmental sample analyses are tabulated in terms of the lower limits of detection (LLD). The LLD in Table 4.5-1 is considered optimum for routine environmental measurements in industrial laboratories. 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.

Detailed discussion of the LLD, and other detection limits can be found in HASL Procedures Manual, HASL-300 (revised annually); Currie, L.A., "Limits for Qualitative Detection and Quantitative Determination - Application to Radiochemistry", Anal. Chem. 40, 586-93 (1968); and Hartwell, J.K., "Detection Limits for Radioanalytical Counting Techniques," Atlantic Richfield Hanford Company Report ARH-SA-215 (June 1975).

(1) In measurable quantities having a potential dose (human food chain) significance comparable to other nuclides if present at their detection limits.

3/4.5.2 Land Use Census

This section is provided to ensure that changes in the use of areas at and beyond the site boundary are identified and that modifications to the radiological environmental monitoring program are made if required by the results of this census. The best information from the door-to-door survey, from aerial survey, or from consulting with local agricultural authorities shall be used. This census satisfies the requirements of 10CFR50, Appendix I, Section IV.B.3. Restricting the census to gardens of greater than 50 m^2 provides assurance that significant exposure pathways via leafy vegetables will be identified and monitored, since a garden of this size is the minimum required to produce the quantity (26 kg/year) of leafy vegetables assumed in Regulatory Guide 1.109 for consumption by a child. To determine this minimum garden size, the following assumptions were made: 1) 20% of the garden was used for growing broad leaf vegetation (i.e., similar to lettuce and cabbage), and 2) a vegetation yield of 2 kg/m^2.

5.0 RADIOLOGICAL EFFLUENT CONTROLS CROSS REFERENCE

Table 5-1 presents a summary of the limits contained in the PNPS Effluent Controls, Sections 3/4.2.1, 3/4.2.2, 3/4.2.3, 3/4.3.1, 3/4.3.2, 3/4.3.3, and 3/4.4.1. This table also presents cross-references to applicable portions of Methodology Section 9.0.

This table is intended to serve as a summary of the PNPS Effluent Controls and does not, in itself, establish limits. The specific effluent controls presented in Section 3/4 should be consulted for exact wording and specifics.

TABLE 5-1

PNPS EFFLUENT CONTROLS AND METHODOLOGY CROSS-REFERENCE

Effluent Control Section	Methodology Section	Applicable Limit or Objective	Exposure Period	Required Action
3/4.2.1 Liquid Effluent Concentration	9.1	10CFR20, App. B, Table 2 Column 2, and 2×10^{-4} µCi/mL for dissolved noble gases	Instantaneous	Restore concentration to within limits
3/4.2.2 Dose- Liquids	9.2	1.5 mrem T.B. 5 mrem Organ ..... 3 mrem T.B. 10 mrem Organ	Calendar Quarter ..... Calendar Year	30-day report if exceeded
3/4.2.3 Liquid Radwaste Treatment	9.2	0.06 mrem T.B. 0.2 mrem Organ	Projected for 31 days	Operate Liquid Waste Treatment System
3/4.3.1 Gaseous Effluents Dose Rate	9.3.1.3 --- 9.3.1.4 --- 9.3.2	500 mrem/yr T.B. from Noble Gases ..... 3000 mrem/yr Skin from Noble Gases ..... 1500 mrem/yr Organ from particulates with $T_{1/2} > 8$d., I-131, I-133 and tritium	Instantaneous	Restore release rates to within specifications
3/4.3.2 Dose- Noble Gases	9.3.1.1 and 9.3.1.2	5 mrad gamma air 10 mrad beta air ..... 10 mrad gamma air 20 mrad beta air	Calendar Quarter ..... Calendar Year	30-day report if exceeded
3/4.3.3 Dose- I-131, I-133 Particulates, H-3	9.3.2	7.5 mrem Organ ..... 15 mrem Organ	Calendar Quarter ..... Calendar Year	30-day report if exceeded
3/4.4.1 Total Dose	9.2, 9.3.1, 9.3.2, and 9.4	25 mrem T.B. 25 mrem Organ 75 mrem Thyroid	Calendar Year	30-day report if controls 3/4.2.2, 3/4.3.2, or 3/4.3.3 are exceeded by a factor of 2. Restore dose to public to within the applicable EPA limit(s) or obtain a variance.

NOTE: T.B. means total body.

6.0 DESCRIPTION OF RADWASTE SYSTEMS

6.1 Liquid Radwaste System

Liquid wastes from Pilgrim Station originates from a variety of sources which have a considerable disparity in chemical and radio-chemical composition and concentration (see section 9.2 of Reference 3). Normally these wastes are collected and treated separately. The liquid wastes fall into the following categories:

1) High Purity

2) Low Purity

3) Detergent

High purity clean wastes are typically characterized by having variable solids content, low conductivity, and variable radioactivity. They come from equipment drain sumps, ultrasonic resin cleaner (URC) operation, and the backwash and resin transfer water used to change out the condensate demineralizers. Reuse of processed high-purity waste is highly desirable.

Low purity chemical wastes have moderate conductivity and solids content. They come from building floor sumps and are generally high-purity wastes which have been contaminated by dirt, oil, etc. When processed, this stream may or may not be reused depending on the water balance in the plant and the quality of the product.

Detergent wastes are low radioactivity concentration wastes that have the potential to contain detergents. This waste is generated from washing and decontamination of equipment, the plant, and personnel. This detergent waste is collected in the miscellaneous waste tank and is not treatable. The waste is passed through strainers, prior to discharge through the radwaste discharge header and into the circulating water discharge canal.

A schematic of the system as determined in Reference 4 is shown in Figure 4.2-1, in Section 3/4.2. In the system, the high purity waste is collected in one of two 15,000-gal clean waste tanks. Low purity waste is collected in one of two 15,000 gallon chemical waste tanks. This low purity waste is batched to the clean waste tanks where both types of waste are processed through a mixed bed ion exchange demineralizer. The processed liquid is collected in one of four 18,000 gal treated water holdup tanks. It is reused to the greatest extent possible.

6.2 Treated Gaseous Radwaste System

The air ejector and augmented offgas system (see Section 9.4 of Reference 3) includes the subsystems that process and/or dispose of the gases from the main condenser air ejectors, the startup mechanical vacuum pump, and the gland seal condensers. All such gases from the unit are routed to the main stack for dilution and elevated release to the atmosphere. Discharges from the air ejector, the charcoal vault, and the stack are continuously monitored by radiation monitors.

Gases routed to the main stack include air ejector and gland seal offgases, and gases from the standby gas treatment system (SGTS). Dilution air input to the stack is supplied by one of two fans located in the filter building at the base of the main stack. The stack is designed such that prompt mixing of all gas inlet streams occurs in the base to allow location of sample points as near the base as possible.

The augmented offgas system uses a high temperature catalytic recombiner to recombine radiolytically dissociated hydrogen and oxygen from the air ejector system. Noncondensable radioactive offgas is continuously removed from the main condenser by the air ejector during plant operation. The air ejector offgas normally contains activation gases, principally N-16, 0-19, and N-13. The N-16 and 0-19 have short half-lives and quickly decay. The 10 min half-life N-13 is present in small amounts which is further reduced by decay. The air ejector offgas also contains Sr-90, Ba-140, and Cs-137. After hydrogen/oxygen recombination and chilling to strip the condensable to reduce the volume, the remaining noncondensables, principally the kryptons, xenons, and air, are delayed in a 30 minute holdup system before reaching the adsorption bed. Radioactive particulate daughters of the noble gases are retained on the HEPA filters and on the charcoal. The charcoal adsorption bed, operating in a constant temperature vault, selectively adsorbs and delays the xenons and kryptons from the bulk carrier gas, principally air. This delay on the charcoal permits the xenons and kryptons to decay in place. The offgas is discharged to the environs via the main stack. The activity of the gas leaving the offgas treatment system is continuously monitored as described in Section 7.2.2. This system results in a reduction of the offgas activity (Curies) released by factor of approximately 185 relative to a 30 minute holdup system.

The system as determined in Reference 4 for handling gaseous waste is shown in Figure 4.3-1, in Section 3/4.3.

7.0 RELEASE POINT AND MONITOR DESCRIPTION

7.1 Radioactive Effluent Release Point Description (Reference 3)

7.1.1 Liquid Radioactive Waste Effluent Release

The liquid radwaste discharge header receives discharge from the chemical radwaste monitor tank pumps, the clean radwaste treated water transfer pumps, and the miscellaneous waste drain tank pump (see Figure 4.2-1). The header provides controlled discharge through either a low flow discharge path or a high flow discharge path. The high flow path is normally used with a variable liquid radwaste effluent flow from 1-200 gpm. The common discharge header extends from both the low and high flow-paths and is monitored for radiation prior to discharge (see Section 7.2.1).

The monitor trips the discharge pumps, closes the flow control valves, and provides an alarm on high radiation. The liquid radwaste effluent is finally discharged through an outlet diffuser to the circulating water discharge canal. Liquid effluent releases enter the Cape Cod Bay at the outfall of the discharge canal which is located about 1100 feet north from the center of the reactor building.

In addition, batch releases from sources other than the radwaste tanks are permitted provided at least two independent samples are analyzed in accordance with PNPS Effluent Control Section 4.1.1.a, an independent verification of the release rate calculations is performed, and an independent verification of the discharge valving is performed. Concentrations released to unrestricted areas must be limited to the values specified in 10CFR20.

All batch releases which are not processed through the liquid radwaste treatment system are also discharged through an outlet to the circulating water discharge canal. These untreated liquid effluent releases also enter the Cape Cod Bay at the outfall of the discharge canal.

7.1.2 Main Stack Gas Release

The processed gases from the unit are routed to the main stack for dilution and elevated release to the atmosphere (see Figure 4.3-1). The main stack is continuously monitored by a radiation monitor (see Section 7.2.2).

Dilution air input to the stack is provided to reduce the hydrogen in the air ejector offgases to a concentration of less than 4 percent by volume. Dilution air is supplied by one of two fans located in the filter building at the base of the main stack. The stack is designed such that prompt mixing of all gas inlet streams occurs in the base to provide prompt dilution of hydrogen and to allow location of sample points as near to the base as possible.

The main stack is a pipe with a top elevation of about 400 feet mean sea level (MSL). The main stack is supported by the filter building. The filter building is a reinforced concrete structure which houses the dilution fans (16,860 cfm each fan), offgas filters, and heaters. The main stack is located about 700 feet west northwest of the reactor building.

7.1.3 Reactor Building Exhaust Vent Release

Air from areas containing potential sources of radioactive contamination such as the reactor building, radwaste building basement, and turbine building basement are discharged through the reactor building exhaust vent (see Figure 4.3-1). Normal airflow is routed from lesser to progressively greater areas of radioactive contamination potential prior to final exhaust. The reactor building exhaust vent is continuously monitored by a radiation monitor (see Section 7.2.3).

The operating floor ventilation is normally supplied with 40,000 cfm of filtered and tempered outside air which enters the reactor building through louvers in the east wall. Air is exhausted from the operating floor through ducts located in the roof truss area and the south wall; adjacent to the floor (54,000 cfm per fan). Additional exhaust ducts are located above the water level in the fuel pool, steam dryer/separator storage pool, and the reactor cavity.

Two contaminated area exhaust fans (25,000 cfm per fan), each rated at design capacity, are located in the reactor building. The fans discharge to the main exhaust plenum at the base of the reactor building. An additional smaller exhaust fan (5,000 cfm), located in the reactor building, exhausts only from the control rod drive maintenance shop and discharges to the main exhaust plenum. Constant volume control is maintained by inlet vanes which are automatically positioned.

The reactor building exhaust vent is a square plenum extending from the top of the west corner of the reactor building. The exhaust plenum releases to the atmosphere at an elevation of 182 feet MSL.

7.2 Radioactive Effluent Monitoring System Description (References 3, 5, and 6)

7.2.1 Liquid Radioactive Waste Effluent Monitoring System

The liquid radiation waste effluent monitoring system consists of a single channel (see Section 7.12 of Reference 3). This channel includes a scintillation detector, a seven decade logarithmic radiation monitor, and a strip chart recorder. The detector is located in a shielded sampler that is located in a section of the radwaste liquid discharge header to minimize background radiation. The meter and recorder are located in the main control room. This channel is connected to the 24 volt DC power bus.

The channel has an upscale trip to indicate high radiation level and a downscale trip to indicate instrument trouble. The upscale trip alarms in the main control room (see Section 8.1 for liquid effluent monitor setpoints), trips the monitor tank pumps, and terminates the discharge. The downscale trip alarms in the main control room. The waste discharge valve is the isolation control device for the liquid radwaste effluent stream and it is automatically closed when the alarm is tripped. There are two waste discharge valves, one is situated on a two inch line and the other is situated on a one inch line. Both valves are located prior to the radiation waste effluent monitor and prior to the discharge canal. The valves are air operated valves. The waste discharge valves are: AO7216A and SV7216A, which are on the 2 inch line; and AO7216B and SV7216B, on the 1 inch line. The power source is the 24 volt DC power bus.

Alarm trip circuits can be tested using test signals. The channel is calibrated by laboratory analysis of a grab sample from the liquid radwaste system.

7.2.2 Main Stack Gas Monitoring System

The main stack gas monitoring system consists of two individual channels (see Section 7.12 of Reference 3) to monitor the release of noble gases. Each channel consists of a gamma-sensitive scintillation detector and a seven decade logarithmic count rate monitor that includes a power supply and a meter. Both channels are recorded on a two-pen recorder located in the main control room. Both channels are connected to the 24 volt DC power bus and to the AC radiation protection system via a transfer switch to the emergency diesel generators.

Each monitor has two upscale alarms and one downscale alarm. Exceeding a setpoint initiates an alarm in the main control room, but no control action is provided. The upscale alarms indicate high radiation (see Section 8-2 for gaseous effluent monitor setpoint), and the downscale alarm indicates instrument trouble.

To monitor noble gases in the gaseous effluent from the main stack, a sample is drawn through an isokinetic probe which is located in the stream to assure representative sampling. The sample passes through a particulate filter and charcoal cartridge. The filtered gas then flows to two shielded chambers where the radiation level of the noble gases is measured by two scintillation detectors, one located in each shielded chamber.

The system also provides for sampling of particulates and iodines by the use of a filter and charcoal cartridge located upstream of the gas being monitored in the shielded chambers. The filter and cartridge are routinely analyzed in a chemistry laboratory in accordance with PNPS Effluent Controls.

Each individual channel includes a built-in check source and a purge line to purge the stack gas from the sampling chamber. Both the purge valve and the check source are operated from the main control room. Each channel is calibrated by laboratory analysis of a grab sample in the offgas line. Alarm trip circuits can be tested using a test source.

7.2.3 Reactor Building Exhaust Vent Monitoring System

The reactor building exhaust vent monitoring system consists of two channels (see Section 7.12 of Reference 3). Each channel consists of a gamma-sensitive detector and a seven decade logarithmic count rate monitor that includes a power supply and a meter. Both channels are recorded on a two-pen recorder located in the main control room. Both channels are connected to the 24 volt DC power bus and the AC radiation protection system via a transfer switch to the emergency diesel generators.

Each monitor has two upscale alarms and one downscale alarm. Exceeding a setpoint initiates an alarm in the main control room, but no control action is provided. The upscale alarms indicate high radiation and the downscale alarm indicates instrument trouble.

To monitor noble gases from the gaseous effluent in the reactor building exhaust vent, a sample is drawn through an isokinetic probe which is located to assure representative sampling. The sample passes through a particulate filter and iodine cartridge. The filtered gas then flows to two shielded chambers where the radiation level of the gas is measured by two scintillation detectors, one located in each shielded chamber.

The system also provides for sampling of particulates and iodines by the use of a filter and charcoal cartridge located upstream of the gas being monitored in the shielded chamber. The filter and cartridge are routinely analyzed in a chemistry laboratory in accordance with PNPS Effluent Controls.

Each individual channel includes a built-in check source and a purge line to purge the gas from the sampling chamber. Both the purge valve and the check source are operable from the main control room. Each channel is calibrated by laboratory analysis of a grab sample from the reactor building ventilation system. Alarm trip circuits are tested using test signals.

TABLE 7-1

RADIOACTIVE EFFLUENT MONITOR DATA

Item	Stack Gas		Reactor Building Vent		Liquid Effluent
	Channel 1	Channel 2	Channel A	Channel B	
Manufacturer	GE	GE	GE	GE	GE
Model Number	194X900G9	194X900G11	194X900G11	194X900G11	194X900G9
Serial Number	6,343,901 PPA 6,342,790 PRM	6,550,PA6,343 907	6,550,733	6,550,789	6,342,995 PPA 6,342,788 PRM
Scale	cps	cps	cps	cps	cps
Range	1E-1 to 1E+6	1E-1 to 1E+6	1E-1 to 1E+6	1E-1 to 1E+6	1E-1 to 1E+6
Power	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC
Location	Panel C910	Panel C910	Panel C910	Panel C910	Panel C910
Installation Date	8/20/71	8/20/71	8/20/71	8/20/71	9/13/71
Surveillance Test					
a. Daily	Channel Check		Channel Check		Channel Check
b. Monthly	Source Check		Source Check		---
c. Quarterly	Channel Functional Test		Channel Functional Test		Channel Functional Test
Calibration					
a. Quarterly	Check Source		Check Source		Check Source
b. 18-month	Known radiation source		Known radiation source		Known radiation source
Alarm Set Points					
a. Hi Alarm	See Section 8.2		See Section 8.2		See Section 8.1
b. Hi-Hi Alarm					
Isolation Control Device	None		None		Waste Discharge Valve

7.3 Measurement Method During Release (References 3 and 7)

7.3.1 Liquid Effluent

Prior to the release of any liquid waste, a sample of the release is collected and the specific activity is determined by isotopic analysis. The waste discharge tank is recirculated at least 60 minutes prior to the collection of a sample. The release of any liquid waste is controlled on a mixed effluent concentration limit (ECL) basis, where the sum of the ratios between the isotopic concentration and the ECL is less than one. The specified waste discharge flow rate must be at least 10% less than the maximum waste discharge flow rate which shall not exceed 200 gpm. The discharge of the liquid effluent is made from the liquid radwaste discharge header.

7.3.2 Gaseous Effluent

The gaseous effluent radiation level is continuously monitored as it is being vented to the atmosphere. Periodic samples are collected from the reactor building vent and the main stack. The particulate filters, charcoal cartridges, gas samples, and condensed water samples are analyzed for isotopic identification and quantification, in accordance with the PNPS Effluent Controls.

7.3.3 Limitations

a. Gaseous Effluent

1) PNPS Effluent Controls for gaseous release values.

b. Liquid Effluent

1) PNPS Effluent Controls for liquid release values.

2) If one pump is used to discharge the liquid waste and fails, the release is immediately discontinued.

3) If the discharge flow rate recorder fails, the release is immediately discontinued.

8.0 MONITOR SET POINTS

8.1 Liquid Effluent Monitor

The setpoint for the liquid effluent monitor (see Section 7.2.1) is established as follows:

1) Prior to a liquid batch release, the waste discharge tank is recirculated for at least 60 minutes and a sample is taken.

2) The liquid effluent sample is analyzed (see Section 7.3) to determine the concentrations of each detectable isotope in μCi/mL. (See Appendix B for the definitions of lower limit of detection.)

3) The efficiency (in counts/sec per μCi/mL) of the liquid discharge monitor is calculated based on prior release experience.

4) The setpoint for the liquid effluent monitor is calculated as follows:

a) Monitor setpoint based on activity concentration

$$c = \frac{C\,F}{f}$$

where:

c = the setpoint of the radioactivity monitor measuring the radioactivity concentration in the effluent line prior to dilution and subsequent release; the setpoint, which is proportional to the volumetric flow of the effluent line and inversely proportional to the volumetric flow of the dilution stream plus the effluent stream, represents a value, which if exceeded, would result in concentrations exceeding the limits of 10CFR20 in the unrestricted area, (μCi/mL);

C = the effluent concentration limit implementing10CFR20 for the site (μCi/mL);

where:

$$C = \frac{\sum_i C_{wi}}{\sum_i \frac{C_{wi}}{ECL_i}}$$

C_{wi} = concentration of nuclide i in the liquid waste discharge volume prior to any dilution as determined by current isotopic analysis for gamma emitting nuclides and most recent results from pure beta emitters as specified in Table 4.2-1 of PNPS Effluent Controls, (μCi/mL);

ECL_i = Effluent Concentration Limit of each nuclide i from 10CFR20 Appendix B, Table 2, Column 2, (μCi/mL);

f = the flow setpoint as measured at the radiation monitor location, (gpm);

F = the dilution water flow setpoint as measured prior to the release point, (gpm);

b) Monitor setpoint based on monitor count rate

$$c_s = (c * x) + z$$

where:

c_s = the setpoint of the radioactivity monitor measuring the radionuclide concentration in the effluent line prior to dilution, (counts/sec);

c = the liquid effluent monitor setpoint based on activity concentration as calculated in step 4.a above, (μCi/mL);

x = the liquid effluent monitor efficiency/conversion factor for activity concentration to count rate, (counts-mL/μCi-sec);

z = the liquid effluent monitor background count rate, (counts/sec).

The setpoint will ensure that the concentration of liquid effluents discharged does not increase above the value for which the maximum permissible discharge flow rate was established (see Section 9.1 of this manual).

8.2 Gaseous Effluent Monitors

The only components of the station's gaseous effluent and discharge which are continuously monitored are the noble gases. The method of determining the main stack gas monitor (see Section 7.2.2) and reactor building exhaust vent monitor (see Section 7.2.3) Hi and Hi-Hi alarms is as follows:

1) At the time a gas grab sample is taken at the discharge point, the gross monitor reading is recorded (in counts/sec).

2) The results of the isotopic analyses on this sample in terms of μCi/cc of each isotope detected are used along with estimates of gaseous discharge flow rate (SCFM) to determine the current release rate of each detected isotope in μCi/sec.

3) These calculated release rates (μCi/sec) are used along with the equations given in Sections 9.3.1.3 and 9.3.1.4 of this manual to calculate the maximum offsite dose rate due to noble gases.

4) The ratio of this calculated dose rate to the PNPS Effluent Control instantaneous dose rate limit (500 mrem/yr for the total body and 3000 mrem/yr for the skin, or some fraction thereof) is used to scale the observed monitor reading at the time at which the grab sample was obtained as follows:

$$S_G = \frac{(C_s - B_g)\, DR_{Limit}}{DR_{Calc}} + B_g$$

where:

S_G = gaseous monitor setpoint corresponding to 500 mrem/yr to the total body or 3000 mrem/yr to the skin, whichever is more limiting (in counts/sec)

C_s = observed monitor reading at the time of the grab sample (in counts/sec)

B_g = measured background count rate at the sampler with no sample present (in counts/sec)

DR_{Limit} = the applicable dose rate limit, 500 mrem/yr for the total body or 3000 mrem/yr for the skin or some fraction thereof

DR_{Calc} = the calculated dose rate for the maximum individual from the methods of Section 9.3.1.3 and 9.3.1.4 of this manual using the release rates determined from the grab sample, mrem/yr

The resulting setpoint will be valid until the next grab sample is taken from the release point.

This method will be used to establish the Hi-Hi alarm at 500 mrem/yr to the total body or 3000 mrem/yr to the skin, whichever is more restrictive.

Since two release points exist for noble gas effluents, the setpoints may be varied to allow greater release rates from one point than the other, provided the total limit is below 500 mrem/yr for the total body or 3000 mrem/yr for the skin, whichever is more restrictive.

The Hi-Hi alarm setpoint for the gaseous monitors will be based on the equation in this section. The Hi alarm setpoint may be set at or below, but in no case above, the Hi-Hi alarm setpoint.

8.3 Steam Jet Air Ejector Monitor

The steam jet air ejector (SJAE) monitor is used to measure the release rate of noble gases in main condenser offgas prior to its further treatment and release from the main stack. This monitor's primary function is to provide alarm and isolation of this process flow stream in the event of excessively high release rates of noble gases from the condenser and recombiner. The maximum allowable release rate of noble gases in the SJAE offgas is 500,000 µCi/sec, as established in Technical Specification 3.8.1. For conservatism, the Hi-Hi alarm is set at 75% of this limit, or 375,000 µCi/sec. In association with changing to a 24-month refueling cycle, the frequency of equipment calibrations has also been extended from the typical 18-month cycle. In order to accommodate for any drift which may occur in SJAE monitor response during the additional 6-months in the calibration interval, the Hi-Hi alarm has been further derated to a release rate of 300,000 µCi/sec.

Since this gaseous stream undergoes further processing downstream of the SJAE monitor and is ultimately released via the main stack and monitored by the main stack gaseous effluent monitor, the SJAE monitor does not strictly qualify as a primary effluent monitor. Therefore, it is not normally recognized as such. However, the methodology for establishment of alarm setpoints is included in this section for completeness. These setpoints are established as follows:

1) A grab sample of the SJAE offgas is collected. The SJAE monitor reading (mR/hr) is recorded in conjunction with this sample.

2) Isotopic analyses are performed on the offgas sample and the total noble gas concentration (μCi/cc) is coupled with the flow rate (CFM) to calculate the SJAE release rate (μCi/sec).

3) The release rate (μCi/sec) is divided by the monitor reading (mR/hr) to determine the SJAE monitor conversion factor (μCi/sec/mR/hr).

4) The Hi-Hi alarm setpoint (mR/hr) is determined by dividing the maximum tolerable release rate of 300,000 μCi/sec by the SJAE monitor conversion factor (μCi/sec/mR/hr).

5) The Hi alarm setpoint is set at 50% of the corresponding Hi-Hi alarm setpoint.

Grab samples of the SJAE offgas are collected: 1) at least once every 31 days; or, 2) if the gross radioactivity release rate increases by 50% or more over the previous day (after factoring out changes in reactor thermal power level and/or hydrogen injection rate). Upon collection of these grab samples, new values are established for the total noble gas concentration, SJAE monitor conversion factor, and alarm setpoints. Typically, existing setpoints will be used unless the newly calculated setpoints yield lower values. In this case, the setpoints will be lowered to the newer, more conservative values.

9.0 CALCULATIONAL METHODS

This section presents the calculational specifics required to demonstrate compliance with each of the Effluent Controls identified in Section 3/4 of this document.

The equations in this section are based on the equations and calculational methods described in Reference 8, unless otherwise specified. These equations have, in some cases, been presented in a slightly different form in an effort to simplify their use. The subscripts used are "a" for age group, "j" for organ, "i" for radionuclide, "p" for pathway and "l" for location. Capital letters have been used on the dose/dose rate, use factor, concentration, and dose conversion factor abbreviations to designate pathways. "A" is for aquatic foods, "S" for shoreline deposits, "W" for swimming, "Y" for yachting/boating, "N" for noble gas, "G" for ground plane deposition, "B" for breathing/inhalation, "L" for leafy vegetation, "R" for root crops/non-leafy vegetation, "M" for milk, and "C" for meat.

The descriptions of constants, variables, and parameters in this section are also based on those described in Reference 8, unless otherwise specified. The descriptions have, in some cases, been modified to describe the constant, variable, and parameter specific application in the corresponding equation. In addition, some of the constant and variable values have been revised to include more site specific values, to include more technically correct information, or to provide uniformity (e.g., λ_i values always presented in hr^{-1}). Values for parameters which only have a single value will appear along with the definition. For those parameters which can take on different values for different conditions, the appropriate value will appear in the referenced tables. All numerical constants have been derived from the indicated base conversion factors and are represented in scientific notation to the third significant digit.

9.1 Concentrations of Liquid Effluents

The following equation shall be used to determine the discharge flow rate such that concentrations of radioactive effluents released to unrestricted areas do not exceed the concentration limits specified in 10CFR20 Appendix B, Table 2, Column 2:

$$DFR = \frac{CW}{\sum_i \frac{C_{wi}}{ECL_i}}$$

where:

DFR = Maximum discharge release rate of liquid effluent, (gal/min).

CW = Flow rate of dilution water, (sum of circulating water pumps and/or salt service water pumps), (gal/min).

C_{wi} = Concentration of nuclide i in the liquid waste discharge volume prior to any dilution as determined by current isotopic analysis for gamma emitting nuclides and most recent results from pure beta and alpha emitters, (μCi/mL).

ECL_i = Effluent Concentration Limit of each nuclide *i* from 10CFR20 Appendix B, Table 2, Column 2, (μCi/mL).

9.2 Liquid Effluents Dose Assessment Methodology

The following equations shall be used to estimate the annual dose rates due to a release of radioactive liquid effluents. All input parameters (i.e., activity and volume) must be normalized to a 1 year release period. Modification of the final results is necessary for comparison to dose rate limits for periods different than one year. For comparison to monthly limits and quarterly limits, results would be scaled by 1/12 and 1/4, respectively. To determine the dose or dose commitment for a desired period, multiply the annual dose rate by the fraction of the year for the dose period desired. For purposes of projecting resulting dose estimates for the subsequent month, the release rates and concentrations are assumed to be equal to the previous month's release.

Pathways assuming internal deposition of radionuclides (i.e., ingestion) involve the use of a 50-year committed dose conversion factor. This entire prospective dose will be assigned to the individual for the year of intake (Reference 8). In the original version of the ODCM, values from Regulatory Guide 1.109 (Reference 8) were used for calculating doses. Upon incorporation of the Generic Letter 89-01 change (Revision 8), and conversion to an electronic document, dose conversion factors were obtained from updated tables used by the NRC in the computer program GASPAR-II (Reference 9). For pathways involving external radiation to the total body (i.e., shoreline activity, swimming, boating), the dose to all other organs is assumed equal to that for the total body (Reference 8, Appendix E).

Summation of the dose rates from the equations below should be performed for all significant pathways.

9.2.1 Liquid Pathways Annual Dose Rates

9.2.1.1 Aquatic Food Ingestion (Fish, Shellfish)

$$DA_{ajp} = UA_{ap} \sum_i \left[CA_{ip}\ DFI_{aij} \right]$$

where:

$$CA_{ip} = CW_{il}\ B_{ip}\ e^{-\lambda_i t_h}$$

$$CW_{il} = \frac{1.00E12\ Q_i\ M_l\ e^{-\lambda_i t_l}}{V}$$

Above equations derived from Reference 8, equations 2 and A-3.

9.2.1.2 Shoreline Deposits (Discharge Canal and Recreational Area)

$$DS_{ajl} = US_{al}\ W_l \sum_i \left[CS_{il}\ DFG_{ij} \right]$$

where:

$$CS_{il} = 2.89\ CW_{il}\ \frac{\left(1 - e^{-\lambda_i t_b}\right)}{\lambda_i}$$

CW_{il} = same as indicated in Equation 9.2.1.1

Above equation derived from Reference 8, equations A-4 through A-7.

9.2.1.3 Swimming (White Horse Beach)

$$DW_{ajl} = UW_{al} \sum_i \left[CW_{il}\ DFW_{ij} \right]$$

where:

CW_{il} = same as indicated in Equation 9.2.1.1

Above equations derived from Reference 10, equation 41 on page 151.

9.2.1.4 Yachting/Boating (Cape Cod Bay)

$$DY_{ajl} = 0.5\ UY_{al} \sum_i \left[CW_{il}\ DFW_{ij} \right]$$

where:

CW_{il} = same as indicated in Equation 9.2.1.1

Above equations derived from Reference 10, equation 41 on page 151.

9.2.2 Definitions:

B_{ip} = equilibrium bioaccumulation factor for radionuclide i, in aquatic foods pathway p, expressed as the concentration in biota (pCi/kg), divided by the concentration in water (pCi/liter) from Table A-1, (liters/kg);

Ca_{ip} = concentration of radionuclide i in pathway p of aquatic foods, (pCi/kg);

CS_{il} = effective surface concentration of radionuclide i in sediments at location l, (pCi/m^2);

CW_{il} = concentration of radionuclide i in seawater at location l, (pCi/liter);

DA_{ajp} = total annual dose rate from ingestion of aquatic foods to organ j, of individuals of age group a, from pathway p, (mrem/yr);

DFG_{ij} = open field ground plane dose conversion factor for organ j, from radionuclide i, from Table A-10, (mrem-m^2/pCi-hr);

DFI_{aij} = ingestion 50-year committed dose conversion factor for organ j, of individuals in age group a, from radionuclide i, from Table A-15 through A-18 (mrem/pCi ingested);

DFW_{ij} = submersion dose conversion factor in water, for organ j, of individuals in age group a, from radionuclide i, from Table A-2, (mrem-liter/pCi-hr);

DS_{ajl} = total annual dose rate from exposure received during shoreline activities, to organ j, of individuals of age group a, at location l, (mrem/yr);

DW_{ajl} = total annual dose rate from exposure received during swimming, to organ j, of individuals of age group a, at location l, (mrem/yr);

DY_{ajl} = total annual dose rate from exposure received during yachting/boating, to organ j, of individuals in age group a, at location l, (mrem/yr);

M_l = mixing ratio (reciprocal of dilution factor) at location l of exposure or harvest of aquatic food, from Table A-3, (dimensionless);

Q_i = annual release rate of radionuclide i in liquid effluents, (Ci/yr);

t_b = period of time for which sediment is exposed to radionuclides in seawater, including buildup, (hr, assumed to be 1.31E5 hr = 15y);

t_h = time between exposure of aquatic foods to radionuclides in sea water and their consumption by an individual, from Table A-3, (hr);

t_l = transit time required for radionuclides to reach location l, (hr, assumed to be 0.0 hr from the liquid waste tank to the discharge canal);

UA_{ap} = use factor of aquatic foods from pathway p, by individuals in age group a, from Table A-9 for maximum individual, Table A-8 for average individual, (kg/yr);

US_{al} = use factor (amount of time) an individual in age group a, engages in shoreline activities at location l, from Table A-9 for maximum individual, Table A-8 for average individual, (hr/yr);

UW_{al} = use factor (amount of time) an individual in age group a, engages in swimming at location l, from Table A-9 for maximum individual, Table A-8 for average individual, (hr/yr);

UY_{al} = use factor (amount of time) an individual in age group a, engages in yachting/boating at location l, from Table A-9 for maximum individual, Table A-8 for average individual, (hr/yr);

V = total annual discharge rate of liquids, represented by the sum of liquid effluents, circulating water pumps, and/or salt service water pumps, (liters/yr);

W_l = shoreline width factor for location l, from Table A-3, (dimensionless);

λ_i = radioactive decay constant of radionuclide i, (hr^{-1});

0.50 = scaling factor for yachting/boating assuming that doses received while on the surface of the water are 1/2 of doses received while immersed in water from Reference 10, (dimensionless);

2.89 = factor to convert for transfer of nuclides from water to sediment, equal to 100 liters/m^2-day from Reference 11 multiplied by 1 day/24 hr and by natural log of 2 (to convert reciprocal λ_i to half-life), as calculated in Reference 8, equation A-5, (liter/m^2-hr);

1.00E12 = factor to convert from Ci to pCi, (pCi/Ci);

9.3 Gaseous Effluents Dose Assessment Methodology

The following equations shall be used to estimate the annual dose rates due to release of radioactive gaseous effluents. All input parameters (i.e., activity and volume) must be normalized to a 1 year release period. Modification of final results is necessary for comparison to dose rate limits for periods different than one year. For comparison to monthly limits and quarterly limits, results would be scaled by 1/12 and 1/4, respectively. To determine the dose or dose commitment for a desired period multiply the annual dose rate by the fraction of the year for the dose period desired.

For conservatism, the shielding factor (S) used for calculating total body dose and skin dose from noble gases is normally assumed to be unity (1.0), as specified in NUREG-0133 (Reference 12). Also, although iodine deposition on vegetation is assumed to be 50% (Reference 8), 100% of airborne iodine is assumed to be deposited on the ground surface when calculating direct radiation (ground plane) exposure.

Pathways assuming internal deposition of radionuclides (i.e., inhalation, ingestion) involve the use of a 50-year committed dose conversion factor. This entire prospective dose will be assigned to the individual for the year of intake (Reference 8). In the original version of the ODCM, values from Regulatory Guide 1.109 (Reference 8) were used for calculating doses. Upon incorporation of the Generic Letter 89-01 change (Revision 8), and conversion to an electronic document, dose conversion factors were obtained from updated tables used by the NRC in the computer program GASPAR-II (Reference 9). For pathways involving external radiation to the total body (i.e., noble gas total body dose, ground plane deposition), the dose to all other organs is assumed equal to that for the total body (Reference 8, Appendix E).

Summation of the doses rates from the equations below should be performed for all significant pathways and all release points from which significant radioactive effluent releases have occurred (i.e., Main Stack and Reactor Building Exhaust Vent).

9.3.1 Gaseous Pathways Annual Dose Rates from Noble Gases

9.3.1.1 Gamma Air Dose

$$DN_{\gamma} = \sum_{i} \left[C_{i\gamma} \; DFN_{i\gamma} \right]$$

where:

$$C_{i\gamma} = 3.17E4 \left[\chi/Q \right]_{\gamma} \; Q_i$$

Above equations derived from Reference 8, equations 6, 7, B-1, B-2, B-4, and B-5, as well as References 13 and 14.

9.3.1.2 Beta Air Dose

$$DN_{\beta} = \sum_{i} \left[c_{i\beta} \; DFN_{i\beta} \right]$$

where:

$$C_{i\beta} = 3.17E4 \left[\chi/Q \right]_{c} \; Q_{i}$$

Above equations derived from Reference 8, equations 7, B-4, and B-5.

9.3.1.3 Total Body Dose

$$DN_{TB} = S \sum_{i} \left[c_{i\gamma} \; DFN_{iTB} \right]$$

where:

$C_{i\gamma}$ = Same as indicated in Equation 9.3.1.1.

Above equations derived from Reference 8, equations 8, 10, B-1, B-2, B-4, B-5, B-6, and B-8, as well as References 13 and 14.

9.3.1.4 Skin Dose

$$DN_{S} = \left(1.11 \; S \; DN_{\gamma} \right) + \sum_{i} \left[c_{i\beta} \; DFN_{iS} \right]$$

where:

$DN_{\gamma}, C_{i\beta}$ = same as indicated in Equations 9.3.1.1 and 9.3.1.2, respectively.

Above equations derived from Reference 8, equations 6, 7, 9, 11, B-1, B-2, B-4, B-7, and B-9, as well as References 13 and 14.

9.3.2 Gaseous Pathways Annual Dose Rates from Iodine 131 and 133, Particulates with a Half-life Greater than 8 Days, and Tritium.

PNPS Effluent Controls do not consider doses from C-14 and I-135 for compliance. However, equations for these radionuclides are included in this section for completeness.

9.3.2.1 Ground Plane Deposition

$$DG_j = S \sum_i \left[CG_i \; DFG_{ij} \right]$$

where:

$$CG_i = 1.00E12 \left[{}^{D}/_{Q} \right] Q_i \; \frac{\left(1 - e^{-\lambda_i t_b}\right)}{\lambda_i}$$

Above equations derived from Reference 8 equations 12, C-1, and C-2.

9.3.2.2 Breathing/Inhalation

$$DB_{aj} = UB_a \sum_i \left[CB_i \; DFB_{aij} \right]$$

where:

$CB_i = 3.17E4 \left[{}^{\chi}/_{Q} \right]_c Q_i$ for H-3, C-14

$CB_i = 3.17E4 \left[{}^{\chi}/_{Q} \right]_d Q_i$ for particulates with $T_{1/2}$ >8d, I-131, I-133, and I-135

Above equations derived from Reference 8, equations 13, C-3, and C-4.

9.3.2.3 Leafy Vegetation Ingestion

$$DL_{aj} = UL_a \; f_l \sum_i \left[CL_i \; DFI_{aij} \right]$$

where:

CL_i = leafy vegetation concentration as calculated below.

Above equation derived from Reference 8, equations 14 and C-13.

where:

$$CH_i, CL_i, CP_i, CR_i = \frac{1.19E7 \; Q_i \left[\chi/Q \right]_c}{H} \qquad \text{for H-3}$$

$$CH_i, CL_i, CP_i, CR_i = 2.18E7 \; p \; Q_i \left[\chi/Q \right]_c \qquad \text{for C-14}$$

$$CH_i, CL_i, CP_i, CR_i = 5.71E7 \; Q_i \left[D/Q \right] * \left[\frac{r_l \left(1 - e^{-\lambda_{Ei} t_e} \right)}{Y_v \; \lambda_{Ei}} + \frac{B_{iv} \left(1 - e^{-\lambda_i t_b} \right)}{\mathrm{P} \; \lambda_i} \right] * e^{-\lambda_i t_h}$$

for I-131, I-133, and I-135

$$CH_i, CL_i, CP_i, CR_i = 1.14E8 \; Q_i \left[D/Q \right] * \left[\frac{r_p \left(1 - e^{-\lambda_{Ei} t_e} \right)}{Y_v \; \lambda_{Ei}} + \frac{B_{iv} \left(1 - e^{-\lambda_i t_b} \right)}{\mathrm{P} \; \lambda_i} \right] * e^{-\lambda_i t_h}$$

for particulates with $T_{1/2}$ >8 days,

Above equations derived from Reference 8, equations C-5 through C-9.

9.3.2.4 Root Crop Non-Leafy Vegetation Ingestion

$$DR_{aj} = UR_a \; f_r \sum_i \left[CR_i \; DFI_{aij} \right]$$

where:

CR_i = root crop concentration as calculated in Equation 9.3.2.3.

Above equations derived from Reference 8, equations 14 and C-13.

9.3.2.5 Milk Ingestion

$$DM_{aj} = UM_a \sum_i \left[CM_i \; DFI_{aij} \right]$$

where:

$$CM_i = F_{im} \; CF_i \; Q_f \; e^{-\lambda_i t_f}$$

$$CF_i = f_p \; f_s \; CP_i + \left(CH_i \left(1 - f_p \right) \right) + CH_i \; f_p \left(1 - f_s \right)$$

CP_i, CH_i = concentration in pasture grass and harvested/stored feed as calculated in Equation 9.3.2.3.

Above equations derived from Reference 8, equations 14, C-10, C-11, and C-13

9.3.2.6 Meat Ingestion

$$DC_{aj} = UC_a \sum_i \left[CC_i \; DFI_{aij} \right]$$

where:

$$CC_i = F_{if} \; CF_i \; Q_f \; e^{-\lambda_i t_s}$$

CF_i = concentration in forage as calculated in Equation 9.3.2.5

Above equations derived from Reference 8, equations 14, C-12, and C-13

9.3.3 Definitions

B_{iv} = concentration factor for uptake of radionuclide i, from soil in the edible portions of crops, in pCi/kg (wet weight) per pCi/kg dry soil, from Table A-5, (kg/kg);

$C_{i\beta}$ = effective semi-infinite cloud concentration of noble gas i, for the purpose of calculating beta air dose, (pCi/m^3);

$C_{i\gamma}$ = effective finite cloud concentration of noble gas i for the purpose of calculating gamma air dose, (pCi/m^3);

CB_i = ground-level airborne concentration of radionuclide i, (pCi/m^3);

CC_i = concentration of radionuclide i in meat, (pCi/kg);

CF_i = concentration of radionuclide i on forage, (pCi/kg);

CG_i = ground plane concentration of radionuclide i, (pCi-hr/m^2-yr);

CH_i = concentration of radionuclide i on harvested/stored feed, (pCi/kg);

CM_i = concentration of radionuclide i in milk, (pCi/liter);

CL_i = concentration of radionuclide i in leafy vegetables, (pCi/kg);

CP_i = concentration of radionuclide i on pasture grass, (pCi/kg);

CR_i = concentration of radionuclide i in root crops/non-leafy vegetables, (pCi/kg);

DB_{aj} = total annual dose rate from breathing/ inhalation to organ j, of an individual in age group a, (mrem/yr);

DC_{aj} = total annual dose rate from ingestion of meat to organ j; of an individual in age group a, (mrem/yr);

DFB_{aij} = inhalation 50-year committed dose conversion factor for organ j, of individuals in age group a, from radionuclide i, from Tables A-11 through A-14, (mrem/pCi);

DFG_{ij} = open field ground plane dose conversion factor for organ j, from radionuclide i, from Table A-10, (mrem -m^2/pCi-hr);

DFI_{aij} = ingestion 50-year committed dose conversion factor for organ j, for individuals in age group a, from radionuclide i, from Tables A-15 through A-18, (mrem/pCi);

DFN_{iS} = beta skin dose conversion factor for a semi-infinite cloud of noble gas i, which includes the attenuation by the outer "dead" layer of skin, from Table A-4, (mrem-m^3/pCi-yr);

DFN_{iTB} = total body dose conversion factor for a semi-infinite cloud of noble gas i, which includes the attenuation of 5 g/cm^2 of tissue, from Table A-4, (mrem-m^3/pCi-yr);

$DFN_{i\beta}$ = beta air dose conversion factor from a semi-infinite cloud of noble gas i, from Table A-4, (mrad-m^3/pCi-yr);

$DFN_{i\gamma}$ = gamma air dose conversion factor from a semi-infinite cloud of noble gas i, from Table A-4, (mrad-m^3/pCi-yr);

DG_j = total annual dose rate to organ j from direct exposure to the contaminated ground plane from all radionuclides, (mrem/yr);

DL_{aj} = total annual dose rate from ingestion of leafy vegetables to organ j, of an individual in age group a, (mrem/yr);

DM_{aj} = total annual dose rate from ingestion of milk to organ j, of an individual in age group a, (mrem/yr);

DN_S = total annual skin dose rate due to immersion in a finite cloud of noble gases, (mrem/yr);

DN_{TB} = annual total body dose rate due to immersion in a finite cloud of noble gases, (mrem/yr);

DN_β = annual beta air dose rate to a semi-infinite cloud of noble gases, (mrad/yr);

DN_γ = annual gamma air dose rate due to a finite cloud of noble gases, (mrad/yr);

DR_{aj} = total annual dose rate from ingestion of root crop or non-leafy vegetables to organ j, of an individual in age group a, (mrem/yr);

$[D/Q]$ = deposition rate considering depletion at the receptor location in question, from Table 10-1, (m^{-2});

f_l = fraction of the ingestion rate of a leafy vegetable that is produced in the garden of interest, (dimensionless; assumed to be 1.0);

f_p = fraction of the year the animals graze on pasture, (dimensionless; assumed to be 1.0);

f_r = fraction of root crops/non-leafy vegetable that are produced in the garden of interest, (dimensionless; assumed to be 0.76);

f_s = fraction of daily feed that is pasture grass when the animal grazes on pasture, (dimensionless; assumed to be 1.0);

F_{if} = average fraction of the animal's daily intake of radionuclide i which appears in each kilogram of meat, from Table A-5, (days/kg);

F_{im} = average fraction of the animal's daily intake of radionuclide i which appears in each liter of milk, from Table A-5 for cows, Table A-6 for goats, (days/liter);

H = absolute humidity of the atmosphere from Reference 15, (g/m^3; assumed to be 5.6 g/m^3);

p = fractional equilibrium ratio, (dimensionless; assumed to be 1.0 for continuous release);

P = effective surface density for dry soil, (kg/m^2; assumed to be 240 kg/m^2);

Q_f = amount of feed consumed by the animal per day from Table A-7, (kg/day);

Q_i = annual release rate of radionuclide i in gaseous effluents (Ci/yr);

r_I = fraction of deposited radioiodine retained on crops, (dimensionless; assumed to be 1.0 from References 16-19);

r_p = fraction of deposited particulates retained on crops, (dimensionless; assumed to be 0.2 from References 20 and 21);

S = attenuation factor that accounts for the dose reduction due to shielding provided by residential structures from Table A-19, (dimensionless);

t_b = time period over which the radionuclide buildup is evaluated, (hr; assumed to be 1.31E5 hr = 15 yr);

t_e = time period that crops are exposed to radionuclide deposition during the growing season, from Table A-19, (hr);

t_f = average transport time of the activity from the feed into the milk and to the receptor from Table A-19, (hr);

t_h = holdup time that represents the time interval between harvest and consumption of the food, from Table A-19, (hr);

t_s = average time for radionuclides to pass from feed through meat to the consuming individual, (hr; assumed to be 480 hr = 20 days);

UB_a = annual breathing rate, for individuals in the age group a, from Table A-9 for maximum individual, Table A-8 for average individual, (m^3/yr);

UC_a = annual intake of meat, for individuals in age group a, from Table A-9 for maximum individual, Table A-8 for average individual, (kg/yr);

UL_a = annual intake of leafy vegetables, for individuals in the age group a, from Table A-9 for maximum individual, Table A-8 for average individual, (kg/yr);

UM_a = annual intake of milk, for individuals in the age group a, from Table A-9 for maximum individual, Table A-8 for average individual, (liter/yr);

UR_a = annual intake of root crops/non-leafy vegetables, for individuals in the age group a, from Table A-9 for maximum individual, Table A-8 for average individual, (kg/yr);

Y_V = agricultural productivity/yield, from Table A-19, (kg/m^2, wet weight);

$[\chi/Q]_C$ = appropriate value of undepieted atmospheric dispersion factor used to estimate ground level airborne concentration of gaseous, (i.e., non-particulate) radionuclides, from Table 10-1, (sec/m^3);

$[\chi/Q]_d$ = appropriate value of the average gaseous dispersion factor corrected for depletion of particulates and radioiodines, from Table 10-1, (sec/m^3);

$[\chi/Q]_\gamma$ = appropriate value of gamma atmospheric dispersion factor used to estimate ground level gamma dose rate from an elevated or ground level plume as calculated in References 13 and 14, from Table 10-1, (sec/m^3);

λ_i = radioactive decay constant of radionuclide i, (hr^{-1});

λ_{Ei} = effective removal rate constant for radionuclide i from crops, in hr^{-1}, where $\lambda_{Ei} = \lambda_i + \lambda_w$. λ_i is the radioactive decay constant, and λ_w is the removal rate constant for physical loss by weathering. $\lambda_w = 0.0021\ hr^{-1}$, ($hr^{-1}$);

1.11 = average ratio of the tissue to air energy absorption coefficients, (mrem/mrad);

3.17E4 = 1.00E12 pCi/Ci divided by 3.15E7 sec/yr, (pCi-yr/Ci-Sec)

1.19E7 = 1.00E12 pCi/Ci divided by 3.15E7 sec/yr and multiplied by 1.00E3 g/kg and by 0.5 g H-3 in plant water per g H-3 in atmospheric water from Reference 22 (dimensionless) and by 0.75 g water per g plant (dimensionless), as calculated in Reference 8 equation C-9, (pCi-yr-g/Ci-sec-kg);

2.18E7 = 1.00E12 pCi/Ci divided by 3.15E7 sec/yr and multiplied by 1.00E3 g/kg and by 0.11 g Carbon/g plant mass from References 23 and 24 divided by 0.16 g Carbon/m^3 of air, as calculated in Reference 8 equation C-8, (pCi-yr-m^3/Ci-sec-kg):

5.71E7 = conversion factor to correct for activity, time units, and elemental forms of radioiodines, equal to the particulate radionuclide conversion factor 1.14E8 multiplied by an elemental iodine fraction of 0.5 from Reference 25, (pCi-yr/Ci-hr);

1.14E8 = conversion factor to correct activity units and time units for particulate radionuclides, equal to 1.00E12 pCi/Ci multiplied by 1 yr/8760 hr, (pCi-yr/Ci-hr);

1.00E12 = conversion factor to correct for activity units, (pCi/Ci);

9.4 Total Dose to a Member of the Public

The purpose of this section is to describe the method used to calculate the cumulative dose contributions from liquid and gaseous effluents in accordance with PNPS Effluent Controls for total dose. This method can also be used to demonstrate compliance with the Environmental Protection Agency (EPA) 40CFR190, "Environmental Standards for the Uranium Fuel Cycle".

Compliance with the PNPS Effluent Controls dose objectives for the maximum individual demonstrates compliance with the EPA limits to any member of the public, since the design dose objectives from 10CFR50 Appendix I are much lower than the 40CFR190 dose limits to the general public. With the operational objectives in PNPS Effluent Controls Sections 3.2.2, 3.3.2, and/or 3.3.3 being exceeded by a factor of two, a special analysis must be performed. The purpose of this special analysis is to demonstrate if the total dose to any member of the public (real individual) from all uranium fuel cycle sources (including all real pathways and direct radiation) is limited to less than or equal to 25 mrem per year to the total body or any organ except for the thyroid which is limited to 75 mrem per year.

If required, the total dose to a member of the public will be calculated for all significant effluent release points for all real pathways including direct radiation. Only effluent releases from PNPS (Pilgrim Station) need to be considered since no other nuclear fuel cycle facilities exist within a 50 mile radius. The calculations will be based on the equations contained in this section, with the exception that the usage factors and other site specific parameters will be modified using more realistic assumptions, where appropriate.

The direct radiation component from the facility can be determined by using environmental TLD results. These results will be corrected for natural background and for actual occupancy time of the recreational areas accessible to the general public at the location of maximum direct radiation. It is recognized that by including the results from the environmental TLDs into the sum of total dose component, the direct radiation dose may be overestimated. The TLD measurements may include the exposure from noble gases, ground plane deposition, and shoreline deposition, which have already been included in the summation of the significant dose pathways to the general public. However, this conservative method can be used, if required, as well as any other method for estimating the direct radiation dose from contained radioactive sources within the facility. The methodology used to incorporate the direct radiation component into total dose estimates will be outlined whenever total doses are reported.

Therefore, the total dose will be determined based on the most realistic site specific data and parameters to assess the real dose to any member of the general public.

10.0 RECEPTOR LOCATIONS, HYDROLOGY, AND METEOROLOGY

The purpose of this section is to identify those receptor locations which represent critical pathway locations and the methods used to estimate dilution and dispersion factors for these locations.

For the dose calculations from liquid effluents, the maximum individual is assumed to: 1) ingest fish and shellfish from the discharge canal, 2) receive direct radiation from shoreline deposits at both the discharge canal and PNPS shoreline recreational area, and 3) receive external radiation while swimming at White Horse Beach as well as while boating on the Cape Cod Bay. The doses are calculated for the various age groups (i.e., infant, child, teenager and adult), as well as for the various organs, (i.e., bone, liver, thyroid, kidney, lung, gastrointestinal tract/lower large intestine, skin, and total body). The maximum total body and organ doses are selected from the totals of the various age groups and organ doses calculated as described above.

For liquid effluent pathways, Table A-3 lists the conservative values for the mixing ratio and shore width factor for the various aquatic receptor locations.

For the dose calculations for gaseous effluents, the maximum individual is assumed to reside at the receptor location that provides the highest dose from the dose contributions from all gaseous release points where significant releases have occurred. The locations selected in Table 10-1 are the site boundary, a garden at the site boundary, and the nearest milk animal at the Plimoth Plantation. The dose calculations are performed for each release point and totaled for the following dose pathways; 1) noble gas immersion, 2) ground plane deposition, 3) inhalation, and 4) ingestion of leafy vegetable, root crops/non-leafy vegetables, milk, and meat. The doses are also calculated for the various age groups and for the various organs as described for liquid effluents. The maximum total body, skin, and organ doses are selected from the totals of the various age groups and organ doses calculated as described above.

In order to estimate atmospheric dispersion and deposition factors for each of these locations, a computer code supplied by the Yankee Atomic Electric Company was used. The code, AEOLUS (Reference 13), was used to calculate quarterly average values of dispersion and deposition factors.

Meteorological data for a three year period, January 1, 1977 to December 31, 1979, were used for these analyses. The most conservative quarterly average values of ground level average atmospheric dispersion factor before depletion $[\chi/Q]_C$, ground level average atmospheric dispersion factor after depletion $[\chi/Q]_d$, average gamma dilution factor $[\chi/Q]_\gamma$, and average deposition rate [D/Q] for the three year period were chosen for each of the critical receptor locations.

The technique used to estimate ground level gamma doses from an elevated or ground level plume is based on the sector average finite cloud model of Regulatory Guide 1.109 (Reference 8). The equation has been rearranged into a form similar to the standard semi-infinite cloud equation thereby allowing the use of a "gamma Chi/Q" which includes the effects of plume dimensions, gamma energy mix, atmospheric and geometric attenuation, etc. (See References 13 and 14 for a detailed discussion.)

For gaseous effluent pathways, Table10-1 lists the critical locations for receptors and conservative atmospheric dispersion factors for each atmospheric receptor location.

TABLE 10-1

CRITICAL RECEPTOR LOCATIONS AND ATMOSPHERIC DISPERSION FACTORS

Effluent Control Section	$[\chi/Q]_c$ (sec/m^3)	$[\chi/Q]_d$ (sec/m^3)	$[\chi/Q]_\gamma$ (sec/m^3)	[D/Q] (1/m^2)
GROUND-LEVEL RELEASES: Reactor Building Vent, Turbine Building, etc.				
3/4.3.1: Gaseous Effluent Dose Rate				
Site Boundary [1]	7.40E-06	7.04E-06	4.69E-06	5.22E-08
Nearest Garden [2]	7.40E-06	7.04E-06	4.69E-06	5.22E-08
Nearest Milk Animal [3]	4.29E-07	4.21E-07	1.70E-07	7.93E-10
3/4.3.2: Dose - Noble Gases				
Site Boundary [1]	7.40E-06	N/A	4.69E-06	N/A
3/4.3.3: Dose - Iodine-131, Iodine-133, Radioactive Materials in Particulate Form, and Tritium				
Site Boundary [1]	7.40E-06	7.04E-06	N/A	5.22E-08
Nearest Garden [2]	7.40E-06	7.04E-06	N/A	5.22E-08
Nearest Milk Animal [3]	4.29E-07	4.21E-07	N/A	7.93E-10
3/4.4.1: Total Dose				
Site Boundary [1]	7.40E-06	7.04E-06	4.69E-06	5.22E-08
Nearest Garden [2]	7.40E-06	7.04E-06	4.69E-06	5.22E-08
Nearest Milk Animal [3]	4.29E-07	4.21E-07	1.70E-07	7.93E-10
ELEVATED RELEASES: Main Stack				
3/4.3.1: Gaseous Effluent Dose Rate				
Site Boundary [1]	4.69E-07	4.69E-07	1.68E-06	2.92E-09
Nearest Garden [2]	4.69E-07	4.69E-07	1.68E-06	2.92E-09
Nearest Milk Animal [3]	3.73E-08	3.70E-08	3.22E-08	2.46E-10
3/4.3.2: Dose - Noble Gases				
Site Boundary [1]	4.69E-07	N/A	1.68E-06	N/A
3/4.3.3: Dose - Iodine-131, Iodine-133, Radioactive Materials in Particulate Form, and Tritium				
Site Boundary [1]	4.69E-07	4.69E-07	N/A	2.92E-09
Nearest Garden [2]	4.69E-07	4.69E-07	N/A	2.92E-09
Nearest Milk Animal [3]	3.73E-08	3.70E-08	N/A	2.46E-10
3/4.4.1: Total Dose				
Site Boundary [1]	4.69E-07	4.69E-07	1.68E-06	2.92E-09
Nearest Garden [2]	4.69E-07	4.69E-07	1.68E-06	2.92E-09
Nearest Milk Animal [3]	3.73E-08	3.70E-08	3.22E-08	2.46E-10

[1] "Site Boundary" means the location at or beyond the boundary of the restricted area with the highest calculated dispersion and/or deposition factor.

[2] "Nearest Garden" is considered to be the same as the site boundary due to the abundance of small gardens near Pilgrim Station.

[3] "Nearest Milk Animal" is presently considered to be at the Plimoth Plantation, 3.7 km (2.3 mi) west of Pilgrim Station.

11.0 RADIOLOGICAL ENVIRONMENTAL SAMPLING AND MEASUREMENT LOCATIONS

Sampling and measurement locations have been established for Pilgrim Station considering meteorology, population distribution, hydrology, and land use characteristics of the Plymouth area. The sampling locations are divided into two classes: indicator and control. Indicator locations are those which are expected to show effects from PNPS operations, if any exist. These locations were selected primarily on the basis of where the highest predicted environmental concentrations were calculated to occur. While the indicator locations are typically within a few kilometers of the plant, the control stations are generally located so as to be outside the influence of Pilgrim Station. They provide a basis on which to evaluate fluctuations at indicator locations relative to natural background radiation, natural radioactivity, and fallout from prior nuclear weapons tests.

The environmental sampling media collected in the vicinity of Pilgrim Station include air particulate filters, charcoal cartridges, seawater, shellfish, Irish moss, American lobster, fishes, sediment, milk, cranberries, vegetation, and beef forage. The media, sample designation location, description, distance, and direction for indicator and control samples are listed in Tables 3.5-1 and 3.5-3 under Control 3/4.5.1. These sampling locations are also displayed on the maps shown in Figures 3.5-1 through 3.5-5. The frequency of collection and types of radioactivity analysis are described in the PNPS Effluent Control 3/4.5.1, Table 3.5-1. The maximum lower limits of detection (LLD) for the analytical measurements are specified in the PNPS Effluent Controls Table 4.5-1 (see Appendix B for the definitions of the lower limit of detection).

The environmental TLD location designations, distance, and direction from the reactor are listed in Table 3.5-2. The radiation measurement locations for the environmental TLDs are shown in Figures 3.5-1 through 3.5-5. The frequency and type of radiation measurement is described in the PNPS Effluent Control 3/4.5.1, Table 3.5-1.

The pressurized ion chamber measurement locations, distance, and direction from the reactor are listed in Table 3.5-3. These radiation measurement locations for the surveys performed on local beaches. The frequency and type of radiation measurement is described in PNPS Effluent Control 3/4.5.1, Table 3.5-1.

The atmospheric and land-based samples are collected by Boston Edison personnel from the Engineering Services Group Environmental Laboratory. The aquatic samples are collected by the Division of Marine Fisheries - Pilgrim Station Project personnel. The direct radiation measurements and soil radioactivity measurements are conducted by Duke Engineering and Services Environmental Laboratory personnel. The radioactivity analysis of samples and the processing of the environmental TLDs is performed by Duke Engineering and Services Environmental Laboratory personnel.

The PNPS staff reviews the radioactivity analysis results from the contractor laboratory. Reporting levels for radioactivity concentrations in environmental samples are listed in PNPS Effluent Controls Table 3.5-4. If the radioactivity concentrations are above the reporting levels, the NRC is notified in writing within 30 days. A determination of the cumulative dose contribution for the current year will be performed for radioactivity which is detected that is attributable to PNPS operation. Depending upon the circumstances, a special study may also be conducted.

If radioactivity levels in the environment become elevated as a result of the station's operation, an investigation is performed, and corrective actions are recommended to reduce the amount of radioactivity to as far below the legal limits as is reasonably achievable.

The radiological environmental sampling and measurement locations are reviewed annually, and modified if necessary. A garden and milk animal census is performed every year to identify changes in the use of the environment in the vicinity of the station to permit modification of the sampling and measurement locations.

12.0 ANNUAL REPORT PREPARATION

12.1 Annual Effluent and Waste Disposal Report

The Annual Radioactive Effluent and Waste Disposal Report covering the operation of Pilgrim Nuclear Power Station during the previous calendar year shall be submitted by May 15 of each year. The report shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid wastes released from the facility. This report shall be submitted in accordance with 10CFR50.36a.

General guidance for the preparation of this report can be found in Regulatory Guide 1.21 (Reference 26). In addition to effluent and disposal data, this report should also include summaries of meteorological data in the form of joint frequency distribution tables. This report should present an evaluation of the doses received by members of the public resulting from operation of Pilgrim Station. Liquid and airborne effluent pathways, as discussed in ODCM Section 9, should be used to assess the doses, as well as ambient (direct) radiation exposure resulting from plant operation.

In addition to summarizing effluents and their resulting doses, the Annual Effluent and Waste Disposal Report serves as the vehicle to notify the NRC of any changes in the ODCM. Changes to the ODCM during the previous calendar year shall be submitted in the Annual Effluent and Waste Disposal Report.

12.2 Annual Radiological Environmental Operating Report

The Annual Radiological Environmental Operating Report covering the operation of Pilgrim Nuclear Power Station during the previous calendar year shall be submitted by May 15 of each year. The report shall include summaries, interpretations, and analyses of trends of the results of the Radiological Environmental Monitoring Program for the reporting period. The material provided shall be consistent with the objectives outlined in other sections of the ODCM, as well as 10CFR50 Appendix I, Sections IV.B.2, IV.B.3, and IV.C.

The Annual Radiological Environmental Operating Report shall include tables summarizing the results of analyses of radiological environmental samples and environmental radiation measurements taken during the period, pursuant to the locations specified in Section 3/4.5 of the ODCM. Summarized and tabulated results of these analyses and measurements shall be similar in format to guidance provided in the Radiological Assessment Branch Technical Position, Revision 1, November 1979. In the event that some individual results are not available for inclusion in the report, the report shall be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted in a supplementary report as soon as possible.

13.0 REFERENCES

1) Boston Edison Company, PNPS Technical Specifications.

2) U. S. Nuclear Regulatory Commission, Generic Letter 89-01, "Implementation of Programmatic Controls for Radioactive Effluent Technical Specifications in the Administrative Controls Section of the Technical Specifications and the Relocation of Procedural Details of RETS to the Offsite Dose Calculation Manual or to the Process Control Program", January 1989.

3) Boston Edison Company, Updated Final Safety Analysis Report for Pilgrim Nuclear Power Station, Volumes 1 through 7.

4) Boston Edison Company, Pilgrim Station Unit 1 Appendix I Evaluation, April, 1977.

5) General Electric Company, GEK-32445A, Pilgrim Process Radiation Monitoring System Manual.

6) Boston Edison Company, PNPS Maintenance Department Recalibration and Malfunction Records.

7) Boston Edison Company, PNPS Operations Manual, Volume 7, Book 2: Chemical and Radiochemical Procedures.

8) U. S. Nuclear Regulatory Commission, Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50, Appendix I", Revision 1, October, 1977.

9) D.L. Strenge, T.J. Bander, and J.K. Soldat, NUREG/CR-4653, "GASPAR II Technical Reference and User Guide", March 1987.

10) "HERMES", A Digital Computer Code for Estimating Regional Radiological Effects from the Nuclear Power Industry, HEDL-TME-N1-168, December 1971.

11) G. L. Toombs and P. B. Culter, "Comprehensive Final Report for the Lower Columbia River Environmental Survey in Oregon June 5, 1961 - July 31, 1967," Oregon State Board of Health, Division of Sanitation and Engineering, 1968.

12) U. S. Nuclear Regulatory Commission, NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants", Revision 2, May, 1982.

13) J.N. Hamawi, "AEOLUS", Yankee Atomic Electric Company YAEC-1120, 1977.

14) J. N. Hamawi, "SKIRON", Yankee Atomic Electric Company YAEC-1138, 1977.

15) U. S. Nuclear Regulatory Commission, NUREG/CR-3332, "Radiological Assessment", December 1983.

16) D. F. Bunck (ed.), USAEC Report IDO-12063, "Controlled Environmental Radioiodine Test, Progress Report Number Two", January 1968.

17) J. D. Zimbrick and P. G. Voilleque, USAEC Report IDO-12065, "Controlled Environmental Radioiodine Tests at the National Reactor Testing Station, Progress Report Number Four," December 1968.

13.0 REFERENCES (continued)

18) F. O. Hoffman, IRS-W-6, "Environmental Variables Involved with the Estimation of the Amount of ^{131}I in Milk and the Subsequent Dose to the Thyroid," Institute fur Reaktorsicherheit, June 1973.

19) F. O. Hoffman, IRS-W-13, "A Reassessment of the Parameters Used To Predict the Environmental Transport of ^{131}I from Air to Milk," Institute fur Reaktorsicherheit, April 1975.

20) C. A. Pelletier and P. G. Voilleque, Health Physics, Vol. 21, p. 777, "The Behavior of ^{137}Cs and Other Fallout Radionuclides on a Michigan Dairy Farm," 1971.

21) P. G. Voilleque and C. A. Pelletier, Health Physics, Vol. 27, p. 189, "Comparison of External Irradiation and Consumption of Cow's Milk as Critical Pathways for ^{137}Cs, ^{54}Mn, and ^{144}Ce-^{144}Pr Released to the Atmosphere", 1974.

22) L. R. Anspaugh et al., USAEC Report UCRL-73195, Rev. 1, "The Dose to Man via the Food-Chain Transfer Resulting from Exposure to Tritiated Water Vapor", 1972.

23) Y. C. Ng et al., USAEC Report UCRL-50163, Part IV, "Prediction of the Maximum Dosage to Man from the Fallout of Nuclear Devices, IV Handbook for Estimating the Maximum Internal Dose from Radionuclides Released to the Biosphere," 1968.

24) R. C. Weast (ed.), "Handbook of Chemistry and Physics," CRC Press, 1970.

25) U.S. Nuclear Regulatory Commission, NUREG-75/021, "Detailed Measurement of I-131 in Air, Vegetation and Milk Around Three Operating Reactor Sites," March 1975.

26) U.S. Nuclear Regulatory Commission, Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water Cooled Nuclear Power Plants", Revision 1, June 1974.

APPENDIX A

DATA REQUIRED FOR EFFLUENT CALCULATIONS

TABLE A-1

BIOACCUMULATION FACTORS TO BE USED IN THE ABSENCE OF SITE-SPECIFIC DATA

pCi/kg per pCi/liter[1]

ELEMENT	FRESHWATER		SALTWATER	
	FISH	INVERTEBRATE	FISH	INVERTEBRATE
H	9.0E-01	9.0E-01	9.0E-01	9.3E-01
C	4.6E+03	9.1E+03	1.8E+03	1.4E+03
Na	1.0E+02	2.0E+02	6.7E-02	1.9E-01
P	1.0E+05	2.0E+04	2.9E+04	3.0E+04
Cr	2.0E+02	2.0E+03	4.0E+02	2.0E+03
Mn	4.0E+02	9.0E+04	5.5E+02	4.0E+02
Fe	1.0E+02	3.2E+03	3.0E+03	2.0E+04
Co	5.0E+01	2.0E+02	1.0E+02	1.0E+03
Ni	1.0E+02	1.0E+02	1.0E+02	2.5E+02
Cu	5.0E+01	4.0E+02	6.7E+02	1.7E+03
Zn	2.0E+03	1.0E+04	2.0E+03	5.0E+04
Br	4.2E+02	3.3E+02	1.5E-02	3.1E+00
Rb	2.0E+03	1.0E+03	8.3E+00	1.7E+01
Sr	3.0E+01	1.0E+02	2.0E+00	2.0E+01
Y	2.5E+01	1.0E+03	2.5E+01	1.0E+03
Zr	3.3E+00	6.7E+00	2.0E+02	8.0E+01
Nb	3.0E+04	1.0E+02	3.0E+04	1.0E+02
Mo	1.0E+01	1.0E+01	1.0E+01	1.0E+01
Tc	1.5E+01	5.0E+00	1.0E+01	5.0E+01
Ru	1.0E+01	3.0E+02	3.0E+00	1.0E+03
Rh	1.0E+01	3.0E+02	1.0E+01	2.0E+03
Te	4.0E+02	6.1E+03	1.0E+01	1.0E+02
I	1.5E+01	5.0E+00	1.0E+01	5.0E+01
Cs	2.0E+03	1.0E+03	4.0E+01	2.5E+01
Ba	4.0E+00	2.0E+02	1.0E+01	1.0E+02
La	2.5E+01	1.0E+03	2.5E+01	1.0E+03
Ce	1.0E+00	1.0E+03	1.0E+01	6.0E+02
Pr	2.5E+01	1.0E+03	2.5E+01	1.0E+03
Nd	2.5E+01	1.0E+03	2.5E+01	1.0E+03
W	1.2E+03	1.0E+01	3.0E+01	3.0E+01
Np	1.0E+01	4.0E+02	1.0E+01	1.0E+01

[1] Data presented in this table are from Reference 8.

TABLE A-2

DOSE FACTORS FOR IMMERSION IN WATER[1]

mrem/hr per pCi/Liter[2]

NUCLIDE	SKIN	TOTAL BODY[3]
H-3[4]	0.0E+00	0.0E+00
N-13	2.6E-06	1.9E-06
C-14[4]	3.8E-06	0.0E+00
Na-22	4.8E-06	4.0E-06
Na-24	9.3E-06	7.8E-06
Cr-51	6.4E-08	5.2E-08
Mn-54	1.8E-06	1.5E-06
Fe-55[5]	3.6E-10	6.4E-11
Fe-59	2.6E-06	2.2E-06
Co-58	2.3E-06	1.8E-06
Co-60	5.4E-06	4.6E-06
Ni-63	0.0E+00	0.0E+00
Cu-64	5.2E-07	3.7E-07
Zn--65	1.2E-06	1.1E-06
Sr-89[5]	5.4E-07	4.6E-09
Sr-90[5]	1.5E-07	5.4E-10
Y-90[5]	9.6E-07	1.3E-08
Sr+Y-90[5],[6]	1.1E-06	1.3E-08
Zr-95	1.8E-06	1.5E-06
Nb-95	1.6E-06	1.4E-06
Mo-99	9.1E-07	4.7E-07
Ru-103	1.1E-06	8.9E-07
Ru-106	1.9E-06	3.8E-07
Te-132	4.8E-07	4.0E-07
I-129	6.1E-09	2.1E-09
I-131	9.5E-07	6.8E-07
I-132	5.5E-06	4.4E-06
I-133	1.5E-06	9.6E-07
I-135	4.0E-06	3.3E-06
Cs-134	3.5E-06	2.9E-06
Cs-137	1.4E-06	1.0E-06
Ba-140	7.6E-07	4.6E-07
La-140	5.3E-06	4.1E-06
Ce-141	2.4E-07	1.3E-07
Ce-144	6.2E-08	3.0E-08
Pr-144	1.3E-06	5.6E-08
Ce+Pr-144[7]	1.4E-06	8.6E-08

(1) Data presented in this table are from Reference 10.
(2) The same factors apply to adult, teenager, and child.
(3) Total body factors also apply to other internal organs.
(4) Not including penetration of oxide into skin.
(5) Includes bremsstrahlung.
(6) Use these factors for Sr-90 unless Y-90 concentration is given separately.
(7) Use these factors for Ce-144 unless Pr-144 concentration is given separately.

TABLE A-3

RECOMMENDED VALUES FOR LIQUID EFFLUENTS[1]

Parameter Symbol	Parameter Description	Values
M_l	Mixing ratio at location l of exposure or harvest of aquatic foods**	0.2 (Aquatic foods taken from Discharge Canal Outfall) [2]
		0.05 (Shoreline, Pilgrim Station Recreational Area) [3]
		1.0 (Shoreline, Discharge Canal)
		0.03 (Swimming, White Horse Beach)
		0.03 (Boating, Cape Cod Bay)
t_h	Period of time between exposure of aquatic foods to radionuclides in water and their consumption	24 hr for maximum individual
		168 hr for average individual, sport fish doses
		240 hr for average individual, commercial fish doses
W_l	Shoreline width factor for location l	0.5 (Recreational Area) [4]
		0.1 (Discharge Canal) [4]

[1] Data presented in this table are from Reference 8 unless otherwise noted.

[2] Collection of aquatic foods from within the Discharge Canal is prohibited.

[3] Swimming is prohibited at Pilgrim Station Recreational Area.

[4] From Reference 4.

TABLE A-4

DOSE FACTORS FOR EXPOSURE TO A SEMI-INFINITE CLOUD OF NOBLE GASES[1]

Nuclide	β-air ($DFN_i\beta$) mrad-m^3/pCi-yr	β-skin (DFN_{iS}) mrem-m^3/pCi-yr	γ-air ($DFN_i\gamma$) mrad-m^3/pCi-yr	γ-body (DFN_{iTB}) mrem-m^3/pCi-yr
Kr-83m	2.88E-04	- - -	1.93E-05	7.56E-08
Kr-85m	1.97E-03	1.46E-03	1.23E-03	1.17E-03
Kr-85	1.95E-03	1.34E-03	1.72E-05	1.61E-05
Kr-87	1.03E-02	9.73E-03	6.17E-03	5.92E-03
Kr-88	2.93E-03	2.37E-03	1.52E-02	1.47E-02
Kr-89	1.06E-02	1.01E-02	1.73E-02	1.66E-02
Kr-90	7.83E-03	7.29E-03	1.63E-02	1.56E-02
Xe-131m	1.11E-03	4.76E-04	1.56E-04	9.15E-05
Xe-133m	1.48E-03	9.94E-04	3.27E-04	2.51E-04
Xe-133	1.05E-03	3.06E-04	3.53E-04	2.94E-04
Xe-135m	7.39E-04	7.11E-04	3.36E-03	3.12E-03
Xe-135	2.46E-03	1.86E-03	1.92-03	1.81E-03
Xe-137	1.27E-02	1.22E-02	1.51E-03	1.42E-03
Xe-138	4.75E-03	4.13E-03	9.21E-03	8.83E-03
Ar-41	3.28E-03	2.69E-03	9.30E-03	8.84E-03

[1] Data presented in this table are from Reference 8.

TABLE A-5

STABLE ELEMENT TRANSFER DATA[1]

Element	B_{iv} Veg/Soil	F_m(Cow) Milk (day/liter)	F_f Meat (day/kg)
H	4.8E+00	1.0E-02	1.2E-02
C	5.5E+00	1.2E-02	3.1E-02
Na	5.2E-02	4.0E-02	3.0E-02
P	1.1E+00	2.5E-02	4.6E-02
Cr	2.5E-04	2.2E-03	2.4E-03
Mn	2.9E-02	2.5E-04	8.0E-04
Fe	6.6E-04	1.2E-03	4.0E-02
Co	9.4E-03	1.0E-03	1.3E-02
Ni	1.9E-02	6.7E-03	5.3E-02
Cu	1.2E-01	1.4E-02	8.0E-03
Zn	4.0E-01	3.9E-02	3.0E-02
Rb	1.3E-01	3.0E-02	3.1E-02
Sr	1.7E-02	8.0E-04	6.0E-04
Y	2.6E-03	1.0E-05	4.6E-03
Zr	1.7E-04	5.0E-06	3.4E-02
Nb	9.4E-03	2.5E-03	2.8E-01
Mo	1.2E-01	7.5E-03	8.0E-03
Tc	2.5E-01	2.5E-02	4.0E-01
Ru	5.0E-02	1.0E-06	4.0E-01
Rh	1.3E+01	1.0E-02	1.5E-03
Ag	1.5E-01	5.0E-02	1.7E-02
Te	1.3E+00	1.0E-03	7.7E-02
I	2.0E-02	6.0E-03	2.9E-03
Cs	1.0E-02	1.2E-02	4.0E-03
Ba	5.0E-03	4.0E-04	3.2E-03
La	2.5E-03	5.0E-06	2.0E-04
Ce	2.5E-03	1.0E-04	1.2E-03
Pr	2.5E-03	5.0E-06	4.7E-03
Nd	2.4E-03	5.0E-06	3.3E-03
W	1.8E-02	5.0E-04	1.3E-03
Np	2.5E-03	5.0E-06	2.0E-04

[1] Data presented in this table are from Reference 8.

TABLE A-6

NUCLIDE TRANSFER PARAMETERS FOR GOAT'S MILK[1]

Element	F_m (day/liter)
H	1.70E-01
C	1.00E-01
P	2.50E-01
Fe	1.30E-04
Cu	1.30E-02
Sr	1.40E-02
I	6.00E-02
Cs	3.00E-01

TABLE A-7

ANIMAL CONSUMPTION RATES[1]

Animal	Q_F Feed or Forage (kg/day [wet weight])	Q_{AW} Water (liter/day)
Milk Cow	50	60
Beef Cattle	50	50
Goats	6	8

[1] Data presented in these tables are from Reference 8.

TABLE A-8

RECOMMENDED USE FACTORS TO BE APPLIED FOR THE AVERAGE INDIVIDUAL[1], [2]

Pathway	Adult	Teen	Child	Infant
Fruits, vegetables, & grain (kg/yr)	190	240	200	-
Milk (liter/yr)	110	200	170	330
Meat & poultry (kg/yr)	95	59	37	-
Fish (kg/yr)	6.9	5.2	2.2	-
Seafood (kg/yr)	1.0	0.75	0.33	-
Drinking Water (liter/yr)	370	260	260	330
Shoreline recreation (hr/yr) [3]				
Discharge Canal	8.3	47	9.5	-
Pilgrim Station Recreational Area	8.3	47	9.5	-
Swimming (hr/yr) [3] White Horse Beach	52	52	29	-
Boating - Cape Cod Bay (hr/yr) [3]	52	52	29	-
Inhalation (m^3/yr)	8000	8000	3700	1400

[1] Data presented in this table are from Reference 8, unless otherwise indicated.

[2] Usage factors for the average individual are used to determine the annual dose to the total body and thyroid of an average individual and the annual integrated dose to the population within a 50 mile radius.

[3] From Reference 4.

TABLE A-9

RECOMMENDED USE FACTORS TO BE APPLIED FOR THE MAXIMUM EXPOSED INDIVIDUAL[1]

Pathway	Adult	Teen	Child	Infant
Fruits, vegetables, & grain (kg/yr)	520	630	520	-
Leafy Vegetables (kg/yr))	64	42	26	-
Milk (liter/yr)	310	400	330	330
Meat & poultry (kg/yr)	110	65	41	-
Fish (fresh or salt) (kg/yr)	21	16	6.9	-
Shellfish (kg/yr) [2]	9	6	3	-
Drinking Water (liter/yr)	730	510	510	330
Shoreline recreation (hr/yr) [2]				
Discharge Canal	12	67	14	-
Pilgrim Station Recreational Area	12	67	14	-
Swimming (hr/yr) [2] White Horse Beach	52	52	29	-
Boating-Cape Cod Bay (hr/yr) [2]	52	52	29	-
Inhalation (m^3/yr)	8000	8000	3700	1400

[1] Data presented in this table are from Reference 8, unless otherwise indicated.

[2] From Reference 4.

TABLE A-10

EXTERNAL DOSE FACTORS FOR STANDING ON CONTAMINATED GROUND [1]

mrem/hr per pCi/m^2

Nuclide	Total Body	Skin	Nuclide	Total Body	Skin
H-3	0.00E+00	0.00E+00	Zr-93	0.00E+00	0.00E+00
Be-10	0.00E+00	0.00E+00	Zr-95	5.00E-09	5.80E-09
C-14	0.00E+00	0.00E+00	Zr-97	5.50E-09	6.40E-09
N-13	7.60E-09	8.80E-09	Nb-93m	8.20E-13	1.00E-10
F-18	6.80E-09	8.00E-09	Nb-95	5.10E-09	6.00E-09
Na-22	1.60E-08	1.80E-08	Nb-97	4.60E-09	5.40E-09
Na-24	2.50E-08	2.90E-08	Mo-93	2.29E-11	9.32E-10
P-32	0.00E+00	0.00E+00	Mo-99	1.90E-09	2.20E-09
Ca-41	3.41E-09	4.01E-09	Tc-99m	9.60E-10	1.10E-09
Sc-46	1.30E-08	1.50E-08	Tc-99	0.00E+00	0.00E+00
Cr-51	2.20E-10	2.60E-10	Tc-101	2.70E-09	3.00E-09
Mn-54	5.80E-09	6.80E-09	Ru-103	3.60E-09	4.20E-09
Mn-56	1.10E-08	1.30E-08	Ru-105	4.50E-09	5.10E-09
Fe-55	0.00E+00	0.00E+00	Ru-106	1.50E-09	1.80E-09
Fe-59	8.00E-09	9.40E-09	Rh-105	6.60E-10	7.70E-10
Co-57	9.10E-10	1.00E-09	Pd-107	0.00E+00	0.00E+00
Co-58	7.00E-09	8.20E-09	Pd-109	3.50E-11	4.00E-11
Co-60	1.70E-08	2.00E-08	Ag-110m	1.80E-08	2.10E-08
Ni-59	0.00E+00	0.00E+00	Ag-111	1.80E-10	2.10E-10
Ni-63	0.00E+00	0.00E+00	Cd-113m	2.30E-12	2.60E-12
Ni-65	3.70E-09	4.30E-09	Cd-115m	0.00E+00	0.00E+00
Cu-64	1.50E-09	1.70E-09	Sn-123	0.00E+00	6.46E-08
Zn-65	4.00E-09	4.60E-09	Sn-125	5.70E-10	6.60E-10
Zn-69m	2.90E-09	3.40E-09	Sn-126	9.00E-09	1.00E-08
Zn-69	0.00E+00	0.00E+00	Sb-124	1.30E-08	1.50E-08
Se-79	0.00E+00	0.00E+00	Sb-125	3.10E-09	3.50E-09
Br-82	1.90E-08	2.20E-08	Sb-126	8.90E-09	1.00E-08
Br-83	6.40E-11	9.30E-11	Sb-127	5.70E-09	6.60E-09
Br-84	1.20E-08	1.40E-08	Te-125m	3.50E-11	4.80E-11
Br-85	0.00E+00	0.00E+00	Te-127m	1.10E-12	1.30E-12
Rb-86	6.30E-10	7.20E-10	Te-127	1.00E-11	1.10E-11
Rb-87	0.00E+00	0.00E+00	Te-129m	7.70E-10	9.00E-10
Rb-88	3.50E-09	4.00E-09	Te-129	7.10E-10	8.40E-10
Rb-89	1.50E-08	1.80E-08	Te-131m	8.40E-09	9.90E-09
Sr-89	5.60E-13	6.50E-13	Te-131	2.20E-09	2.60E-06
Sr-90	0.00E+00	0.00E+00	Te-132	1.70E-09	2.00E-09
Sr-91	7.10E-09	8.30E-09	Te-133m	1.50E-08	1.70E-08
Sr-92	9.00E-09	1.00E-08	Te-134	1.00E-09	1.20E-09
Y-90	2.20E-12	2.60E-12			
Y-91m	3.80E-09	4.40E-09			
Y-91	2.40E-11	2.70E-11			
Y-92	1.60E-09	1.90E-09			
Y-93	5.70E-10	7.80E-10			

[1] Data presented in this table are from Reference 9.

TABLE A-10 (continued)

EXTERNAL DOSE FACTORS FOR STANDING ON CONTAMINATED GROUND [1]

mrem/hr per pCi/m^2

Nuclide	Total Body	Skin	Nuclide	Total Body	Skin
I-129	4.50E-10	7.50E-10	Pb-210	1.30E-11	1.70E-11
I-130	1.40E-08	1.70E-08	Bi-210	0.00E+00	0.00E+00
I-131	2.80E-09	3.40E-09	Po-210	5.40E-14	6.20E-14
I-132	1.70E-08	2.00E-08	Ra-223	1.50E-09	1.80E-09
I-133	3.70E-09	4.50E-09	Ra-224	8.90E-09	1.00E-08
I-134	1.60E-08	1.90E-08	Ra-225	8.40E-11	1.20E-10
I-135	1.20E-08	1.40E-08	Ra-226	6.40E-09	7.40E-09
Cs-134m	6.20E-10	7.30E-10	Ra-228	1.20E-08	1.40E-08
Cs-134	1.20E-08	1.40E-08	Ac-225	1.60E-09	1.80E-09
Cs-135	0.00E+00	0.00E+00	Ac-227	2.00E-09	2.40E-09
Cs-136	1.50E-08	1.70E-08	Th-227	5.10E-10	6.30E-10
Cs-137	4.20E-09	4.90E-09	Th-228	8.90E-09	1.00E-08
Cs-138	2.10E-08	2.40E-08	Th-229	2.20E-09	2.70E-09
Cs-139	6.30E-09	7.20E-09	Th-230	6.50E-09	7.50E-09
Ba-139	2.40E-09	2.70E-09	Th-232	3.00E-09	4.00E-09
Ba-140	2.10E-09	2.40E-09	Th-234	1.10E-10	1.30E-10
Ba-141	4.30E-09	4.90E-09	Pa-231	2.20E-09	2.70E-09
Ba-142	7.90E-09	9.00E-09	Pa-233	1.30E-09	1.50E-09
La-140	1.50E-08	1.70E-08	U-232	2.59E-12	2.69E-11
La-141	2.50E-10	2.80E-10	U-233	2.30E-09	2.80E-09
La-142	1.50E-08	1.80E-08	U-234	6.32E-13	1.59E-10
Ce-141	5.50E-10	6.20E-10	U-235	3.20E-09	4.00E-09
Ce-143	2.20E-09	2.50E-09	U-236	2.10E-14	1.80E-11
Ce-144	3.20E-10	3.70E-10	U-237	1.00E-09	1.30E-09
Pr-143	0.00E+00	0.00E+00	U-238	1.10E-10	1.50E-10
Pr-144	2.00E-10	2.30E-10	Np-237	1.40E-09	1.60E-09
Nd-147	1.00E-09	1.20E-09	Np-238	2.80E-09	3.20E-09
Pm-147	0.00E+00	0.00E+00	Np-239	9.50E-10	1.10E-09
Pm-148m	1.41E-08	8.16E-08	Pu-238	1.30E-12	1.80E-11
Pm-148	4.60E-09	5.30E-09	Pu-239	7.90E-13	7.70E-12
Pm-149	2.50E-11	2.90E-11	Pu-240	1.30E-12	1.80E-11
Pm-151	2.20E-09	2.30E-09	Pu-241	4.60E-12	6.80E-12
Sm-151	4.80E-11	2.10E-10	Pu-242	1.10E-12	1.60E-11
Sm-153	2.70E-10	3.00E-10	Pu-244	8.95E-10	9.62E-10
Eu-152	7.37E-09	8.53E-09	Am-241	1.80E-10	2.60E-10
Eu-154	7.80E-09	9.00E-09	Am-242m	2.60E-11	1.80E-10
Eu-155	3.81E-10	4.33E-10	Am-243	1.30E-09	1.50E-09
Eu-156	7.60E-09	8.70E-09	Cm-242	5.50E-12	2.30E-11
Tb-160	8.60E-09	1.00E-08	Cm-243	2.30E-09	2.90E-09
Ho-166m	8.90E-09	1.00E-08	Cm-244	2.90E-12	1.80E-11
W-181	2.10E-12	2.80E-12	Cm-245	9.50E-10	1.20E-09
W-185	0.00E+00	0.00E+00	Cm-246	1.00E-12	1.50E-11
W-187	3.10E-09	3.60E-09	Cm-247	2.20E-09	2.60E-09
			Cm-248	6.81E-09	5.23E-09
			Cf-252	6.60E-08	7.20E-08

[1] Data presented in this table are from Reference 9.

TABLE A-11

INHALATION DOSE FACTORS FOR ADULT[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
H-3	No Data	8.98E-08	8.98E-08	8.98E-08	8.98E-08	8.98E-08	8.98E-08
Be-10	1.98E-04	3.06E-05	4.96E-06	No Data	No Data	2.22E-04	1.67E-05
C-14	2.27E-06	4.26E-07	4.26E-07	4.26E-07	4.26E-07	4.26E-07	4.25E-07
N-13	6.27E-09	6.27E-09	6.27E-09	6.27E-09	6.27E-09	6.27E-09	6.27E-09
F-18	4.71E-07	No Data	5.19E-08	No Data	No Data	No Data	9.24E-09
Na-22	1.30E-05	1.30E-05	1.30E-05	1.30E-05	1.30E-05	1.30E-05	1.30E-05
Na-24	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06
P-32	1.65E-04	9.64E-06	6.26E-06	No Data	No Data	No Data	1.08E-05
Ca-41	3.83E-05	No Data	4.13E-06	No Data	No Data	3.83E-06	2.86E-07
Sc-46	5.51E-05	1.07E-04	3.11E-05	No Data	9.99E-05	No Data	3.23E-05
Cr-51	No Data	No Data	1.25E-08	7.44E-09	2.85E-09	1.80E-06	4.15E-07
Mn-54	No Data	4.95E-06	7.87E-07	No Data	1.23E-06	1.75E-04	9.67E-06
Mn-56	No Data	1.55E-10	2.29E-11	No Data	1.63E-10	1.18E-06	2.53E-06
Fe-55	3.07E-06	2.12E-06	4.93E-07	No Data	No Data	9.01E-06	7.54E-07
Fe-59	1.47E-06	3.47E-06	1.32E-06	No Data	No Data	1.27E-04	2.35E-05
Co-57	No Data	8.65E-08	8.39E-08	No Data	No Data	4.62E-05	3.93E-06
Co-58	No Data	1.98E-07	2.59E-07	No Data	No Data	1.16E-04	1.33E-05
Co-60	No Data	1.44E-06	1.85E-06	No Data	No Data	7.46E-04	3.56E-05
Ni-59	4.06E-06	1.46E-06	6.77E-07	No Data	No Data	8.20E-06	6.11E-07
Ni-63	5.40E-05	3.93E-06	1.81E-06	No Data	No Data	2.23E-05	1.67E-06
Ni-65	1.92E-10	2.62E-11	1.14E-11	No Data	No Data	7.00E-07	1.54E-06
Cu-64	No Data	1.83E-10	7.69E-11	No Data	5.78E-10	8.48E-07	6.12E-06
Zn-65	4.05E-06	1.29E-05	5.82E-06	No Data	8.62E-06	1.08E-04	6.68E-06
Zn-69m	1.02E-09	2.45E-09	2.24E-10	No Data	1.48E-09	2.38E-06	1.71E-05
Zn-69	4.23E-12	8.14E-12	5.65E-13	No Data	5.27E-12	1.15E-07	2.04E-09
Se-79	No Data	3.83E-07	6.09E-08	No Data	5.69E-07	4.47E-05	3.33E-06
Br-82	No Data	No Data	1.69E-06	No Data	No Data	No Data	1.30E-06
Br-83	No Data	No Data	3.01E-08	No Data	No Data	No Data	2.90E-08
Br-84	No Data	No Data	3.91E-08	No Data	No Data	No Data	2.05E-13
Br-85	No Data	No Data	1.60E-09	No Data	No Data	No Data	No Data
Rb-86	No Data	1.69E-05	7.37E-06	No Data	No Data	No Data	2.08E-06
Rb-87	No Data	9.86E-06	3.21E-06	No Data	No Data	No Data	2.88E-07
Rb-88	No Data	4.84E-08	2.41E-08	No Data	No Data	No Data	4.18E-19
Rb-89	No Data	3.20E-08	2.12E-08	No Data	No Data	No Data	1.16E-21
Sr-89	3.80E-05	No Data	1.09E-06	No Data	No Data	1.75E-04	4.37E-05
Sr-90	3.59E-03	No Data	7.21E-05	No Data	No Data	1.20E-03	9.02E-05
Sr-91	7.74E-09	No Data	3.13E-10	No Data	No Data	4.56E-06	2.39E-05
Sr-92	8.43E-10	No Data	3.64E-11	No Data	No Data	2.06E-06	5.38E-06
Y-90	2.61E-07	No Data	7.01E-09	No Data	No Data	2.12E-05	6.32E-05
Y-91m	3.26E-11	No Data	1.27E-12	No Data	No Data	2.40E-07	1.66E-10
Y-91	5.78E-05	No Data	1.55E-06	No Data	No Data	2.13E-04	4.81E-05
Y-92	1.29E-09	No Data	3.77E-11	No Data	No Data	1.96E-06	9.19E-06
Y-93	1.18E-08	No Data	3.26E-10	No Data	No Data	6.06E-06	5.27E-05

[1] Data presented in this Table are from Reference 9.

TABLE A-11 (continued)

INHALATION DOSE FACTORS FOR ADULT[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Zr-93	5.22E-05	2.92E-06	1.37E-06	No Data	1.11E-05	2.13E-05	1.51E-06
Zr-95	1.34E-05	4.30E-06	2.91E-06	No Data	6.77E-06	2.21E-04	1.88E-05
Zr-97	1.21E-08	2.45E-09	1.13E-09	No Data	3.71E-09	9.84E-06	6.54E-05
Nb-93m	3.10E-05	1.01E-05	2.49E-06	No Data	1.16E-05	3.11E-05	2.38E-06
Nb-95	1.76E-06	9.77E-07	5.26E-07	No Data	9.67E-07	6.31E-05	1.30E-05
Nb-97	2.78E-11	7.03E-12	2.56E-12	No Data	8.18E-12	3.00E-07	3.02E-08
Mo-93	No Data	1.17E-06	3.17E-08	No Data	3.55E-07	5.11E-05	3.79E-06
Mo-99	No Data	1.51E-08	2.87E-09	No Data	3.64E-08	1.14E-05	3.10E-05
Tc-99m	1.29E-13	3.64E-13	4.63E-12	No Data	5.52E-12	9.55E-08	5.20E-07
Tc-99	3.13E-08	4.64E-08	1.25E-08	No Data	5.85E-07	1.01E-04	7.54E-06
Tc-101	5.22E-15	7.52E-15	7.38E-14	No Data	1.35E-13	4.99E-08	1.36E-21
Ru-103	1.91E-07	No Data	8.23E-08	No Data	7.29E-07	6.31E-05	1.38E-05
Ru-105	9.88E-11	No Data	3.89E-11	No Data	1.27E-10	1.37E-06	6.02E-06
Ru-106	8.64E-06	No Data	1.09E-06	No Data	1.67E-05	1.17E-03	1.14E-04
Rh-105	9.24E-10	6.73E-10	4.43E-10	No Data	2.86E-09	2.41E-06	1.09E-05
Pd-107	No Data	8.27E-08	5.87E-09	No Data	6.57E-07	9.47E-06	7.06E-07
Pd-109	No Data	4.63E-10	1.16E-10	No Data	2.35E-09	1.85E-06	1.52E-05
Ag-110m	1.35E-06	1.25E-06	7.43E-07	No Data	2.46E-06	5.79E-04	3.78E-05
Ag-111	4.25E-08	1.78E-08	8.87E-09	No Data	5.74E-08	2.33E-05	2.79E-05
Cd-113m	No Data	1.54E-04	4.97E-06	No Data	1.71E-04	2.08E-04	1.59E-05
Cd-115m	No Data	2.46E-05	7.95E-07	No Data	1.98E-05	1.76E-04	4.80E-05
Sn-123	3.02E-05	6.67E-07	9.82E-07	5.67E-07	No Data	2.88E-04	3.92E-05
Sn-125	1.16E-06	3.12E-08	7.03E-08	2.59E-08	No Data	7.37E-05	6.81E-05
Sn-126	1.58E-04	4.18E-06	6.00E-06	1.23E-06	No Data	1.17E-03	1.59E-05
Sb-124	3.90E-06	7.36E-08	1.55E-06	9.44E-09	No Data	3.10E-04	5.08E-05
Sb-125	5.67E-06	7.44E-08	1.58E-06	6.75E-09	No Data	2.18E-04	1.26E-05
Sb-126	4.50E-07	9.13E-09	1.62E-07	2.75E-09	No Data	9.57E-05	6.01E-05
Sb-127	3.30E-08	7.22E-10	1.27E-08	3.97E-10	No Data	2.05E-05	3.77E-05
Te-125m	4.27E-07	1.98E-07	5.84E-08	1.31E-07	1.55E-06	3.92E-05	8.83E-06
Te-127m	1.58E-06	7.21E-07	1.96E-07	4.11E-07	5.72E-06	1.20E-04	1.87E-05
Te-127	1.75E-10	8.03E-11	3.87E-11	1.32E-10	6.37E-10	8.14E-07	7.17E-06
Te-129m	1.22E-06	5.84E-07	1.98E-07	4.30E-07	4.57E-06	1.45E-04	4.79E-05
Te-129	6.22E-12	2.99E-12	1.55E-12	4.87E-12	2.34E-11	2.42E-07	1.96E-08
Te-131m	8.74E-09	5.45E-09	3.63E-09	6.88E-09	3.86E-08	1.82E-05	6.95E-05
Te-131	1.39E-12	7.44E-13	4.49E-13	1.17E-12	5.46E-12	1.74E-07	2.30E-09
Te-132	3.25E-08	2.69E-08	2.02E-08	2.37E-08	1.82E-07	3.60E-05	6.37E-05
Te-133m	7.24E-12	5.40E-12	4.17E-12	6.27E-12	3.74E-11	5.51E-07	7.65E-09
Te-134	3.84E-12	3.22E-12	1.57E-12	3.44E-12	2.18E-11	4.34E-07	2.97E-11
I-129	2.48E-06	2.11E-06	6.91E-06	5.54E-03	4.53E-06	No Data	2.22E-07
I-130	5.72E-07	1.68E-06	6.60E-07	1.42E-04	2.61E-06	No Data	9.61E-07
I-131	3.15E-06	4.47E-06	2.56E-06	1.49E-03	7.66E-06	No Data	7.85E-07
I-132	1.45E-07	4.07E-07	1.45E-07	1.43E-05	6.48E-07	No Data	5.08E-08
I-133	1.08E-06	1.85E-06	5.65E-07	2.69E-04	3.23E-06	No Data	1.11E-06
I-134	8.05E-08	2.16E-07	7.69E-08	3.73E-06	3.44E-07	No Data	1.26E-10
I-135	3.35E-07	8.73E-07	3.21E-07	5.60E-05	1.39E-06	No Data	6.56E-07

[1] Data presented in this Table are from Reference 9.

TABLE A-11 (continued)

INHALATION DOSE FACTORS FOR ADULT[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Cs-134m	1.59E-08	3.20E-08	1.72E-08	No Data	1.83E-08	2.93E-09	7.92E-09
Cs-134	4.66E-05	1.06E-04	9.10E-05	No Data	3.59E-05	1.22E-05	1.30E-06
Cs-135	1.46E-05	1.29E-05	5.99E-06	No Data	5.11E-06	1.57E-06	2.11E-07
Cs-136	4.88E-06	1.83E-05	1.38E-05	No Data	1.07E-05	1.50E-06	1.46E-06
Cs-137	5.98E-05	7.76E-05	5.35E-05	No Data	2.78E-05	9.40E-06	1.05E-06
Cs-138	4.14E-08	7.76E-08	4.05E-08	No Data	6.00E-08	6.07E-09	2.33E-13
Cs-139	2.56E-08	3.63E-08	1.39E-08	No Data	3.05E-08	2.84E-09	5.49E-31
Ba-139	1.17E-10	8.32E-14	3.42E-12	No Data	7.78E-14	4.70E-07	1.12E-07
Ba-140	4.88E-06	6.13E-09	3.21E-07	No Data	2.09E-09	1.59E-04	2.73E-05
Ba-141	1.25E-11	9.41E-15	4.20E-13	No Data	8.75E-15	2.42E-07	1.45E-17
Ba-142	3.29E-12	3.38E-15	2.07E-13	No Data	2.86E-15	1.49E-07	1.96E-26
La-140	4.30E-08	2.17E-08	5.73E-09	No Data	No Data	1.70E-05	5.73E-05
La-141	5.34E-10	1.66E-10	2.71E-11	No Data	No Data	1.35E-06	7.31E-06
La-142	8.54E-11	3.88E-11	9.65E-12	No Data	No Data	7.91E-07	2.64E-07
Ce-141	2.49E-06	1.69E-06	1.91E-07	No Data	7.83E-07	4.52E-05	1.50E-05
Ce-143	2.33E-08	1.72E-08	1.91E-09	No Data	7.60E-09	9.97E-06	2.83E-05
Ce-144	4.29E-04	1.79E-04	2.30E-05	No Data	1.06E-04	9.72E-04	1.02E-04
Pr-143	1.17E-06	4.69E-07	5.80E-08	No Data	2.70E-07	3.51E-05	2.50E-05
Pr-144	3.76E-12	1.56E-12	1.91E-13	No Data	8.81E-13	1.27E-07	2.69E-18
Nd-147	6.59E-07	7.62E-07	4.56E-08	No Data	4.45E-07	2.76E-05	2.16E-05
Pm-147	8.37E-05	7.87E-06	3.19E-06	No Data	1.49E-05	6.60E-05	5.54E-06
Pm-148m	9.82E-06	2.54E-06	1.94E-06	No Data	3.85E-06	2.14E-04	4.18E-05
Pm-148	3.84E-07	6.37E-08	3.20E-08	No Data	1.20E-07	3.91E-05	5.80E-05
Pm-149	3.44E-08	4.87E-09	1.99E-09	No Data	9.19E-09	7.21E-06	2.50E-05
Pm-151	8.50E-09	1.42E-09	7.21E-10	No Data	2.55E-09	3.94E-06	2.00E-05
Sm-151	8.59E-05	1.48E-05	3.55E-06	No Data	1.66E-05	4.45E-05	3.25E-06
Sm-153	1.70E-08	1.42E-08	1.04E-09	No Data	4.59E-09	4.14E-06	1.58E-05
Eu-152	2.38E-04	5.41E-05	4.76E-05	No Data	3.35E-04	3.43E-04	1.59E-05
Eu-154	7.40E-04	9.10E-05	6.48E-05	No Data	4.36E-04	5.84E-04	3.40E-05
Eu-155	1.01E-04	1.43E-05	9.21E-06	No Data	6.59E-05	9.46E-05	5.95E-06
Eu-156	1.93E-06	1.48E-06	2.40E-07	No Data	9.95E-07	8.56E-05	4.50E-05
Tb-160	2.21E-05	No Data	2.75E-06	No Data	9.10E-06	1.92E-04	2.68E-05
Ho-166m	3.37E-04	1.05E-04	8.00E-05	No Data	1.57E-04	3.94E-04	1.59E-05
W-181	6.23E-09	2.03E-09	2.17E-10	No Data	No Data	1.71E-06	2.53E-07
W-185	1.95E-07	6.47E-08	6.81E-09	No Data	No Data	5.57E-05	1.07E-05
W-187	1.06E-09	8.85E-10	3.10E-10	No Data	No Data	3.63E-06	1.94E-05
Pb-210	2.64E-02	6.73E-03	8.37E-04	No Data	2.12E-02	2.62E-02	1.51E-06
Bi-210	2.31E-07	1.59E-06	1.32E-07	No Data	1.92E-05	1.11E-03	2.95E-05
Po-210	3.97E-04	8.60E-04	9.58E-05	No Data	2.95E-03	3.14E-02	4.19E-05
Ra-223	1.80E-04	2.77E-07	3.60E-05	No Data	7.85E-06	2.55E-02	2.84E-04
Ra-224	1.98E-05	4.78E-08	3.96E-06	No Data	1.35E-06	8.77E-03	3.01E-04
Ra-225	3.00E-04	3.56E-07	5.99E-05	No Data	1.01E-05	2.92E-02	2.71E-04
Ra-226	1.25E-01	2.39E-06	9.14E-02	No Data	6.77E-05	1.17E-01	2.94E-04
Ra-228	4.41E-02	1.23E-06	4.78E-02	No Data	3.48E-05	1.61E-01	5.00E-05

[1] Data presented in this Table are from Reference 9.

TABLE A-11 (continued)

INHALATION DOSE FACTORS FOR ADULT[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Ac-225	4.23E-04	5.82E-04	2.84E-05	No Data	6.63E-05	2.21E-02	2.52E-04
Ac-227	2.30E+00	3.05E-01	1.36E-01	No Data	9.82E-02	2.41E-01	5.08E-05
Th-227	2.17E-04	3.92E-06	6.25E-06	No Data	2.22E-05	3.77E-02	3.34E-04
Th-228	2.00E-01	3.39E-03	6.77E-03	No Data	1.89E-02	1.01E+00	3.49E-04
Th-229	1.51E+01	4.34E-01	2.51E-01	No Data	2.13E+00	3.62E+00	4.83E-05
Th-230	2.29E+00	1.31E-01	6.36E-02	No Data	6.40E-01	6.21E-01	3.73E-05
Th-232	2.56E+00	1.12E-01	9.04E-04	No Data	5.47E-01	5.96E-01	3.17E-05
Th-234	1.63E-06	9.56E-08	4.70E-08	No Data	5.41E-07	1.89E-04	7.03E-05
Pa-231	5.08E+00	1.91E-01	1.98E-01	No Data	1.07E+00	5.75E-02	4.44E-05
Pa-233	1.21E-06	2.42E-07	2.09E-07	No Data	9.15E-07	3.52E-05	1.02E-05
U-232	5.14E-02	No Data	3.66E-03	No Data	5.56E-03	2.22E-01	4.21E-05
U-233	1.09E-02	No Data	6.60E-04	No Data	2.54E-03	5.32E-02	3.89E-05
U-234	1.04E-02	No Data	6.46E-04	No Data	2.49E-03	5.22E-02	3.81E-05
U-235	1.00E-02	No Data	6.07E-04	No Data	2.34E-03	4.90E-02	4.84E-05
U-236	1.00E-02	No Data	6.20E-04	No Data	2.39E-03	5.00E-02	3.57E-05
U-237	3.67E-08	No Data	9.77E-09	No Data	1.51E-07	1.02E-05	1.20E-05
U-238	9.58E-03	No Data	5.67E-04	No Data	2.18E-03	4.58E-02	3.41E-05
Np-237	1.56E+00	1.00E+00	6.87E-02	No Data	5.10E-01	5.22E-02	4.92E-05
Np-238	2.96E-07	7.20E-08	4.61E-09	No Data	2.72E-08	1.02E-05	2.13E-05
Np-239	2.87E-08	2.54E-08	1.55E-09	No Data	8.75E-09	4.70E-06	1.49E-05
Pu-238	1.43E+00	9.71E-01	6.90E-02	No Data	2.96E-01	1.82E-01	4.52E-05
Pu-239	1.66E+00	1.07E+00	7.75E-02	No Data	3.30E-01	1.72E-01	4.13E-05
Pu-240	1.65E+00	1.07E+00	7.73E-02	No Data	3.29E-01	1.72E-01	4.21E-05
Pu-241	3.42E-02	8.69E-03	1.29E-03	No Data	5.93E-03	1.52E-04	8.65E-07
Pu-242	1.53E+00	1.03E+00	7.46E-02	No Data	3.17E-01	1.65E-01	4.05E-05
Pu-244	1.79E+00	1.18E+00	8.54E-02	No Data	3.64E-01	1.89E-01	6.03E-05
Am-241	1.68E+00	1.13E+00	6.71E-02	No Data	5.04E-01	6.06E-02	4.60E-05
Am-242m	1.70E+00	1.06E+00	6.73E-02	No Data	5.01E-01	2.44E-02	5.79E-05
Am-243	1.68E+00	1.10E+00	6.57E-02	No Data	4.95E-01	5.75E-02	5.40E-05
Cm-242	2.22E-02	1.77E-02	9.84E-04	No Data	4.48E-03	3.92E-02	4.91E-05
Cm-243	1.10E+00	7.61E-01	4.61E-02	No Data	2.15E-01	6.31E-02	4.84E-05
Cm-244	8.37E-01	5.88E-01	3.51E-02	No Data	1.64E-01	6.06E-02	4.68E-05
Cm-245	1.74E+00	1.14E+00	7.14E-02	No Data	3.33E-01	5.85E-02	4.36E-05
Cm-246	1.73E+00	1.14E+00	7.13E-02	No Data	3.33E-01	5.96E-02	4.29E-05
Cm-247	1.68E+00	1.12E+00	7.03E-02	No Data	3.28E-01	5.85E-02	5.63E-05
Cm-248	1.40E+01	9.26E+00	5.79E-01	No Data	2.70E+00	4.82E-01	9.09E-04
Cf-252	5.43E-01	No Data	2.33E-02	No Data	No Data	1.99E-01	1.78E-04

[1] Data presented in this Table are from Reference 9.

TABLE A-12

INHALATION DOSE FACTORS FOR TEEN[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
H-3	No Data	9.06E-08	9.06E-08	9.06E-08	9.06E-08	9.06E-08	9.06E-08
Be-10	2.78E-04	4.33E-05	7.09E-06	No Data	No Data	3.84E-04	1.77E-05
C-14	3.25E-06	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07
N-13	8.65E-09	8.65E-09	8.65E-09	8.65E-09	8.65E-09	8.65E-09	8.65E-09
F-18	6.52E-07	No Data	7.10E-08	No Data	No Data	No Data	3.89E-08
Na-22	1.76E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05
Na-24	1.72E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06
P-32	2.36E-04	1.37E-05	8.95E-06	No Data	No Data	No Data	1.16E-05
Ca-41	4.05E-05	No Data	4.38E-06	No Data	No Data	1.01E-01	3.03E-07
Sc-46	7.24E-05	1.41E-04	4.18E-05	No Data	1.35E-04	No Data	2.98E-05
Cr-51	No Data	No Data	1.69E-08	9.37E-09	3.84E-09	2.62E-06	3.75E-07
Mn-54	No Data	6.39E-06	1.05E-06	No Data	1.59E-06	2.48E-04	8.35E-06
Mn-56	No Data	2.12E-10	3.15E-11	No Data	2.24E-10	1.90E-06	7.18E-06
Fe-55	4.18E-06	2.98E-06	6.93E-07	No Data	No Data	1.55E-05	7.99E-07
Fe-59	1.99E-06	4.62E-06	1.79E-06	No Data	No Data	1.91E-04	2.23E-05
Co-57	No Data	1.18E-07	1.15E-07	No Data	No Data	7.33E-05	3.93E-06
Co-58	No Data	2.59E-07	3.47E-07	No Data	No Data	1.68E-04	1.19E-05
Co-60	No Data	1.89E-06	2.48E-06	No Data	No Data	1.09E-03	3.24E-05
Ni-59	5.44E-06	2.02E-06	9.24E-07	No Data	No Data	1.41E-05	6.48E-07
Ni-63	7.25E-05	5.43E-06	2.47E-06	No Data	No Data	3.84E-05	1.77E-06
Ni-65	2.73E-10	3.66E-11	1.59E-11	No Data	No Data	1.17E-06	4.59E-06
Cu-64	No Data	2.54E-10	1.06E-10	No Data	8.01E-10	1.39E-06	7.68E-06
Zn-65	4.82E-06	1.67E-05	7.80E-06	No Data	1.08E-05	1.55E-04	5.83E-06
Zn-69m	1.44E-09	3.39E-09	3.11E-10	No Data	2.06E-09	3.92E-06	2.14E-05
Zn-69	6.04E-12	1.15E-11	8.07E-13	No Data	7.53E-12	1.98E-07	3.56E-08
Se-79	No Data	5.43E-07	8.71E-08	No Data	8.13E-07	7.71E-05	3.53E-06
Br-82	No Data	No Data	2.28E-06	No Data	No Data	No Data	No Data
Br-83	No Data	No Data	4.30E-08	No Data	No Data	No Data	No Data
Br-84	No Data	No Data	5.41E-08	No Data	No Data	No Data	No Data
Br-85	No Data	No Data	2.29E-09	No Data	No Data	No Data	No Data
Rb-86	No Data	2.38E-05	1.05E-05	No Data	No Data	No Data	2.21E-06
Rb-87	No Data	1.40E-05	4.58E-06	No Data	No Data	No Data	3.05E-07
Rb-88	No Data	6.82E-08	3.40E-08	No Data	No Data	No Data	3.65E-15
Rb-89	No Data	4.40E-08	2.91E-08	No Data	No Data	No Data	4.22E-17
Sr-89	5.43E-05	No Data	1.56E-06	No Data	No Data	3.02E-04	4.64E-05
Sr-90	4.14E-03	No Data	8.33E-05	No Data	No Data	2.06E-03	9.56E-05
Sr-91	1.10E-08	No Data	4.39E-10	No Data	No Data	7.59E-06	3.24E-05
Sr-92	1.19E-09	No Data	5.08E-11	No Data	No Data	3.43E-06	1.49E-05
Y-90	3.73E-07	No Data	1.00E-08	No Data	No Data	3.66E-05	6.99E-05
Y-91m	4.63E-11	No Data	1.77E-12	No Data	No Data	4.00E-07	3.77E-09
Y-91	8.26E-05	No Data	2.21E-06	No Data	No Data	3.67E-04	5.11E-05
Y-92	1.84E-09	No Data	5.36E-11	No Data	No Data	3.35E-06	2.06E-05
Y-93	1.69E-08	No Data	4.65E-10	No Data	No Data	1.04E-05	7.24E-05

[1] Data presented in this Table are from Reference 9.

TABLE A-12 (continued)

INHALATION DOSE FACTORS FOR TEEN[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Zr-93	6.83E-05	3.38E-06	1.84E-06	No Data	1.16E-05	3.67E-05	1.60E-06
Zr-95	1.82E-05	5.73E-06	3.94E-06	No Data	8.42E-06	3.36E-04	1.86E-05
Zr-97	1.72E-08	3.40E-09	1.57E-09	No Data	5.15E-09	1.62E-05	7.88E-05
Nb-93m	4.14E-05	1.36E-05	3.41E-06	No Data	1.59E-05	5.36E-05	2.52E-06
Nb-95	2.32E-06	1.29E-06	7.08E-07	No Data	1.25E-06	9.39E-05	1.21E-05
Nb-97	3.92E-11	9.72E-12	3.55E-12	No Data	1.14E-11	4.91E-07	2.71E-07
Mo-93	No Data	1.66E-06	4.52E-08	No Data	5.06E-07	8.81E-05	3.99E-06
Mo-99	No Data	2.11E-08	4.03E-09	No Data	5.14E-08	1.92E-05	3.36E-05
Tc-99m	1.73E-13	4.83E-13	6.24E-12	No Data	7.20E-12	1.44E-07	7.66E-07
Tc-99	4.48E-08	6.58E-08	1.79E-08	No Data	8.35E-07	1.74E-04	7.99E-06
Tc-101	7.40E-15	1.05E-14	1.03E-13	No Data	1.90E-13	8.34E-08	1.09E-16
Ru-103	2.63E-07	No Data	1.12E-07	No Data	9.29E-07	9.79E-05	1.36E-05
Ru-105	1.40E-10	No Data	5.42E-11	No Data	1.76E-10	2.27E-06	1.13E-05
Ru-106	1.23E-05	No Data	1.55E-06	No Data	2.38E-05	2.01E-03	1.20E-04
Rh-105	1.32E-09	9.48E-10	6.24E-10	No Data	4.04E-09	4.09E-06	1.23E-05
Pd-107	No Data	1.17E-07	8.39E-09	No Data	9.39E-07	1.63E-05	7.49E-07
Pd-109	No Data	6.56E-10	1.66E-10	No Data	3.36E-09	3.19E-06	1.96E-05
Ag-110m	1.73E-06	1.64E-06	9.99E-07	No Data	3.13E-06	8.44E-04	3.41E-05
Ag-111	6.07E-08	2.52E-08	1.26E-08	No Data	8.17E-08	4.00E-05	3.00E-05
Cd-113m	No Data	2.17E-04	7.10E-06	No Data	2.43E-04	3.59E-04	1.68E-05
Cd-115m	No Data	3.48E-05	1.14E-06	No Data	2.82E-05	3.03E-04	5.10E-05
Sn-123	4.31E-05	9.44E-07	1.40E-06	7.55E-07	No Data	4.96E-04	4.16E-05
Sn-125	1.66E-06	4.42E-08	9.99E-08	3.45E-08	No Data	1.26E-04	7.29E-05
Sn-126	2.18E-04	5.39E-06	8.24E-06	1.42E-06	No Data	1.72E-03	1.68E-05
Sb-124	5.38E-06	9.92E-08	2.10E-06	1.22E-08	No Data	4.81E-04	4.98E-05
Sb-125	9.23E-06	1.01E-07	2.15E-06	8.80E-09	No Data	3.42E-04	1.24E-05
Sb-126	6.19E-07	1.27E-08	2.23E-07	3.50E-09	No Data	1.55E-04	6.01E-05
Sb-127	4.64E-08	9.92E-10	1.75E-08	5.21E-10	No Data	3.31E-05	3.94E-05
Te-125m	6.10E-07	2.80E-07	8.34E-08	1.75E-07	No Data	6.70E-05	9.38E-06
Te-127m	2.25E-06	1.02E-06	2.73E-07	5.48E-07	8.17E-06	2.07E-04	1.99E-05
Te-127	2.51E-10	1.14E-10	5.52E-11	1.77E-10	9.10E-10	1.40E-06	1.01E-05
Te-129m	1.74E-06	8.23E-07	2.81E-07	5.72E-07	6.49E-06	2.47E-04	5.06E-05
Te-129	8.87E-12	4.22E-12	2.20E-12	6.48E-12	3.32E-11	4.12E-07	2.02E-07
Te-131m	1.23E-08	7.51E-09	5.03E-09	9.06E-09	5.49E-08	2.97E-05	7.76E-05
Te-131	1.97E-12	1.04E-12	6.30E-13	1.55E-12	7.72E-12	2.92E-07	1.89E-09
Te-132	4.50E-08	3.63E-08	2.74E-08	3.07E-08	2.44E-07	5.61E-05	5.79E-05
Te-133m	1.01E-11	7.33E-12	5.71E-12	8.18E-12	5.07E-11	8.71E-07	1.23E-07
Te-134	5.31E-12	4.35E-12	3.64E-12	4.46E-12	2.91E-11	6.75E-07	1.37E-09
I-129	3.53E-06	2.94E-06	4.90E-06	3.66E-03	5.26E-06	No Data	2.29E-07
I-130	7.80E-07	2.24E-06	8.96E-07	1.86E-04	3.44E-06	No Data	1.14E-06
I-131	4.43E-06	6.14E-06	3.30E-06	1.83E-03	1.05E-05	No Data	8.11E-07
I-132	1.99E-07	5.47E-07	1.97E-07	1.89E-05	8.65E-07	No Data	1.59E-07
I-133	1.52E-06	2.56E-06	7.78E-07	3.65E-04	4.49E-06	No Data	1.29E-06
I-134	1.11E-07	2.90E-07	1.05E-07	4.94E-06	4.58E-07	No Data	2.55E-09
I-135	4.62E-07	1.18E-06	4.36E-07	7.76E-05	1.86E-06	No Data	8.69E-07

[1] Data presented in this Table are from Reference 9.

TABLE A-12 (continued)

INHALATION DOSE FACTORS FOR TEEN[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Cs-134m	2.20E-08	4.35E-08	2.35E-08	No Data	2.54E-08	4.56E-09	2.02E-08
Cs-134	6.28E-05	1.41E-04	6.86E-05	No Data	4.69E-05	1.83E-05	1.22E-06
Cs-135	2.08E-05	1.82E-05	4.47E-06	No Data	7.30E-06	2.70E-06	2.23E-07
Cs-136	6.44E-06	2.42E-05	1.71E-05	No Data	1.38E-05	2.22E-06	1.36E-06
Cs-137	8.38E-05	1.06E-04	3.89E-05	No Data	3.80E-05	1.51E-05	1.06E-06
Cs-138	5.82E-08	1.07E-07	5.58E-08	No Data	8.28E-08	9.84E-09	3.38E-11
Cs-139	3.65E-08	5.12E-08	1.97E-08	No Data	4.34E-08	4.86E-09	1.66E-23
Ba-139	1.67E-10	1.18E-13	4.87E-12	No Data	1.11E-13	8.08E-07	8.06E-07
Ba-140	6.84E-06	8.38E-09	4.40E-07	No Data	2.85E-09	2.54E-04	2.86E-05
Ba-141	1.78E-11	1.32E-14	5.93E-13	No Data	1.23E-14	4.11E-07	9.33E-14
Ba-142	4.62E-12	4.63E-15	2.84E-13	No Data	3.92E-15	2.39E-07	5.99E-20
La-140	5.99E-08	2.95E-08	7.82E-09	No Data	No Data	2.68E-05	6.09E-05
La-141	7.63E-10	2.35E-10	3.87E-11	No Data	No Data	2.31E-06	1.54E-05
La-142	1.20E-10	5.31E-11	1.32E-11	No Data	No Data	1.27E-06	1.50E-06
Ce-141	3.55E-06	2.37E-06	2.71E-07	No Data	1.11E-06	7.67E-05	1.58E-05
Ce-143	3.32E-08	2.42E-08	2.70E-09	No Data	1.08E-08	1.63E-05	3.19E-05
Ce-144	6.11E-04	2.53E-04	3.28E-05	No Data	1.51E-04	1.67E-03	1.08E-04
Pr-143	1.67E-06	6.64E-07	8.28E-08	No Data	3.86E-07	6.04E-05	2.67E-05
Pr-144	5.37E-12	2.20E-12	2.72E-13	No Data	1.26E-12	2.19E-07	2.94E-14
Nd-147	9.83E-07	1.07E-06	6.41E-08	No Data	6.28E-07	4.65E-05	2.28E-05
Pm-147	1.15E-04	1.10E-05	4.50E-06	No Data	2.10E-05	1.14E-04	5.87E-06
Pm-148m	1.32E-05	3.35E-06	2.62E-06	No Data	5.07E-06	3.20E-04	4.10E-05
Pm-148	5.44E-07	8.88E-08	4.48E-08	No Data	1.60E-07	6.52E-05	6.14E-05
Pm-149	4.91E-08	6.89E-09	2.84E-09	No Data	1.31E-08	1.24E-05	2.79E-05
Pm-151	1.20E-08	1.99E-09	1.01E-09	No Data	3.57E-09	6.56E-06	2.27E-05
Sm-151	1.07E-04	2.10E-05	4.86E-06	No Data	2.27E-05	7.68E-05	3.53E-06
Sm-153	2.43E-08	2.01E-08	1.47E-09	No Data	6.56E-09	7.11E-06	1.77E-05
Eu-152	2.96E-04	7.19E-05	6.30E-05	No Data	3.34E-04	5.01E-04	1.35E-05
Eu-154	9.43E-04	1.23E-04	8.60E-05	No Data	5.44E-04	9.12E-04	3.34E-05
Eu-155	2.00E-04	1.96E-05	1.21E-05	No Data	7.65E-05	1.51E-03	5.97E-05
Eu-156	2.70E-06	2.03E-06	3.30E-07	No Data	1.36E-06	1.37E-04	4.56E-05
Tb-160	3.04E-05	No Data	3.79E-06	No Data	1.20E-05	2.97E-04	2.60E-05
Ho-166m	4.40E-04	1.36E-04	9.87E-05	No Data	2.00E-04	6.24E-04	1.68E-05
W-181	8.90E-09	2.88E-09	3.01E-10	No Data	No Data	2.95E-05	2.69E-07
W-185	2.78E-07	9.17E-08	9.73E-09	No Data	No Data	9.60E-05	1.14E-05
W-187	1.50E-09	1.22E-09	4.29E-10	No Data	No Data	5.92E-06	2.21E-05
Pb-210	3.09E-02	8.28E-03	1.07E-03	No Data	2.95E-02	4.52E-02	1.60E-06
Bi-210	3.30E-07	2.26E-06	1.89E-07	No Data	2.74E-05	1.91E-03	3.19E-05
Po-210	5.68E-04	1.22E-03	1.37E-04	No Data	4.21E-03	5.41E-02	4.45E-05
Ra-223	2.57E-04	3.93E-07	5.14E-05	No Data	1.12E-05	4.39E-02	3.04E-04
Ra-224	2.83E-05	6.77E-08	5.65E-06	No Data	1.93E-06	1.51E-02	3.29E-04
Ra-225	4.28E-04	5.04E-07	8.56E-05	No Data	1.44E-05	5.04E-02	2.89E-04
Ra-226	1.33E-01	3.38E-06	9.87E-02	No Data	9.67E-05	2.02E-01	3.11E-04
Ra-228	5.34E-02	1.74E-06	5.88E-02	No Data	4.97E-05	2.78E-01	5.30E-05

[1] Data presented in this Table are from Reference 9.

TABLE A-12 (continued)

INHALATION DOSE FACTORS FOR TEEN[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Ac-225	6.04E-04	8.25E-04	4.06E-05	No Data	9.47E-05	3.81E-02	2.70E-04
Ac-227	2.49E+00	3.69E-01	1.48E-01	No Data	1.07E-01	4.16E-01	5.38E-05
Th-227	3.09E-04	5.56E-06	8.93E-06	No Data	3.18E-05	6.50E-02	3.57E-04
Th-228	2.60E-01	4.37E-03	8.78E-03	No Data	2.45E-02	1.69E+00	3.70E-04
Th-229	1.54E+01	4.44E-01	2.56E-01	No Data	2.18E+00	5.24E+00	5.12E-05
Th-230	2.34E+00	1.34E-01	6.49E-02	No Data	6.55E-01	8.98E-01	3.95E-05
Th-232	2.61E+00	1.14E-01	9.21E-04	No Data	5.60E-01	8.60E-01	3.36E-05
Th-234	2.32E-06	1.35E-07	6.71E-08	No Data	7.73E-07	3.26E-04	7.49E-05
Pa-231	5.32E+00	2.00E-01	2.07E-01	No Data	1.12E+00	9.91E-02	4.71E-05
Pa-233	1.68E-06	3.24E-07	2.89E-07	No Data	1.22E-06	5.39E-05	1.00E-05
U-232	7.31E-02	No Data	5.23E-03	No Data	7.94E-03	3.84E-01	4.46E-05
U-233	1.55E-02	No Data	9.42E-04	No Data	3.63E-03	9.18E-02	4.12E-05
U-234	1.48E-02	No Data	9.23E-04	No Data	3.55E-03	8.99E-02	4.04E-05
U-235	1.42E-02	No Data	8.67E-04	No Data	3.34E-03	8.44E-02	5.13E-05
U-236	1.42E-02	No Data	8.86E-04	No Data	3.41E-03	8.62E-02	3.79E-05
U-237	5.25E-08	No Data	1.40E-08	No Data	2.16E-07	1.76E-05	1.29E-05
U-238	1.36E-02	No Data	8.10E-04	No Data	3.12E-03	7.89E-02	3.62E-05
Np-237	1.64E+00	1.06E+00	7.21E-02	No Data	5.35E-01	8.99E-02	5.22E-05
Np-238	4.23E-07	1.02E-07	6.59E-09	No Data	3.88E-08	1.75E-05	2.38E-05
Np-239	4.23E-08	3.60E-08	2.21E-09	No Data	1.25E-08	8.11E-06	1.65E-05
Pu-238	1.50E+00	1.03E+00	7.22E-02	No Data	3.10E-01	3.12E-01	4.79E-05
Pu-239	1.73E+00	1.12E+00	8.05E-02	No Data	3.44E-01	2.93E-01	4.37E-05
Pu-240	1.72E+00	1.12E+00	8.04E-02	No Data	3.43E-01	2.93E-01	4.46E-05
Pu-241	3.74E-02	9.56E-03	1.40E-03	No Data	6.47E-03	2.60E-04	9.17E-07
Pu-242	1.60E+00	1.08E+00	7.75E-02	No Data	3.31E-01	2.82E-01	4.29E-05
Pu-244	1.87E+00	1.24E+00	8.88E-02	No Data	3.79E-01	3.23E-01	6.39E-05
Am-241	1.77E+00	1.20E+00	7.10E-02	No Data	5.32E-01	1.05E-01	4.88E-05
Am-242m	1.79E+00	1.13E+00	7.15E-02	No Data	5.30E-01	4.21E-02	6.14E-05
Am-243	1.77E+00	1.17E+00	6.95E-02	No Data	5.21E-01	9.91E-02	5.72E-05
Cm-242	3.17E-02	2.51E-02	1.41E-03	No Data	6.40E-03	6.76E-02	5.21E-05
Cm-243	1.19E+00	8.30E-01	5.00E-02	No Data	2.34E-01	1.09E-01	5.13E-05
Cm-244	9.19E-01	6.53E-01	3.88E-02	No Data	1.81E-01	1.05E-01	4.96E-05
Cm-245	1.83E+00	1.22E+00	7.53E-02	No Data	3.52E-01	1.01E-01	4.63E-05
Cm-246	1.81E+00	1.22E+00	7.52E-02	No Data	3.51E-01	1.03E-01	4.54E-05
Cm-247	1.77E+00	1.19E+00	7.41E-02	No Data	3.46E-01	1.01E-01	5.97E-05
Cm-248	1.47E+01	9.83E+00	6.11E-01	No Data	2.85E+00	8.32E-01	9.63E-04
Cf-252	7.16E-01	No Data	3.07E-02	No Data	No Data	3.43E-01	1.89E-04

[1] Data presented in this Table are from Reference 9.

TABLE A-13

INHALATION DOSE FACTORS FOR CHILD[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
H-3	No Data	1.73E-07	1.73E-07	1.73E-07	1.73E-07	1.73E-07	1.73E-07
Be-10	8.43E-04	9.83E-05	2.12E-05	No Data	No Data	7.41E-04	1.72E-05
C-14	9.70E-06	1.82E-06	1.82E-06	1.82E-06	1.82E-06	1.82E-06	1.82E-06
N-13	2.33E-08	2.33E-08	2.33E-08	2.33E-08	2.33E-08	2.33E-08	2.33E-08
F-18	1.88E-06	No Data	1.85E-07	No Data	No Data	No Data	3.37E-07
Na-22	4.41E-05	4.41E-05	4.41E-05	4.41E-05	4.41E-05	4.41E-05	4.41E-05
Na-24	4.35E-06	4.35E-06	4.35E-06	4.35E-06	4.35E-06	4.35E-06	4.35E-06
P-32	7.04E-04	3.09E-05	2.67E-05	No Data	No Data	No Data	1.14E-05
Ca-41	7.06E-05	No Data	7.70E-06	No Data	No Data	7.21E-02	2.94E-07
Sc-46	1.97E-04	2.70E-04	1.04E-04	No Data	2.39E-04	No Data	2.45E-05
Cr-51	No Data	No Data	4.17E-08	2.31E-08	6.57E-09	4.59E-06	2.93E-07
Mn-54	No Data	1.16E-05	2.57E-06	No Data	2.71E-06	4.26E-04	6.19E-06
Mn-56	No Data	4.48E-10	8.43E-11	No Data	4.52E-10	3.55E-06	3.33E-05
Fe-55	1.28E-05	6.80E-06	2.10E-06	No Data	No Data	3.00E-05	7.75E-07
Fe-59	5.59E-06	9.04E-06	4.51E-06	No Data	No Data	3.43E-04	1.91E-05
Co-57	No Data	2.44E-07	2.88E-07	No Data	No Data	1.37E-04	3.58E-06
Co-58	No Data	4.79E-07	8.55E-07	No Data	No Data	2.99E-04	9.29E-06
Co-60	No Data	3.55E-06	6.12E-06	No Data	No Data	1.91E-03	2.60E-05
Ni-59	1.66E-05	4.67E-06	2.83E-06	No Data	No Data	2.73E-05	6.29E-07
Ni-63	2.22E-04	1.25E-05	7.56E-06	No Data	No Data	7.43E-05	1.71E-06
Ni-65	8.08E-10	7.99E-11	4.44E-11	No Data	No Data	2.21E-06	2.27E-05
Cu-64	No Data	5.39E-10	2.90E-10	No Data	1.63E-09	2.59E-06	9.92E-06
Zn-65	1.15E-05	3.06E-05	1.90E-05	No Data	1.93E-05	2.69E-04	4.41E-06
Zn-69m	4.26E-09	7.28E-09	8.59E-10	No Data	4.22E-09	7.36E-06	2.71E-05
Zn-69	1.81E-11	2.61E-11	2.41E-12	No Data	1.58E-11	3.84E-07	2.75E-06
Se-79	No Data	1.23E-06	2.60E-07	No Data	1.71E-06	1.49E-04	3.43E-06
Br-82	No Data	No Data	5.66E-06	No Data	No Data	No Data	No Data
Br-83	No Data	No Data	1.28E-07	No Data	No Data	No Data	No Data
Br-84	No Data	No Data	1.48E-07	No Data	No Data	No Data	No Data
Br-85	No Data	No Data	6.84E-09	No Data	No Data	No Data	No Data
Rb-86	No Data	5.36E-05	3.09E-05	No Data	No Data	No Data	2.16E-06
Rb-87	No Data	3.16E-05	1.37E-05	No Data	No Data	No Data	2.96E-07
Rb-88	No Data	1.52E-07	9.90E-08	No Data	No Data	No Data	4.66E-09
Rb-89	No Data	9.33E-08	7.83E-08	No Data	No Data	No Data	5.11E-10
Sr-89	1.62E-04	No Data	4.66E-06	No Data	No Data	5.83E-04	4.52E-05
Sr-90	1.04E-02	No Data	2.07E-04	No Data	No Data	3.99E-03	9.28E-05
Sr-91	3.28E-08	No Data	1.24E-09	No Data	No Data	1.44E-05	4.70E-05
Sr-92	3.54E-09	No Data	1.42E-10	No Data	No Data	6.49E-06	6.55E-05
Y-90	1.11E-06	No Data	2.99E-08	No Data	No Data	7.07E-05	7.24E-05
Y-91m	1.37E-10	No Data	4.98E-12	No Data	No Data	7.60E-07	4.64E-07
Y-91	2.47E-04	No Data	6.59E-06	No Data	No Data	7.10E-04	4.97E-05
Y-92	5.50E-09	No Data	1.57E-10	No Data	No Data	6.46E-06	6.46E-05
Y-93	5.04E-08	No Data	1.38E-09	No Data	No Data	2.01E-05	1.05E-04

[1] Data presented in this Table are from Reference 9.

TABLE A-13 (continued)

INHALATION DOSE FACTORS FOR CHILD[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Zr-93	2.07E-04	7.80E-06	5.55E-06	No Data	3.00E-05	7.10E-05	1.47E-06
Zr-95	5.13E-05	1.13E-05	1.00E-05	No Data	1.61E-05	6.03E-04	1.65E-05
Zr-97	5.07E-08	7.34E-09	4.32E-09	No Data	1.05E-08	3.06E-05	9.49E-05
Nb-93m	1.27E-04	3.17E-05	1.04E-05	No Data	3.44E-05	1.04E-04	2.45E-06
Nb-95	6.35E-06	2.48E-06	1.77E-06	No Data	2.33E-06	1.66E-04	1.00E-05
Nb-97	1.16E-10	2.08E-11	9.74E-12	No Data	2.31E-11	9.23E-07	7.52E-06
Mo-93	No Data	3.76E-06	1.35E-07	No Data	1.06E-06	1.70E-04	3.78E-06
Mo-99	No Data	4.66E-08	1.15E-08	No Data	1.06E-07	3.66E-05	3.42E-05
Tc-99m	4.81E-13	9.41E-13	1.56E-11	No Data	1.37E-11	2.57E-07	1.30E-06
Tc-99	1.34E-07	1.49E-07	5.35E-08	No Data	1.75E-06	3.37E-04	7.75E-06
Tc-101	2.19E-14	2.30E-14	2.91E-13	No Data	3.92E-13	1.58E-07	4.41E-09
Ru-103	7.55E-07	No Data	2.90E-07	No Data	1.90E-06	1.79E-04	1.21E-05
Ru-105	4.13E-10	No Data	1.50E-10	No Data	3.63E-10	4.30E-06	2.69E-05
Ru-106	3.68E-05	No Data	4.57E-06	No Data	4.97E-05	3.87E-03	1.16E-04
Rh-105	3.91E-09	2.10E-09	1.79E-09	No Data	8.39E-09	7.82E-06	1.33E-05
Pd-107	No Data	2.65E-07	2.51E-08	No Data	1.97E-06	3.16E-05	7.26E-07
Pd-109	No Data	1.48E-09	4.95E-10	No Data	7.06E-09	6.16E-06	2.59E-05
Ag-110m	4.56E-06	3.08E-06	2.47E-06	No Data	5.74E-06	1.48E-03	2.71E-05
Ag-111	1.81E-07	5.68E-08	3.75E-08	No Data	1.71E-07	7.73E-05	2.98E-05
Cd-113m	No Data	4.93E-04	2.12E-05	No Data	5.13E-04	6.94E-04	1.63E-05
Cd-115m	No Data	7.88E-05	3.39E-06	No Data	5.93E-05	5.86E-04	4.97E-05
Sn-123	1.29E-04	2.14E-06	4.19E-06	2.27E-06	No Data	9.59E-04	4.05E-05
Sn-125	4.95E-06	9.94E-08	2.95E-07	1.03E-07	No Data	2.43E-04	7.17E-05
Sn-126	6.23E-04	1.04E-05	2.36E-05	2.84E-06	No Data	3.02E-03	1.63E-05
Sb-124	1.55E-05	2.00E-07	5.41E-06	3.41E-08	No Data	8.76E-04	4.43E-05
Sb-125	2.66E-05	2.05E-07	5.59E-06	2.46E-08	No Data	6.27E-04	1.09E-05
Sb-126	1.72E-06	2.62E-08	6.16E-07	1.00E-08	No Data	2.86E-04	5.67E-05
Sb-127	1.36E-07	2.09E-09	4.70E-08	1.51E-09	No Data	6.17E-05	3.82E-05
Te-125m	1.82E-06	6.29E-07	2.47E-07	5.20E-07	No Data	1.29E-04	9.13E-06
Te-127m	6.72E-06	2.31E-06	8.16E-07	1.64E-06	1.72E-05	4.00E-04	1.93E-05
Te-127	7.49E-10	2.57E-10	1.65E-10	5.30E-10	1.91E-09	2.71E-06	1.52E-05
Te-129m	5.19E-06	1.85E-06	8.22E-07	1.71E-06	1.36E-05	4.76E-04	4.91E-05
Te-129	2.64E-11	9.45E-12	6.44E-12	1.93E-11	6.94E-11	7.93E-07	6.89E-06
Te-131m	3.63E-08	1.60E-08	1.37E-08	2.64E-08	1.08E-07	5.56E-05	8.32E-05
Te-131	5.87E-12	2.28E-12	1.78E-12	4.59E-12	1.59E-11	5.55E-07	3.60E-07
Te-132	1.30E-07	7.36E-08	7.12E-08	8.58E-08	4.79E-07	1.02E-04	3.72E-05
Te-133m	2.93E-11	1.51E-11	1.50E-11	2.32E-11	1.01E-10	1.60E-06	4.77E-06
Te-134	1.53E-11	8.81E-12	9.40E-12	1.24E-11	5.71E-11	1.23E-06	4.87E-07
I-129	1.05E-05	6.40E-06	5.71E-06	4.28E-03	1.08E-05	No Data	2.15E-07
I-130	2.21E-06	4.43E-06	2.28E-06	4.99E-04	6.61E-06	No Data	1.38E-06
I-131	1.30E-05	1.30E-05	7.37E-06	4.39E-03	2.13E-05	No Data	7.68E-07
I-132	5.72E-07	1.10E-06	5.07E-07	5.23E-05	1.69E-06	No Data	8.65E-07
I-133	4.48E-06	5.49E-06	2.08E-06	1.04E-03	9.13E-06	No Data	1.48E-06
I-134	3.17E-07	5.84E-07	2.69E-07	1.37E-05	8.92E-07	No Data	2.58E-07
I-135	1.33E-06	2.36E-06	1.12E-06	2.14E-04	3.62E-06	No Data	1.20E-06

[1] Data presented in this Table are from Reference 9.

TABLE A-13 (continued)

INHALATION DOSE FACTORS FOR CHILD[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Cs-134m	6.33E-08	8.92E-08	6.12E-08	No Data	4.94E-08	8.35E-09	7.92E-08
Cs-134	1.76E-04	2.74E-04	6.07E-05	No Data	8.93E-05	3.27E-05	1.04E-06
Cs-135	6.23E-05	4.13E-05	4.45E-06	No Data	1.53E-05	5.22E-06	2.17E-07
Cs-136	1.76E-05	4.62E-05	3.14E-05	No Data	2.58E-05	3.93E-06	1.13E-06
Cs-137	2.45E-04	2.23E-04	3.47E-05	No Data	7.63E-05	2.81E-05	9.78E-07
Cs-138	1.71E-07	2.27E-07	1.50E-07	No Data	1.68E-07	1.84E-08	7.29E-08
Cs-139	1.09E-07	1.15E-07	5.80E-08	No Data	9.08E-08	9.36E-09	7.23E-12
Ba-139	4.98E-10	2.66E-13	1.45E-11	No Data	2.33E-13	1.56E-06	1.56E-05
Ba-140	2.00E-05	1.75E-08	1.17E-06	No Data	5.71E-09	4.71E-04	2.75E-05
Ba-141	5.29E-11	2.95E-14	1.72E-12	No Data	2.56E-14	7.89E-07	7.44E-08
Ba-142	1.35E-11	9.73E-15	7.54E-13	No Data	7.87E-15	4.44E-07	7.41E-10
La-140	1.74E-07	6.08E-08	2.04E-08	No Data	No Data	4.94E-05	6.10E-05
La-141	2.28E-09	5.31E-10	1.15E-10	No Data	No Data	4.48E-06	4.37E-05
La-142	3.50E-10	1.11E-10	3.49E-11	No Data	No Data	2.35E-06	2.05E-05
Ce-141	1.06E-05	5.28E-06	7.83E-07	No Data	2.31E-06	1.47E-04	1.53E-05
Ce-143	9.89E-08	5.37E-08	7.77E-09	No Data	2.26E-08	3.12E-05	3.44E-05
Ce-144	1.83E-03	5.72E-04	9.77E-05	No Data	3.17E-04	3.23E-03	1.05E-04
Pr-143	4.99E-06	1.50E-06	2.47E-07	No Data	8.11E-07	1.17E-04	2.63E-05
Pr-144	1.61E-11	4.99E-12	8.10E-13	No Data	2.64E-12	4.23E-07	5.32E-08
Nd-147	2.92E-06	2.36E-06	1.84E-07	No Data	1.30E-06	8.87E-05	2.22E-05
Pm-147	3.52E-04	2.52E-05	1.36E-05	No Data	4.45E-05	2.20E-04	5.70E-06
Pm-148m	3.31E-05	6.55E-06	6.55E-06	No Data	9.74E-06	5.72E-04	3.58E-05
Pm-148	1.61E-06	1.94E-07	1.25E-07	No Data	3.30E-07	1.24E-04	6.01E-05
Pm-149	1.47E-07	1.56E-08	8.45E-09	No Data	2.75E-08	2.40E-05	2.92E-05
Pm-151	3.57E-08	4.33E-09	2.82E-09	No Data	7.35E-09	1.24E-05	2.50E-05
Sm-151	3.14E-04	4.75E-05	1.49E-05	No Data	4.89E-05	1.48E-04	3.43E-06
Sm-153	7.24E-08	4.51E-08	4.35E-09	No Data	1.37E-08	1.37E-05	1.87E-05
Eu-152	7.42E-04	1.37E-04	1.61E-04	No Data	5.73E-04	9.00E-04	1.14E-05
Eu-154	2.74E-03	2.49E-04	2.27E-04	No Data	1.09E-03	1.66E-03	2.98E-05
Eu-155	5.60E-04	4.05E-05	3.18E-05	No Data	1.51E-04	2.79E-04	5.39E-05
Eu-156	7.89E-06	4.23E-06	8.75E-07	No Data	2.72E-06	2.54E-04	4.24E-05
Tb-160	7.79E-05	No Data	9.67E-06	No Data	2.32E-05	5.34E-04	2.28E-05
Ho-166m	1.34E-03	2.81E-04	2.37E-04	No Data	4.01E-04	1.13E-03	1.63E-05
W-181	2.66E-08	6.52E-09	8.99E-10	No Data	No Data	5.71E-06	2.61E-07
W-185	8.31E-07	2.08E-07	2.91E-08	No Data	No Data	1.86E-04	1.11E-05
W-187	4.41E-09	2.61E-09	1.17E-09	No Data	No Data	1.11E-05	2.46E-05
Pb-210	8.03E-02	1.85E-02	3.18E-03	No Data	6.31E-02	8.74E-02	1.55E-06
Bi-210	9.85E-07	5.11E-06	5.65E-07	No Data	5.76E-05	3.70E-03	3.21E-05
Po-210	1.70E-03	2.76E-03	4.09E-04	No Data	8.85E-03	1.05E-01	4.32E-05
Ra-223	7.69E-04	8.89E-07	1.54E-04	No Data	2.36E-05	8.48E-02	3.00E-04
Ra-224	8.44E-05	1.53E-07	1.69E-05	No Data	4.06E-06	2.92E-02	3.34E-04
Ra-225	1.28E-03	1.14E-06	2.56E-04	No Data	3.02E-05	9.74E-02	2.84E-04
Ra-226	2.34E-01	7.66E-06	1.92E-01	No Data	2.03E-04	3.90E-01	3.02E-04
Ra-228	1.49E-01	3.94E-06	1.68E-01	No Data	1.04E-04	5.37E-01	5.14E-05

[1] Data presented in this Table are from Reference 9.

TABLE A-13 (continued)

INHALATION DOSE FACTORS FOR CHILD[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Ac-225	1.81E-03	1.87E-03	1.21E-04	No Data	1.99E-04	7.37E-02	2.67E-04
Ac-227	4.96E+00	8.05E-01	3.07E-01	No Data	1.77E-01	8.04E-01	5.22E-05
Th-227	9.24E-04	1.26E-05	2.67E-05	No Data	6.67E-05	1.26E-01	3.49E-04
Th-228	8.06E-01	1.04E-02	2.72E-02	No Data	5.41E-02	3.34E+00	3.59E-04
Th-229	2.18E+01	5.74E-01	3.63E-01	No Data	2.83E+00	1.08E+01	4.99E-05
Th-230	3.30E+00	1.73E-01	9.20E-02	No Data	8.52E-01	1.85E+00	3.84E-05
Th-232	3.68E+00	1.47E-01	1.28E-03	No Data	7.28E-01	1.77E+00	3.27E-05
Th-234	6.94E-06	3.07E-07	2.00E-07	No Data	1.62E-06	6.31E-04	7.32E-05
Pa-231	8.62E+00	2.86E-01	3.43E-01	No Data	1.56E+00	1.92E-01	4.57E-05
Pa-233	4.14E-06	6.48E-07	7.25E-07	No Data	2.38E-06	9.77E-05	8.95E-06
U-232	2.19E-01	No Data	1.56E-02	No Data	1.67E-02	7.42E-01	4.33E-05
U-233	4.64E-02	No Data	2.82E-03	No Data	7.62E-03	1.77E-01	4.00E-05
U-234	4.46E-02	No Data	2.76E-03	No Data	7.47E-03	1.74E-01	3.92E-05
U-235	4.27E-02	No Data	2.59E-03	No Data	7.01E-03	1.63E-01	4.98E-05
U-236	4.27E-02	No Data	2.65E-03	No Data	7.16E-03	1.67E-01	3.67E-05
U-237	1.57E-07	No Data	4.17E-08	No Data	4.53E-07	3.40E-05	1.29E-05
U-238	4.09E-02	No Data	2.42E-03	No Data	6.55E-03	1.53E-01	3.51E-05
Np-237	2.72E+00	1.62E+00	1.19E-01	No Data	7.41E-01	1.74E-01	5.06E-05
Np-238	1.26E-06	2.30E-07	1.97E-08	No Data	8.16E-08	3.39E-05	2.50E-05
Np-239	1.26E-07	8.14E-08	6.35E-09	No Data	2.63E-08	1.57E-05	1.73E-05
Pu-238	2.55E+00	1.60E+00	1.21E-01	No Data	4.47E-01	6.08E-01	4.65E-05
Pu-239	2.79E+00	1.68E+00	1.28E-01	No Data	4.78E-01	5.72E-01	4.24E-05
Pu-240	2.79E+00	1.68E+00	1.27E-01	No Data	4.77E-01	5.71E-01	4.33E-05
Pu-241	7.94E-02	1.75E-02	2.93E-03	No Data	1.10E-02	5.06E-04	8.90E-07
Pu-242	2.59E+00	1.62E+00	1.23E-01	No Data	4.60E-01	5.50E-01	4.16E-05
Pu-244	3.02E+00	1.85E+00	1.41E-01	No Data	5.27E-01	6.30E-01	6.20E-05
Am-241	2.97E+00	1.84E+00	1.24E-01	No Data	7.63E-01	2.02E-01	4.73E-05
Am-242m	3.07E+00	1.76E+00	1.27E-01	No Data	7.71E-01	8.14E-02	5.96E-05
Am-243	2.94E+00	1.78E+00	1.20E-01	No Data	7.42E-01	1.92E-01	5.55E-05
Cm-242	9.48E-02	5.68E-02	4.20E-03	No Data	1.34E-02	1.31E-01	5.06E-05
Cm-243	2.32E+00	1.42E+00	9.95E-02	No Data	3.74E-01	2.10E-01	4.98E-05
Cm-244	1.94E+00	1.18E+00	8.31E-02	No Data	3.06E-01	2.02E-01	4.82E-05
Cm-245	3.05E+00	1.84E+00	1.28E-01	No Data	5.03E-01	1.95E-01	4.49E-05
Cm-246	3.02E+00	1.84E+00	1.28E-01	No Data	5.03E-01	1.99E-01	4.41E-05
Cm-247	2.94E+00	1.82E+00	1.26E-01	No Data	4.95E-01	1.95E-01	5.80E-05
Cm-248	2.45E+01	1.50E+01	1.04E+00	No Data	4.08E+00	1.61E+00	9.35E-04
Cf-252	2.18E+00	No Data	9.33E-02	No Data	No Data	6.62E-01	1.84E-04

[1] Data presented in this Table are from Reference 9.

TABLE A-14

INHALATION DOSE FACTORS FOR INFANT[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
H-3	No Data	2.63E-07	2.63E-07	2.63E-07	2.63E-07	2.63E-07	2.63E-07
Be-10	9.49E-04	1.25E-04	2.65E-05	No Data	No Data	1.49E-03	1.73E-05
C-14	1.89E-05	3.79E-06	3.79E-06	3.79E-06	3.79E-06	3.79E-06	3.79E-06
N-13	4.39E-08	4.39E-08	4.39E-08	4.39E-08	4.39E-08	4.39E-08	4.39E-08
F-18	3.92E-06	No Data	3.33E-07	No Data	No Data	No Data	6.10E-07
Na-22	7.37E-05	7.37E-05	7.37E-05	7.37E-05	7.37E-05	7.37E-05	7.37E-05
Na-24	7.54E-06	7.54E-06	7.54E-06	7.54E-06	7.54E-06	7.54E-06	7.54E-06
P-32	1.45E-03	8.03E-05	5.53E-05	No Data	No Data	No Data	1.15E-05
Ca-41	7.48E-05	No Data	8.16E-06	No Data	No Data	6.94E-02	2.96E-07
Sc-46	3.75E-04	5.41E-04	1.69E-04	No Data	3.56E-04	No Data	2.19E-05
Cr-51	No Data	No Data	6.39E-08	4.11E-08	9.45E-09	9.17E-06	2.55E-07
Mn-54	No Data	1.81E-05	3.56E-06	No Data	3.56E-06	7.14E-04	5.04E-06
Mn-56	No Data	1.10E-09	1.58E-10	No Data	7.86E-10	8.95E-06	5.12E-05
Fe-55	1.41E-05	8.39E-06	2.38E-06	No Data	No Data	6.21E-05	7.82E-07
Fe-59	9.69E-06	1.68E-05	6.77E-06	No Data	No Data	7.25E-04	1.77E-05
Co-57	No Data	4.65E-07	4.58E-07	No Data	No Data	2.71E-04	3.47E-06
Co-58	No Data	8.71E-07	1.30E-06	No Data	No Data	5.5[illegible]	7.95E-06
Co-60	No Data	5.73E-06	8.41E-06	No Data	No Data	3.22E-[illegible]	2.28E-05
Ni-59	1.81E-05	5.44E-06	3.10E-06	No Data	No Data	5.48E-05	6.34E-07
Ni-63	2.42E-04	1.46E-05	8.29E-06	No Data	No Data	1.49E-04	1.73E-06
Ni-65	1.71E-09	2.03E-10	8.79E-11	No Data	No Data	5.80E-06	3.58E-05
Cu-64	No Data	1.34E-09	5.53E-10	No Data	2.84E-09	6.64E-06	1.07E-05
Zn-65	1.38E-05	4.47E-05	2.22E-05	No Data	2.32E-05	4.62E-04	3.67E-05
Zn-69m	8.98E-09	1.84E-08	1.67E-09	No Data	7.45E-09	1.91E-05	2.92E-05
Zn-69	3.85E-11	6.91E-11	5.13E-12	No Data	2.87E-11	1.05E-06	9.44E-06
Se-79	No Data	2.25E-06	4.20E-07	No Data	2.47E-06	2.99E-04	3.46E-06
Br-82	No Data	No Data	9.49E-06	No Data	No Data	No Data	No Data
Br-83	No Data	No Data	2.72E-07	No Data	No Data	No Data	No Data
Br-84	No Data	No Data	2.86E-07	No Data	No Data	No Data	No Data
Br-85	No Data	No Data	1.46E-08	No Data	No Data	No Data	No Data
Rb-86	No Data	1.36E-04	6.30E-05	No Data	No Data	No Data	2.17E-06
Rb-87	No Data	7.11E-05	2.64E-05	No Data	No Data	No Data	2.99E-07
Rb-88	No Data	3.98E-07	2.05E-07	No Data	No Data	No Data	2.42E-07
Rb-89	No Data	2.29E-07	1.47E-07	No Data	No Data	No Data	4.87E-08
Sr-89	2.84E-04	No Data	8.15E-06	No Data	No Data	1.45E-03	4.57E-05
Sr-90	1.11E-02	No Data	2.23E-04	No Data	No Data	8.03E-03	9.36E-05
Sr-91	6.83E-08	No Data	2.47E-09	No Data	No Data	3.76E-05	5.24E-05
Sr-92	7.50E-09	No Data	2.79E-10	No Data	No Data	1.70E-05	1.00E-04
Y-90	2.35E-06	No Data	6.30E-08	No Data	No Data	1.92E-04	7.43E-05
Y-91m	2.91E-10	No Data	9.90E-12	No Data	No Data	1.99E-06	1.68E-06
Y-91	4.20E-04	No Data	1.12E-05	No Data	No Data	1.75E-03	5.02E-05
Y-92	1.17E-08	No Data	3.29E-10	No Data	No Data	1.75E-05	9.04E-05
Y-93	1.07E-07	No Data	2.91E-09	No Data	No Data	5.46E-05	1.19E-04

[1] Data presented in this Table are from Reference 9.

TABLE A-14 (continued)

INHALATION DOSE FACTORS FOR INFANT[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Zr-93	2.24E-04	9.51E-06	6.18E-06	No Data	3.19E-05	1.37E-04	1.48E-06
Zr-95	8.24E-05	1.99E-05	1.45E-05	No Data	2.22E-05	1.25E-03	1.55E-05
Zr-97	1.07E-07	1.83E-08	8.36E-09	No Data	1.85E-08	7.88E-05	1.00E-04
Nb-93m	1.38E-04	3.59E-05	1.15E-05	No Data	3.68E-05	2.09E-04	2.47E-06
Nb-95	1.12E-05	4.59E-06	2.70E-06	No Data	3.37E-06	3.42E-04	9.05E-06
Nb-97	2.44E-10	5.21E-11	1.88E-11	No Data	4.07E-11	2.37E-06	1.92E-05
Mo-93	No Data	6.46E-06	2.22E-07	No Data	1.54E-06	3.40E-04	3.76E-06
Mo-99	No Data	1.18E-07	2.31E-08	No Data	1.89E-07	9.63E-05	3.48E-05
Tc-99m	9.98E-13	2.06E-12	2.66E-11	No Data	2.22E-11	5.79E-07	1.45E-06
Tc-99	2.09E-07	2.68E-07	8.85E-08	No Data	2.49E-06	6.77E-04	7.82E-06
Tc-101	4.65E-14	5.88E-14	5.80E-13	No Data	6.99E-13	4.17E-07	6.03E-07
Ru-103	1.44E-06	No Data	4.85E-07	No Data	3.03E-06	3.94E-04	1.15E-05
Ru-105	8.74E-10	No Data	2.93E-10	No Data	6.42E-10	1.12E-05	3.46E-05
Ru-106	6.20E-05	No Data	7.77E-06	No Data	7.61E-05	8.26E-03	1.17E-04
Rh-105	8.26E-09	5.41E-09	3.63E-09	No Data	1.50E-08	2.08E-05	1.37E-05
Pd-107	No Data	4.92E-07	4.11E-08	No Data	2.75E-06	6.34E-05	7.33E-07
Pd-109	No Data	3.92E-09	1.05E-09	No Data	1.28E-08	1.68E-05	2.85E-05
Ag-110m	7.13E-06	5.16E-06	3.57E-06	No Data	7.80E-06	2.62E-03	2.36E-05
Ag-111	3.75E-07	1.45E-07	7.75E-08	No Data	3.05E-07	2.06E-04	3.02E-05
Cd-113m	No Data	6.67E-04	2.64E-05	No Data	5.80E-04	1.40E-03	1.65E-05
Cd-115m	No Data	1.73E-04	6.19E-06	No Data	9.41E-05	1.47E-03	5.02E-05
Sn-123	2.09E-04	4.21E-06	7.28E-06	4.27E-06	No Data	2.22E-03	4.08E-05
Sn-125	1.01E-05	2.51E-07	6.00E-07	2.47E-07	No Data	6.43E-04	7.26E-05
Sn-126	8.30E-04	1.44E-05	3.52E-05	3.84E-06	No Data	4.93E-03	1.65E-05
Sb-124	2.71E-05	3.97E-07	8.56E-06	7.18E-08	No Data	1.89E-03	4.22E-05
Sb-125	3.69E-05	3.41E-07	7.78E-06	4.45E-08	No Data	1.17E-03	1.05E-05
Sb-126	3.08E-06	6.01E-08	1.11E-06	2.35E-08	No Data	6.88E-04	5.33E-05
Sb-127	2.82E-07	5.04E-09	8.76E-08	3.60E-09	No Data	1.54E-04	3.78E-05
Te-125m	3.40E-06	1.42E-06	4.70E-07	1.16E-06	No Data	3.19E-04	9.22E-06
Te-127m	1.19E-05	4.93E-06	1.48E-06	3.48E-06	2.68E-05	9.37E-04	1.95E-05
Te-127	1.59E-09	6.81E-10	3.49E-10	1.32E-09	3.47E-09	7.39E-06	1.74E-05
Te-129m	1.01E-05	4.35E-06	1.59E-06	3.91E-06	2.27E-05	1.20E-03	4.93E-05
Te-129	5.63E-11	2.48E-11	1.34E-11	4.82E-11	1.25E-10	2.14E-06	1.88E-05
Te-131m	7.62E-08	3.93E-08	2.59E-08	6.38E-08	1.89E-07	1.42E-04	8.51E-05
Te-131	1.24E-11	5.87E-12	3.57E-12	1.13E-11	2.85E-11	1.47E-06	5.87E-06
Te-132	2.66E-07	1.69E-07	1.26E-07	1.99E-07	7.39E-07	2.43E-04	3.15E-05
Te-133m	6.13E-11	3.59E-11	2.74E-11	5.52E-11	1.72E-10	3.92E-06	1.59E-05
Te-134	3.18E-11	2.04E-11	1.68E-11	2.91E-11	9.59E-11	2.93E-06	2.53E-06
I-129	2.16E-05	1.59E-05	1.16E-05	1.04E-02	1.88E-05	No Data	2.12E-07
I-130	4.54E-06	9.91E-06	3.98E-06	1.14E-03	1.09E-05	No Data	1.42E-06
I-131	2.71E-05	3.17E-05	1.40E-05	1.06E-02	3.70E-05	No Data	7.56E-07
I-132	1.21E-06	2.53E-06	8.99E-07	1.21E-04	2.82E-06	No Data	1.36E-06
I-133	9.46E-06	1.37E-05	4.00E-06	2.54E-03	1.60E-05	No Data	1.54E-06
I-134	6.58E-07	1.34E-06	4.75E-07	3.18E-05	1.49E-06	No Data	9.21E-07
I-135	2.76E-06	5.43E-06	1.98E-06	4.97E-04	6.05E-06	No Data	1.31E-06

[1] Data presented in this Table are from Reference 9.

TABLE A-14 (continued)

INHALATION DOSE FACTORS FOR INFANT[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Cs-134m	1.32E-07	2.10E-07	1.11E-07	No Data	8.50E-08	2.00E-08	1.16E-07
Cs-134	2.83E-04	5.02E-04	5.32E-05	No Data	1.36E-04	5.69E-05	9.53E-07
Cs-135	1.00E-04	8.66E-05	4.73E-06	No Data	2.58E-05	1.01E-05	2.18E-07
Cs-136	3.45E-05	9.61E-05	3.78E-05	No Data	4.03E-05	8.40E-06	1.02E-06
Cs-137	3.92E-04	4.37E-04	3.25E-05	No Data	1.23E-04	5.09E-05	9.53E-07
Cs-138	3.61E-07	5.58E-07	2.84E-07	No Data	2.93E-07	4.67E-08	6.26E-07
Cs-139	2.32E-07	3.03E-07	1.22E-07	No Data	1.65E-07	2.53E-08	1.33E-08
Ba-139	1.06E-09	7.03E-13	3.07E-11	No Data	4.23E-13	4.25E-06	3.64E-05
Ba-140	4.00E-05	4.00E-08	2.07E-06	No Data	9.59E-09	1.14E-03	2.74E-05
Ba-141	1.12E-10	7.70E-14	3.55E-12	No Data	4.64E-14	2.12E-06	3.39E-06
Ba-142	2.84E-11	2.36E-14	1.40E-12	No Data	1.36E-14	1.11E-06	4.95E-07
La-140	3.61E-07	1.43E-07	3.68E-08	No Data	Nc Data	1.20E-04	6.06E-05
La-141	4.85E-09	1.40E-09	2.45E-10	No Data	No Data	1.22E-05	5.96E-05
La-142	7.36E-10	2.69E-10	6.46E-11	No Data	No Data	5.87E-06	4.25E-05
Ce-141	1.98E-05	1.19E-05	1.42E-06	No Data	3.75E-06	3.69E-04	1.54E-05
Ce-143	2.09E-07	1.38E-07	1.58E-08	No Data	4.03E-08	8.30E-05	3.55E-05
Ce-144	2.28E-03	8.65E-04	1.26E-04	No Data	3.84E-04	7.03E-03	1.06E-04
Pr-143	1.00E-05	3.74E-06	4.99E-07	No Data	1.41E-06	3.09E-04	2.66E-05
Pr-144	3.42E-11	1.32E-11	1.72E-12	No Data	4.80E-12	1.15E-06	3.06E-06
Nd-147	5.67E-06	5.81E-06	3.57E-07	No Data	2.25E-06	2.30E-04	2.23E-05
Pm-147	3.91E-04	3.07E-05	1.56E-05	No Data	4.93E-05	4.55E-04	5.75E-06
Pm-148m	5.00E-05	1.24E-05	9.94E-06	No Data	1.45E-05	1.22E-03	3.37E-05
Pm-148	3.34E-06	4.82E-07	2.44E-07	No Data	5.76E-07	3.20E-04	6.04E-05
Pm-149	3.10E-07	4.08E-08	1.78E-08	No Data	4.96E-08	6.50E-05	3.01E-05
Pm-151	7.52E-08	1.10E-08	5.55E-09	No Data	1.30E-08	3.25E-05	2.58E-05
Sm-151	3.38E-04	6.45E-05	1.63E-05	No Data	5.24E-05	2.98E-04	3.46E-06
Sm-153	1.53E-07	1.18E-07	9.06E-09	No Data	2.47E-08	3.70E-05	1.93E-05
Eu-152	7.83E-04	1.77E-04	1.72E-04	No Data	5.94E-04	1.48E-03	9.88E-06
Eu-154	2.96E-03	3.46E-04	2.45E-04	No Data	1.14E-03	3.05E-03	2.84E-05
Eu-155	5.97E-04	5.72E-05	3.46E-05	No Data	1.58E-04	5.20E-04	5.19E-05
Eu-156	1.56E-05	9.59E-06	1.54E-06	No Data	4.48E-06	6.12E-04	4.14E-05
Tb-160	1.12E-04	No Data	1.40E-05	No Data	3.20E-05	1.11E-03	2.14E-05
Ho-166m	1.45E-03	3.07E-04	2.51E-04	No Data	4.22E-04	2.05E-03	1.65E-05
W-181	4.86E-08	1.46E-08	1.67E-09	No Data	No Data	1.33E-05	2.63E-07
W-185	1.57E-06	4.83E-07	5.58E-08	No Data	No Data	4.48E-04	1.12E-05
W-187	9.26E-09	6.44E-09	2.23E-09	No Data	No Data	2.83E-05	2.54E-05
Pb-210	8.62E-02	2.02E-02	3.43E-03	No Data	6.85E-02	1.76E-01	1.57E-06
Bi-210	2.06E-06	1.33E-05	1.18E-06	No Data	1.03E-04	9.96E-03	3.27E-05
Po-210	2.98E-03	5.63E-03	7.12E-04	No Data	1.30E-02	2.40E-01	4.36E-05
Ra-223	1.56E-03	2.26E-06	3.12E-04	No Data	4.16E-05	2.25E-01	3.04E-04
Ra-224	1.77E-04	4.00E-07	3.54E-05	No Data	7.30E-06	7.91E-02	3.42E-04
Ra-225	2.57E-03	2.88E-06	5.13E-04	No Data	5.31E-05	2.57E-01	2.87E-04
Ra-226	2.48E-01	1.46E-05	2.05E-01	No Data	2.94E-04	7.83E-01	3.05E-04
Ra-228	1.60E-01	7.61E-06	1.80E-01	No Data	1.53E-04	1.09E+00	5.19E-05

[1] Data presented in this Table are from Reference 9.

TABLE A-14 (continued)

INHALATION DOSE FACTORS FOR INFANT[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Ac-225	3.69E-03	4.72E-03	2.48E-04	No Data	3.49E-04	1.96E-01	2.71E-04
Ac-227	5.29E+00	8.76E-01	3.28E-01	No Data	1.86E-01	1.62E+00	5.27E-05
Th-227	1.82E-03	3.03E-05	5.24E-05	No Data	1.13E-04	3.27E-01	3.53E-04
Th-228	8.46E-01	1.10E-02	2.86E-02	No Data	5.61E-02	4.65E+00	3.62E-04
Th-229	2.28E+01	5.94E-01	3.81E-01	No Data	9.32E-01	1.27E+01	5.02E-05
Th-230	3.46E+00	1.79E-01	9.65E-02	No Data	8.82E-01	2.18E+00	3.87E-05
Th-232	3.86E+00	1.53E-01	2.29E-03	No Data	7.54E-01	2.09E+00	3.29E-05
Th-234	1.33E-05	7.17E-07	3.84E-07	No Data	2.70E-06	1.62E-03	7.40E-05
Pa-231	9.10E+00	3.00E-01	3.62E-01	No Data	1.62E+00	3.85E-01	4.61E-05
Pa-233	6.84E-06	1.32E-06	1.19E-06	No Data	3.68E-06	2.19E-04	9.04E-06
U-232	2.57E-01	No Data	2.13E-02	No Data	2.40E-02	1.49E+00	4.36E-05
U-233	5.44E-02	No Data	3.83E-03	No Data	1.09E-02	3.56E-01	4.03E-05
U-234	5.22E-02	No Data	3.75E-03	No Data	1.07E-02	3.49E-01	3.95E-05
U-235	5.01E-02	No Data	3.52E-03	No Data	1.01E-02	3.28E-01	5.02E-05
U-236	5.01E-02	No Data	3.60E-03	No Data	1.03E-02	3.35E-01	3.71E-05
U-237	3.25E-07	No Data	8.65E-08	No Data	8.08E-07	9.13E-05	1.31E-05
U-238	4.79E-02	No Data	3.29E-03	No Data	9.40E-03	3.06E-01	3.54E-05
Np-237	2.88E+00	1.71E+00	1.26E-01	No Data	7.69E-01	3.49E-01	5.10E-05
Np-238	2.67E-06	6.05E-07	4.16E-08	No Data	1.47E-07	9.19E-05	2.58E-05
Np-239	2.65E-07	2.13E-07	1.34E-08	No Data	4.73E-08	4.25E-05	1.78E-05
Pu-238	2.69E+00	1.68E+00	1.27E-01	No Data	4.64E-01	9.03E-01	4.69E-05
Pu-239	2.93E+00	1.76E+00	1.34E-01	No Data	4.95E-01	8.47E-01	4.28E-05
Pu-240	2.93E+00	1.75E+00	1.34E-01	No Data	4.94E-01	8.47E-01	4.36E-05
Pu-241	8.43E-02	1.85E-02	3.11E-03	No Data	1.15E-02	7.62E-04	8.97E-07
Pu-242	2.72E+00	1.69E+00	1.29E-01	No Data	4.77E-01	8.15E-01	4.20E-05
Pu-244	3.17E+00	1.94E+00	1.48E-01	No Data	5.46E-01	9.33E-01	6.26E-05
Am-241	3.15E+00	1.95E+00	1.31E-01	No Data	7.94E-01	4.06E-01	4.78E-05
Am-242m	3.25E+00	1.86E+00	1.35E-01	No Data	8.03E-01	1.64E-01	6.01E-05
Am-243	3.10E+00	1.88E+00	1.27E-01	No Data	7.72E-01	3.85E-01	5.60E-05
Cm-242	1.28E-01	8.65E-02	5.70E-03	No Data	1.69E-02	2.97E-01	5.10E-05
Cm-243	2.47E+00	1.52E+00	1.06E-01	No Data	3.91E-01	4.24E-01	5.02E-05
Cm-244	2.07E+00	1.27E+00	8.89E-02	No Data	3.21E-01	4.08E-01	4.86E-05
Cm-245	3.22E+00	1.96E+00	1.36E-01	No Data	5.23E-01	3.92E-01	4.53E-05
Cm-246	3.20E+00	1.96E+00	1.36E-01	No Data	5.23E-01	3.99E-01	4.45E-05
Cm-247	3.11E+00	1.93E+00	1.33E-01	No Data	5.15E-01	3.92E-01	5.85E-05
Cm-248	2.58E+01	1.59E+01	1.10E+00	No Data	4.24E+00	3.23E+00	9.43E-04
Cf-252	2.37E+00	No Data	1.01E-01	No Data	No Data	1.37E+00	1.85E-04

[1] Data presented in this Table are from Reference 9.

TABLE A-15

INGESTION DOSE FACTORS FOR ADULT[1]

mrem/pCi Ingested

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
H-3	No Data	5.99E-08	5.99E-08	5.99E-08	5.99E-08	5.99E-08	5.99E-08
Be-10	3.18E-06	4.91E-07	7.94E-08	No Data	3.71E-07	No Data	2.68E-05
C-14	2.84E-06	5.68E-07	5.68E-07	5.68E-07	5.68E-07	5.68E-07	5.68E-07
N-13	8.36E-09	8.36E-09	8.36E-09	8.36E-09	8.36E-09	8.36E-09	8.36E-09
F-18	6.24E-07	No Data	6.92E-08	No Data	No Data	No Data	1.85E-08
Na-22	1.74E-05	1.74E-05	1.74E-05	1.74E-05	1.74E-05	1.74E-05	1.74E-05
Na-24	1.70E-06	1.70E-06	1.70E-06	1.70E-06	1.70E-06	1.70E-06	1.70E-06
P-32	1.93E-04	1.20E-05	7.46E-06	No Data	No Data	No Data	2.17E-05
Ca-41	1.85E-04	No Data	2.00E-05	No Data	No Data	No Data	1.84E-07
Sc-46	5.51E-09	1.07E-08	3.11E-09	No Data	9.99E-09	No Data	5.21E-05
Cr-51	No Data	No Data	2.66E-09	1.59E-09	5.86E-10	3.53E-09	6.69E-07
Mn-54	No Data	4.57E-06	8.72E-07	No Data	1.36E-06	No Data	1.40E-05
Mn-56	No Data	1.15E-07	2.04E-08	No Data	1.46E-07	No Data	3.67E-06
Fe-55	2.75E-06	1.90E-06	4.43E-07	No Data	No Data	1.06E-06	1.09E-06
Fe-59	4.34E-06	1.02E-05	3.91E-06	No Data	No Data	2.85E-06	3.40E-05
Co-57	No Data	1.75E-07	2.91E-07	No Data	No Data	No Data	4.44E-06
Co-58	No Data	7.45E-07	1.67E-06	No Data	No Data	No Data	1.51E-05
Co-60	No Data	2.14E-06	4.72E-06	No Data	No Data	No Data	4.02E-05
Ni-59	9.76E-06	3.35E-06	1.63E-06	No Data	No Data	No Data	6.90E-07
Ni-63	1.30E-04	9.01E-06	4.36E-06	No Data	No Data	No Data	1.88E-06
Ni-65	5.28E-07	6.86E-08	3.13E-08	No Data	No Data	No Data	1.74E-06
Cu-64	No Data	8.33E-08	3.91E-08	No Data	2.10E-07	No Data	7.10E-06
Zn-65	4.84E-06	1.54E-05	6.96E-06	No Data	1.03E-05	No Data	9.70E-06
Zn-69m	1.70E-07	4.08E-07	3.73E-08	No Data	2.47E-07	No Data	2.49E-05
Zn-69	1.03E-08	1.97E-08	1.37E-09	No Data	1.28E-08	No Data	2.96E-09
Se-73	No Data	2.63E-06	4.39E-07	No Data	4.55E-06	No Data	5.38E-07
Br-82	No Data	No Data	2.26E-06	No Data	No Data	No Data	2.59E-06
Br-83	No Data	No Data	4.02E-08	No Data	No Data	No Data	5.79E-08
Br-84	No Data	No Data	5.21E-08	No Data	No Data	No Data	4.09E-13
Br-85	No Data	No Data	2.14E-09	No Data	No Data	No Data	No Data
Rb-86	No Data	2.11E-05	9.83E-06	No Data	No Data	No Data	4.16E-06
Rb-87	No Data	1.23E-05	4.28E-06	No Data	No Data	No Data	5.76E-07
Rb-88	No Data	6.05E-08	3.21E-08	No Data	No Data	No Data	8.36E-19
Rb-89	No Data	4.01E-08	2.82E-08	No Data	No Data	No Data	2.33E-21
Sr-89	3.08E-04	No Data	8.84E-06	No Data	No Data	No Data	4.94E-05
Sr-90	8.71E-03	No Data	1.75E-04	No Data	No Data	No Data	2.19E-04
Sr-91	5.67E-06	No Data	2.29E-07	No Data	No Data	No Data	2.70E-05
Sr-92	2.15E-06	No Data	9.30E-08	No Data	No Data	No Data	4.26E-05
Y-90	9.62E-09	No Data	2.58E-10	No Data	No Data	No Data	1.02E-04
Y-91m	9.09E-11	No Data	3.52E-12	No Data	No Data	No Data	2.67E-10
Y-91	1.41E-07	No Data	3.77E-09	No Data	No Data	No Data	7.76E-05
Y-92	8.45E-10	No Data	2.47E-11	No Data	No Data	No Data	1.48E-05
Y-93	2.68E-09	No Data	7.40E-11	No Data	No Data	No Data	8.50E-05

[1] Data presented in this Table are from Reference 9.

TABLE A-15 (continued)

INGESTION DOSE FACTORS FOR ADULT[1]

mrem/pCi Ingested

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Zr-93	4.18E-08	2.34E-09	1.09E-09	No Data	8.87E-09	No Data	2.43E-06
Zr-95	3.04E-08	9.75E-09	6.60E-09	No Data	1.53E-08	No Data	3.09E-05
Zr-97	1.68E-09	3.39E-10	1.55E-10	No Data	5.12E-10	No Data	1.05E-04
Nb-93m	2.55E-08	8.32E-09	2.05E-09	No Data	9.57E-09	No Data	3.84E-06
Nb-95	6.22E-09	3.46E-09	1.86E-09	No Data	3.42E-09	No Data	2.10E-05
Nb-97	5.22E-11	1.32E-11	4.82E-12	No Data	1.54E-11	No Data	4.87E-08
Mo-93	No Data	7.51E-06	2.03E-07	No Data	2.13E-06	No Data	1.22E-06
Mo-99	No Data	4.31E-06	8.20E-07	No Data	9.76E-06	No Data	9.99E-06
Tc-99m	2.47E-10	6.98E-10	8.89E-09	No Data	1.06E-08	3.42E-10	4.13E-07
Tc-99	1.25E-07	1.86E-07	5.02E-08	No Data	2.34E-06	1.58E-08	6.08E-06
Tc-101	2.54E-10	3.66E-10	3.59E-09	No Data	6.59E-09	1.87E-10	1.10E-21
Ru-103	1.85E-07	No Data	7.97E-08	No Data	7.06E-07	No Data	2.16E-05
Ru-105	1.54E-08	No Data	6.08E-09	No Data	1.99E-07	No Data	9.42E-06
Ru-106	2.75E-06	No Data	3.48E-07	No Data	5.31E-06	No Data	1.78E-04
Rh-105	1.21E-07	8.85E-08	5.83E-08	No Data	3.76E-07	No Data	1.41E-05
Pd-107	No Data	1.47E-07	9.40E-09	No Data	1.32E-06	No Data	9.11E-07
Pd-109	No Data	1.77E-07	3.99E-08	No Data	1.01E-06	No Data	1.96E-05
Ag-110m	1.60E-07	1.48E-07	8.79E-08	No Data	2.91E-07	No Data	6.04E-05
Ag-111	5.81E-08	2.43E-08	1.21E-08	No Data	7.84E-08	No Data	4.46E-05
Cd-113m	No Data	3.18E-06	1.02E-07	No Data	3.50E-06	No Data	2.56E-05
Cd-115m	No Data	1.84E-06	5.87E-08	No Data	1.46E-06	No Data	7.74E-05
Sn-123	3.11E-05	5.15E-07	7.59E-07	4.38E-07	No Data	No Data	6.33E-05
Sn-125	8.33E-06	1.68E-07	3.78E-07	1.39E-07	No Data	No Data	1.04E-04
Sn-126	8.45E-05	1.67E-06	2.40E-06	4.92E-07	No Data	No Data	2.43E-05
Sb-124	2.80E-06	5.29E-08	1.11E-06	6.79E-09	No Data	2.18E-06	7.95E-05
Sb-125	1.79E-06	2.00E-08	4.26E-07	1.82E-09	No Data	1.38E-06	1.97E-05
Sb-126	1.15E-06	2.34E-08	4.15E-07	7.04E-09	No Data	7.05E-07	9.40E-05
Sb-127	2.58E-07	5.65E-09	9.90E-08	3.10E-09	No Data	1.53E-07	5.90E-05
Te-125m	2.68E-06	9.71E-07	3.59E-07	8.06E-07	1.09E-05	No Data	1.07E-05
Te-127m	6.77E-06	2.42E-06	8.25E-07	1.73E-06	2.75E-05	No Data	2.27E-05
Te-127	1.10E-07	3.95E-08	2.38E-08	8.15E-08	4.48E-07	No Data	8.68E-06
Te-129m	1.15E-05	4.29E-06	1.82E-06	3.95E-06	4.80E-05	No Data	5.79E-05
Te-129	3.14E-08	1.18E-08	7.65E-09	2.41E-08	1.32E-07	No Data	2.37E-08
Te-131m	1.73E-06	8.46E-07	7.05E-07	1.34E-06	8.57E-06	No Data	8.40E-05
Te-131	1.97E-08	8.23E-09	6.22E-09	1.62E-08	8.63E-08	No Data	2.79E-09
Te-132	2.52E-06	1.63E-06	1.53E-06	1.80E-06	1.57E-05	No Data	7.71E-05
Te-133m	4.62E-08	2.70E-08	2.60E-08	3.91E-08	2.67E-07	No Data	9.26E-09
Te-134	3.24E-08	2.12E-08	1.30E-08	2.83E-08	2.05E-07	No Data	3.59E-11
I-129	3.27E-06	2.81E-06	9.21E-06	7.23E-03	6.04E-06	No Data	4.44E-07
I-130	7.56E-07	2.23E-06	8.80E-07	1.89E-04	3.48E-06	No Data	1.92E-06
I-131	4.16E-06	5.95E-06	3.41E-06	1.95E-03	1.02E-05	No Data	1.57E-06
I-132	2.03E-07	5.43E-07	1.90E-07	1.90E-05	8.65E-07	No Data	1.02E-07
I-133	1.42E-06	2.47E-06	7.53E-07	3.63E-04	4.31E-06	No Data	2.22E-06
I-134	1.06E-07	2.88E-07	1.03E-07	4.99E-06	4.58E-07	No Data	2.51E-10
I-135	4.43E-07	1.16E-06	4.28E-07	7.65E-05	1.86E-06	No Data	1.31E-06

[1] Data presented in this Table are from Reference 9.

TABLE A-15 (continued)

INGESTION DOSE FACTORS FOR ADULT[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Cs-134m	2.13E-08	4.48E-08	2.29E-08	No Data	2.43E-08	3.83E-09	1.58E-08
Cs-134	6.22E-05	1.48E-04	1.21E-04	No Data	4.79E-05	1.59E-05	2.59E-06
Cs-135	1.95E-05	1.80E-05	7.99E-06	No Data	6.81E-06	2.04E-06	4.21E-07
Cs-136	6.51E-06	2.57E-05	1.85E-05	No Data	1.43E-05	1.96E-06	2.92E-06
Cs-137	7.97E-05	1.09E-04	7.14E-05	No Data	3.70E-05	1.23E-05	2.11E-06
Cs-138	5.52E-08	1.09E-07	5.40E-08	No Data	8.01E-08	7.91E-09	4.65E-13
Cs-139	3.41E-08	5.08E-08	1.85E-08	No Data	4.07E-08	3.70E-09	1.10e-30
Ba-139	9.70E-08	6.91E-11	2.84E-09	No Data	6.46E-11	3.92E-11	1.72E-07
Ba-140	2.03E-05	2.55E-08	1.33E-06	No Data	8.67E-09	1.46E-08	4.18E-05
Ba-141	4.71E-08	3.56E-11	1.59E-09	No Data	3.31E-11	2.02E-11	2.22E-17
Ba-142	2.13E-08	2.19E-11	1.34E-09	No Data	1.85E-11	1.24E-11	3.00e-26
La-140	2.50E-09	1.26E-09	3.33E-10	No Data	No Data	No Data	9.25E-05
La-141	3.19E-10	9.90E-11	1.62E-11	No Data	No Data	No Data	1.18E-05
La-142	1.28E-10	5.82E-11	1.45E-11	No Data	No Data	No Data	4.25E-07
Ce-141	9.36E-09	6.33E-09	7.18E-10	No Data	2.94E-09	No Data	2.42E-05
Ce-143	1.65E-09	1.22E-06	1.35E-10	No Data	5.37E-10	No Data	4.56E-05
Ce-144	4.88E-07	2.04E-07	2.62E-08	No Data	1.21E-07	No Data	1.65E-04
Pr-143	9.20E-09	3.69E-09	4.56E-10	No Data	2.13E-09	No Data	4.03E-05
Pr-144	3.01E-11	1.25E-11	1.53E-12	No Data	7.05E-12	No Data	4.33E-18
Nd-147	6.29E-09	7.27E-09	4.35E-10	No Data	4.25E-09	No Data	3.49E-05
Pm-147	7.54E-08	7.09E-09	2.87E-09	No Data	1.34E-08	No Data	8.93E-06
Pm-148m	3.07E-08	7.95E-09	6.08E-09	No Data	1.20E-08	No Data	6.74E-05
Pm-148	7.17E-09	1.19E-09	5.99E-10	No Data	2.25E-09	No Data	9.35E-05
Pm-149	1.52E-09	2.15E-10	8.78E-11	No Data	4.06E-10	No Data	4.03E-05
Pm-151	6.97E-10	1.17E-10	5.91E-11	No Data	2.09E-10	No Data	3.22E-05
Sm-151	6.90E-08	1.19E-08	2.85E-09	No Data	1.33E-08	No Data	5.25E-06
Sm-153	8.57E-10	7.15E-10	5.22E-11	No Data	2.31E-10	No Data	2.55E-05
Eu-152	1.95E-07	4.44E-08	3.90E-08	No Data	2.75E-07	No Data	2.56E-05
Eu-154	6.15E-07	7.56E-08	5.38E-08	No Data	3.62E-07	No Data	5.48E-05
Eu-155	8.60E-08	1.22E-08	7.87E-09	No Data	5.63E-08	No Data	9.60E-06
Eu-156	1.37E-08	1.06E-08	1.71E-09	No Data	7.08E-09	No Data	7.26E-05
Tb-160	4.70E-08	No Data	5.86E-09	No Data	1.94E-08	No Data	4.33E-05
Ho-166m	2.70E-07	8.43E-08	6.40E-08	No Data	1.26E-07	No Data	2.56E-05
W-181	9.91E-09	3.23E-09	3.46E-10	No Data	No Data	No Data	3.68E-07
W-185	4.05E-07	1.35E-07	1.42E-08	No Data	No Data	No Data	1.56E-05
W-187	1.03E-07	8.61E-08	3.01E-08	No Data	No Data	No Data	2.82E-05
Pb-210	1.53E-02	4.37E-03	5.44E-04	No Data	1.23E-02	No Data	2.24E-06
Bi-210	4.61E-07	3.18E-06	2.64E-07	No Data	3.83E-05	No Data	4.75E-05
Po-210	3.56E-04	7.56E-04	8.59E-05	No Data	2.52E-03	No Data	6.36E-05
Ra-223	4.97E-03	7.65E-06	9.94E-04	No Data	2.17E-04	No Data	3.21E-04
Ra-224	1.61E-03	3.90E-06	3.23E-04	No Data	1.10E-04	No Data	3.40E-04
Ra-225	6.56E-03	7.78E-06	1.31E-03	No Data	2.21E-04	No Data	3.06E-04
Ra-226	3.02E-01	5.74E-06	2.20E-01	No Data	1.63E-04	No Data	3.32E-04
Ra-228	1.12E-01	3.12E-06	1.21E-01	No Data	8.83E-05	No Data	5.64E-05

[1] Data presented in this Table are from Reference 9.

TABLE A-15 (continued)

INGESTION DOSE FACTORS FOR ADULT[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Ac-225	4.40E-06	6.06E-06	2.96E-07	No Data	6.90E-07	No Data	4.07E-04
Ac-227	1.87E-03	2.48E-04	1.11E-04	No Data	8.00E-05	No Data	8.19E-05
Th-227	1.37E-05	2.48E-07	3.95E-07	No Data	1.41E-06	No Data	5.40E-04
Th-228	4.96E-04	8.40E-06	1.68E-05	No Data	4.67E-05	No Data	5.63E-04
Th-229	1.36E-02	3.89E-04	2.25E-04	No Data	1.88E-03	No Data	7.81E-05
Th-230	2.06E-03	1.17E-04	5.70E-05	No Data	5.65E-04	No Data	6.02E-05
Th-232	2.30E-03	1.00E-04	1.50E-06	No Data	4.82E-04	No Data	5.12E-05
Th-234	8.01E-08	4.71E-09	2.31E-09	No Data	2.67E-08	No Data	1.13E-04
Pa-231	4.10E-03	1.54E-04	1.59E-04	No Data	8.64E-04	No Data	7.17E-05
Pa-233	5.26E-09	1.06E-09	9.12E-10	No Data	3.99E-09	No Data	1.64E-05
U-232	4.13E-03	No Data	2.95E-04	No Data	4.47E-04	No Data	6.78E-05
U-233	8.71E-04	No Data	5.28E-05	No Data	2.03E-04	No Data	6.27E-05
U-234	8.36E-04	No Data	5.17E-05	No Data	1.99E-04	No Data	6.14E-05
U-235	8.01E-04	No Data	4.86E-05	No Data	1.87E-04	No Data	7.81E-05
U-236	8.01E-04	No Data	4.96E-05	No Data	1.91E-04	No Data	5.76E-05
U-237	5.52E-08	No Data	1.47E-08	No Data	2.27E-07	No Data	1.94E-05
U-238	7.67E-04	No Data	4.54E-05	No Data	1.75E-04	No Data	5.50E-05
Np-237	1.26E-03	8.96E-05	5.54E-05	No Data	4.12E-04	No Data	7.94E-05
Np-238	1.37E-08	3.69E-10	2.13E-10	No Data	1.25E-09	No Data	3.43E-05
Np-239	1.19E-09	1.17E-10	6.45E-11	No Data	3.65E-10	No Data	2.40E-05
Pu-238	6.30E-04	7.98E-05	1.71E-05	No Data	7.32E-05	No Data	7.30E-05
Pu-239	7.25E-04	8.71E-05	1.91E-05	No Data	8.11E-05	No Data	6.66E-05
Pu-240	7.24E-04	8.70E-05	1.91E-05	No Data	8.10E-05	No Data	6.78E-05
Pu-241	1.57E-05	7.45E-07	3.32E-07	No Data	1.53E-06	No Data	1.40E-06
Pu-242	6.72E-04	8.39E-05	1.84E-05	No Data	7.81E-05	No Data	6.53E-05
Pu-244	7.84E-04	9.61E-05	2.11E-05	No Data	8.95E-05	No Data	9.73E-05
Am-241	7.55E-04	7.05E-04	5.41E-05	No Data	4.07E-04	No Data	7.42E-05
Am-242m	7.61E-04	6.63E-04	5.43E-05	No Data	4.05E-04	No Data	9.34E-05
Am-243	7.54E-04	6.90E-04	5.30E-05	No Data	3.99E-04	No Data	8.70E-05
Cm-242	2.06E-05	2.19E-05	1.37E-06	No Data	6.22E-06	No Data	7.92E-05
Cm-243	5.99E-04	5.49E-04	3.75E-05	No Data	1.75E-04	No Data	7.81E-05
Cm-244	4.56E-04	4.27E-04	2.87E-05	No Data	1.34E-04	No Data	7.55E-05
Cm-245	9.38E-04	8.17E-04	5.76E-05	No Data	2.69E-04	No Data	7.04E-05
Cm-246	9.30E-04	8.16E-04	5.75E-05	No Data	2.68E-04	No Data	6.91E-05
Cm-247	9.07E-04	8.04E-04	5.67E-05	No Data	2.64E-04	No Data	9.09E-05
Cm-248	7.54E-03	6.63E-03	4.67E-04	No Data	2.18E-03	No Data	1.47E-03
Cf-252	2.61E-04	No Data	6.29E-06	No Data	No Data	No Data	2.88E-04

[1] Data presented in this Table are from Reference 9.

TABLE A-16

INGESTION DOSE FACTORS FOR TEEN[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
H-3	No Data	6.04E-08	6.04E-08	6.04E-08	6.04E-08	6.04E-08	6.04E-08
Be-10	4.48E-06	6.94E-07	1.13E-07	No Data	5.30E-07	No Data	2.84E-05
C-14	4.06E-06	8.12E-07	8.12E-07	8.12E-07	8.12E-07	8.12E-07	8.12E-07
N-13	1.15E-08	1.15E-08	1.15E-08	1.15E-08	1.15E-08	1.15E-08	1.15E-08
F-18	8.64E-07	No Data	9.47E-08	No Data	No Data	No Data	7.78E-08
Na-22	2.34E-05	2.34E-05	2.34E-05	2.34E-05	2.34E-05	2.34E-05	2.34E-05
Na-24	2.30E-06	2.30E-06	2.30E-06	2.30E-06	2.30E-06	2.30E-06	2.30E-06
P-32	2.76E-04	1.71E-05	1.07E-05	No Data	No Data	No Data	2.32E-05
Ca-41	1.97E-04	No Data	2.13E-05	No Data	No Data	No Data	1.95E-07
Sc-46	7.24E-09	1.41E-08	4.18E-09	No Data	1.35E-08	No Data	4.80E-05
Cr-51	No Data	No Data	3.60E-09	2.00E-09	7.89E-10	5.14E-09	6.05E-07
Mn-54	No Data	5.90E-06	1.17E-06	No Data	1.76E-06	No Data	1.21E-05
Mn-56	No Data	1.58E-07	2.81E-08	No Data	2.00E-07	No Data	1.04E-05
Fe-55	3.78E-06	2.68E-06	6.25E-07	No Data	No Data	1.70E-06	1.16E-06
Fe-59	5.87E-06	1.37E-05	5.29E-06	No Data	No Data	4.32E-06	3.24E-05
Co-57	No Data	2.38E-07	3.99E-07	No Data	No Data	No Data	4.44E-06
Co-58	No Data	9.72E-07	2.24E-06	No Data	No Data	No Data	1.34E-05
Co-60	No Data	2.81E-06	6.33E-06	No Data	No Data	No Data	3.66E-05
Ni-59	1.32E-05	4.66E-06	2.24E-06	No Data	No Data	No Data	7.31E-07
Ni-63	1.77E-04	1.25E-05	6.00E-06	No Data	No Data	No Data	1.99E-06
Ni-65	7.49E-07	9.57E-08	4.36E-08	No Data	No Data	No Data	5.19E-06
Cu-64	No Data	1.15E-07	5.41E-08	No Data	2.91E-07	No Data	8.92E-06
Zn-65	5.76E-06	2.00E-05	9.33E-06	No Data	1.28E-05	No Data	8.47E-06
Zn-69m	2.40E-07	5.66E-07	5.19E-08	No Data	3.44E-07	No Data	3.11E-05
Zn-69	1.47E-08	2.80E-08	1.96E-09	No Data	1.83E-08	No Data	5.16E-08
Se-79	No Data	3.73E-06	6.27E-07	No Data	6.50E-06	No Data	5.70E-07
Br-82	No Data	No Data	3.04E-06	No Data	No Data	No Data	No Data
Br-83	No Data	No Data	5.74E-08	No Data	No Data	No Data	No Data
Br-84	No Data	No Data	7.22E-08	No Data	No Data	No Data	No Data
Br-85	No Data	No Data	3.05E-09	No Data	No Data	No Data	No Data
Rb-86	No Data	2.98E-05	1.40E-05	No Data	No Data	No Data	4.41E-06
Rb-87	No Data	1.75E-05	6.11E-06	No Data	No Data	No Data	6.11E-07
Rb-88	No Data	8.52E-08	4.54E-08	No Data	No Data	No Data	7.30E-15
Rb-89	No Data	5.50E-08	3.89E-08	No Data	No Data	No Data	8.43E-17
Sr-89	4.40E-04	No Data	1.26E-05	No Data	No Data	No Data	5.24E-05
Sr-90	1.02E-02	No Data	2.04E-04	No Data	No Data	No Data	2.33E-04
Sr-91	8.07E-06	No Data	3.21E-07	No Data	No Data	No Data	3.66E-05
Sr-92	3.05E-06	No Data	1.30E-07	No Data	No Data	No Data	7.77E-05
Y-90	1.37E-08	No Data	3.69E-10	No Data	No Data	No Data	1.13E-04
Y-91m	1.29E-10	No Data	4.93E-12	No Data	No Data	No Data	6.09E-09
Y-91	2.01E-07	No Data	5.39E-09	No Data	No Data	No Data	8.24E-05
Y-92	1.21E-09	No Data	3.50E-11	No Data	No Data	No Data	3.32E-05
Y-93	3.83E-09	No Data	1.05E-10	No Data	No Data	No Data	1.17E-04

[1] Data presented in this Table are from Reference 9.

TABLE A-16 (continued)

INGESTION DOSE FACTORS FOR TEEN[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Zr-93	5.53E-08	2.73E-09	1.49E-09	No Data	9.65E-09	No Data	2.58E-06
Zr-95	4.12E-08	1.30E-08	8.94E-09	No Data	1.91E-08	No Data	3.00E-05
Zr-97	2.37E-09	4.69E-10	2.16E-10	No Data	7.11E-10	No Data	1.27E-04
Nb-93m	3.44E-08	1.13E-08	2.83E-09	No Data	1.32E-08	No Data	4.07E-06
Nb-95	8.22E-09	4.56E-09	2.51E-09	No Data	4.42E-09	No Data	1.95E-05
Nb-97	7.37E-11	1.83E-11	6.68E-12	No Data	2.14E-11	No Data	4.37E-07
Mo-93	No Data	1.06E-05	2.90E-07	No Data	3.04E-06	No Data	1.29E-06
Mo-99	No Data	6.03E-06	1.15E-06	No Data	1.38E-05	No Data	1.08E-05
Tc-99m	3.32E-10	9.26E-10	1.20E-08	No Data	1.38E-08	5.14E-10	6.08E-07
Tc-99	1.79E-07	2.63E-07	7.17E-08	No Data	3.34E-06	2.72E-08	6.44E-06
Tc-101	3.60E-10	5.12E-10	5.03E-09	No Data	9.26E-09	3.12E-10	8.75E-17
Ru-103	2.55E-07	No Data	1.09E-07	No Data	8.99E-07	No Data	2.13E-05
Ru-105	2.18E-08	No Data	8.46E-09	No Data	2.75E-07	No Data	1.76E-05
Ru-106	3.92E-06	No Data	4.94E-07	No Data	7.56E-06	No Data	1.88E-04
Rh-105	1.73E-07	1.25E-07	8.20E-08	No Data	5.31E-07	No Data	1.59E-05
Pd-107	No Data	2.08E-07	1.34E-08	No Data	1.88E-06	No Data	9.66E-07
Pd-109	No Data	2.51E-07	5.70E-08	No Data	1.45E-06	No Data	2.53E-05
Ag-110m	2.05E-07	1.94E-07	1.18E-07	No Data	3.70E-07	No Data	5.45E-05
Ag-111	8.29E-08	3.44E-08	1.73E-08	No Data	1.12E-07	No Data	4.80E-05
Cd-113m	No Data	4.51E-06	1.45E-07	No Data	4.99E-06	No Data	2.71E-05
Cd-115m	No Data	2.60E-06	8.39E-08	No Data	2.08E-06	No Data	8.23E-05
Sn-123	4.44E-05	7.29E-07	1.08E-06	5.84E-07	No Data	No Data	6.71E-05
Sn-125	1.19E-05	2.37E-07	5.37E-07	1.86E-07	No Data	No Data	1.12E-04
Sn-126	1.16E-04	2.16E-06	3.30E-06	5.69E-07	No Data	No Data	2.58E-05
Sb-124	3.87E-06	7.13E-08	1.51E-06	8.78E-09	No Data	3.38E-06	7.80E-05
Sb-125	2.48E-06	2.71E-08	5.80E-07	2.37E-09	No Data	2.18E-06	1.93E-05
Sb-126	1.59E-06	3.25E-08	5.71E-07	8.99E-09	No Data	1.14E-06	9.41E-05
Sb-127	3.63E-07	7.76E-09	1.37E-07	4.08E-09	No Data	2.47E-07	6.16E-05
Te-125m	3.83E-06	1.38E-06	5.12E-07	1.07E-06	No Data	No Data	1.13E-05
Te-127m	9.67E-06	3.43E-06	1.15E-06	2.30E-06	3.92E-05	No Data	2.41E-05
Te-127	1.58E-07	5.60E-08	3.40E-08	1.09E-07	6.40E-07	No Data	1.22E-05
Te-129m	1.63E-05	6.05E-06	2.58E-06	5.26E-06	6.82E-05	No Data	6.12E-05
Te-129	4.48E-08	1.67E-08	1.09E-08	3.20E-08	1.88E-07	No Data	2.45E-07
Te-131m	2.44E-06	1.17E-06	9.76E-07	1.76E-06	1.22E-05	No Data	9.39E-05
Te-131	2.79E-08	1.15E-08	8.72E-09	2.15E-08	1.22E-07	No Data	2.29E-09
Te-132	3.49E-06	2.21E-06	2.08E-06	2.33E-06	2.12E-05	No Data	7.00E-05
Te-133m	6.44E-08	3.66E-08	3.56E-08	5.11E-08	3.62E-07	No Data	1.48E-07
Te-134	4.47E-08	2.87E-08	3.00E-08	3.67E-08	2.74E-07	No Data	1.66E-09
I-129	4.66E-06	3.92E-06	6.54E-06	4.77E-03	7.01E-06	No Data	4.57E-07
I-130	1.03E-06	2.98E-06	1.19E-06	2.43E-04	4.59E-06	No Data	2.29E-06
I-131	5.85E-06	8.19E-06	4.40E-06	2.39E-03	1.41E-05	No Data	1.62E-06
I-132	2.79E-07	7.30E-07	2.62E-07	2.46E-05	1.15E-06	No Data	3.18E-07
I-133	2.01E-06	3.41E-06	1.04E-06	4.76E-04	5.98E-06	No Data	2.58E-06
I-134	1.46E-07	3.87E-07	1.39E-07	6.45E-06	6.10E-07	No Data	5.10E-09
I-135	6.10E-07	1.57E-06	5.82E-07	1.01E-04	2.48E-06	No Data	1.74E-06

[1] Data presented in this Table are from Reference 9.

TABLE A-16 (continued)

INGESTION DOSE FACTORS FOR TEEN[1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Cs-134m	2.94E-08	6.09E-08	3.13E-08	No Data	3.39E-08	5.95E-09	4.05E-08
Cs-134	8.37E-05	1.97E-04	9.14E-05	No Data	6.26E-05	2.39E-05	2.45E-06
Cs-135	2.78E-05	2.55E-05	5.96E-06	No Data	9.73E-06	3.52E-06	4.46E-07
Cs-136	8.59E-06	3.38E-05	2.27E-05	No Data	1.84E-05	2.90E-06	2.72E-06
Cs-137	1.12E-04	1.49E-04	5.19E-05	No Data	5.07E-05	1.97E-05	2.12E-06
Cs-138	7.76E-08	1.49E-07	7.45E-08	No Data	1.10E-07	1.28E-08	6.76E-11
Cs-139	4.87E-08	7.17E-08	2.63E-08	No Data	5.79E-08	6.34E-09	3.33E-23
Ba-139	1.39E-07	9.78E-11	4.05E-09	No Data	9.22E-11	6.74E-11	1.24E-06
Ba-140	2.84E-05	3.48E-08	1.83E-06	No Data	1.18E-08	2.34E-08	4.38E-05
Ba-141	6.71E-08	5.01E-11	2.24E-09	No Data	4.65E-11	3.43E-11	1.43E-13
Ba-142	2.99E-08	2.99E-11	1.84E-09	No Data	2.53E-11	1.99E-11	9.18E-20
La-140	3.48E-09	1.71E-09	4.55E-10	No Data	No Data	No Data	9.82E-05
La-141	4.55E-10	1.40E-10	2.31E-11	No Data	No Data	No Data	2.48E-05
La-142	1.79E-10	7.95E-11	1.98E-11	No Data	No Data	No Data	2.42E-06
Ce-141	1.33E-08	8.88E-09	1.02E-09	No Data	4.18E-09	No Data	2.54E-05
Ce-143	2.35E-09	1.71E-06	1.91E-10	No Data	7.67E-10	No Data	5.14E-05
Ce-144	6.96E-07	2.88E-07	3.74E-08	No Data	1.72E-07	No Data	1.75E-04
Pr-143	1.31E-08	5.23E-09	6.52E-10	No Data	3.04E-09	No Data	4.31E-05
Pr-144	4.30E-11	1.76E-11	2.18E-12	No Data	1.01E-11	No Data	4.74E-14
Nd-147	9.38E-09	1.02E-08	6.11E-10	No Data	5.99E-09	No Data	3.68E-05
Pm-147	1.05E-07	9.96E-09	4.06E-09	No Data	1.90E-08	No Data	9.47E-06
Pm-148m	4.14E-08	1.05E-08	8.21E-09	No Data	1.59E-08	No Data	6.61E-05
Pm-148	1.02E-08	1.66E-09	8.36E-10	No Data	3.00E-09	No Data	9.90E-05
Pm-149	2.17E-09	3.05E-10	1.25E-10	No Data	5.81E-10	No Data	4.49E-05
Pm-151	9.87E-10	1.63E-10	8.25E-11	No Data	2.93E-10	No Data	3.66E-05
Sm-151	8.73E-08	1.68E-08	3.94E-09	No Data	1.84E-08	No Data	5.70E-06
Sm-153	1.22E-09	1.01E-09	7.43E-11	No Data	3.30E-10	No Data	2.85E-05
Eu-152	2.45E-07	5.90E-08	5.20E-08	No Data	2.74E-07	No Data	2.17E-05
Eu-154	7.91E-07	1.02E-07	7.19E-08	No Data	4.56E-07	No Data	5.39E-05
Eu-155	1.74E-07	1.68E-08	1.04E-08	No Data	6.57E-08	No Data	9.63E-05
Eu-156	1.92E-08	1.44E-08	2.35E-09	No Data	9.69E-09	No Data	7.36E-05
Tb-160	6.47E-08	No Data	8.07E-09	No Data	2.56E-08	No Data	4.19E-05
Ho-166m	3.57E-07	1.10E-07	7.96E-08	No Data	1.61E-07	No Data	2.71E-05
W-181	1.42E-08	4.58E-09	4.79E-10	No Data	No Data	No Data	3.90E-07
W-185	5.79E-07	1.91E-07	2.02E-08	No Data	No Data	No Data	1.65E-05
W-187	1.46E-07	1.19E-07	4.17E-08	No Data	No Data	No Data	3.22E-05
Pb-210	1.81E-02	5.44E-03	7.01E-04	No Data	1.72E-02	No Data	2.37E-06
Bi-210	6.59E-07	4.51E-06	3.77E-07	No Data	5.48E-05	No Data	5.15E-05
Po-210	5.09E-04	1.07E-03	1.23E-04	No Data	3.60E-03	No Data	6.75E-05
Ra-223	7.11E-03	1.08E-05	1.42E-03	No Data	3.10E-04	No Data	3.43E-04
Ra-224	2.31E-03	5.52E-06	4.61E-04	No Data	1.58E-04	No Data	3.71E-04
Ra-225	9.37E-03	1.10E-05	1.87E-03	No Data	3.15E-04	No Data	3.27E-04
Ra-226	3.22E-01	8.13E-06	2.39E-01	No Data	2.32E-04	No Data	3.51E-04
Ra-228	1.37E-01	4.41E-06	1.51E-01	No Data	1.26E-04	No Data	5.98E-05

[1] Data presented in this Table are from Reference 9.

TABLE A-16 (continued)

INGESTION DOSE FACTORS FOR TEEN [1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Ac-225	6.29E-06	8.59E-06	4.22E-07	No Data	9.85E-07	No Data	4.36E-04
Ac-227	2.05E-03	3.03E-04	1.22E-04	No Data	8.81E-05	No Data	8.68E-05
Th-227	1.96E-05	3.52E-07	5.65E-07	No Data	2.01E-06	No Data	5.75E-04
Th-228	6.80E-04	1.14E-05	2.30E-05	No Data	6.41E-05	No Data	5.97E-04
Th-229	1.43E-02	4.11E-04	2.37E-04	No Data	1.99E-03	No Data	8.28E-05
Th-230	2.16E-03	1.23E-04	6.00E-05	No Data	5.99E-04	No Data	6.38E-05
Th-232	2.42E-03	1.05E-04	1.63E-06	No Data	5.11E-04	No Data	5.43E-05
Th-234	1.14E-07	6.68E-09	3.31E-09	No Data	3.81E-08	No Data	1.21E-04
Pa-231	4.31E-03	1.62E-04	1.68E-04	No Data	9.10E-04	No Data	7.60E-05
Pa-233	7.33E-09	1.41E-09	1.26E-09	No Data	5.32E-09	No Data	1.61E-05
U-232	5.89E-03	No Data	4.21E-04	No Data	6.38E-04	No Data	7.19E-05
U-233	1.24E-03	No Data	7.54E-05	No Data	2.90E-04	No Data	6.65E-05
U-234	1.19E-03	No Data	7.39E-05	No Data	2.85E-04	No Data	6.51E-05
U-235	1.14E-03	No Data	6.94E-05	No Data	2.67E-04	No Data	8.28E-05
U-236	1.14E-03	No Data	7.09E-05	No Data	2.73E-04	No Data	6.11E-05
U-237	7.89E-08	No Data	2.10E-08	No Data	3.24E-07	No Data	2.09E-05
U-238	1.09E-03	No Data	6.49E-05	No Data	2.50E-04	No Data	5.83E-05
Np-237	1.33E-03	9.55E-05	5.85E-05	No Data	4.33E-04	No Data	8.41E-05
Np-238	1.95E-08	5.22E-10	3.04E-10	No Data	1.79E-09	No Data	3.83E-05
Np-239	1.76E-09	1.66E-10	9.22E-11	No Data	5.21E-10	No Data	2.67E-05
Pu-238	6.70E-04	8.58E-05	1.82E-05	No Data	7.80E-05	No Data	7.73E-05
Pu-239	7.65E-04	9.29E-05	2.01E-05	No Data	8.57E-05	No Data	7.06E-05
Pu-240	7.64E-04	9.27E-05	2.01E-05	No Data	8.56E-05	No Data	7.19E-05
Pu-241	1.75E-05	8.40E-07	3.69E-07	No Data	1.71E-06	No Data	1.48E-06
Pu-242	7.09E-04	8.94E-05	1.94E-05	No Data	8.25E-05	No Data	6.92E-05
Pu-244	8.28E-04	1.02E-04	2.22E-05	No Data	9.45E-05	No Data	1.03E-04
Am-241	7.98E-04	7.53E-04	5.75E-05	No Data	4.31E-04	No Data	7.87E-05
Am-242m	8.07E-04	7.11E-04	5.80E-05	No Data	4.30E-04	No Data	9.90E-05
Am-243	7.96E-04	7.35E-04	5.62E-05	No Data	4.22E-04	No Data	9.23E-05
Cm-242	2.94E-05	3.10E-05	1.95E-06	No Data	8.89E-06	No Data	8.40E-05
Cm-243	6.50E-04	6.03E-04	4.09E-05	No Data	1.91E-04	No Data	8.28E-05
Cm-244	5.04E-04	4.77E-04	3.19E-05	No Data	1.49E-04	No Data	8.00E-05
Cm-245	9.90E-04	8.71E-04	6.10E-05	No Data	2.85E-04	No Data	7.46E-05
Cm-246	9.82E-04	8.70E-04	6.09E-05	No Data	2.84E-04	No Data	7.33E-05
Cm-247	9.57E-04	8.57E-04	6.00E-05	No Data	2.80E-04	No Data	9.63E-05
Cm-248	7.95E-03	7.06E-03	4.95E-04	No Data	2.31E-03	No Data	1.55E-03
Cf-252	3.47E-04	No Data	8.37E-06	No Data	No Data	No Data	3.05E-04

[1] Data presented in this Table are from Reference 9.

TABLE A-17

INGESTION DOSE FACTORS FOR CHILD [1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
H-3	No Data	1.16E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07
Be-10	1.35E-05	1.57E-06	3.39E-07	No Data	1.11E-06	No Data	2.75E-05
C-14	1.21E-05	2.42E-06	2.42E-06	2.42E-06	2.42E-06	2.42E-06	2.42E-06
N-13	3.10E-08	3.10E-08	3.10E-08	3.10E-08	3.10E-08	3.10E-08	3.10E-08
F-18	2.49E-06	No Data	2.47E-07	No Data	No Data	No Data	6.74E-07
Na-22	5.88E-05	5.88E-05	5.88E-05	5.88E-05	5.88E-05	5.88E-05	5.88E-05
Na-24	5.80E-06	5.80E-06	5.80E-06	5.80E-06	5.80E-06	5.80E-06	5.80E-06
P-32	8.25E-04	3.86E-05	3.18E-05	No Data	No Data	No Data	2.28E-05
Ca-41	3.47E-04	No Data	3.79E-05	No Data	No Data	No Data	1.90E-07
Sc-46	1.97E-08	2.70E-08	1.04E-08	No Data	2.39E-08	No Data	3.95E-05
Cr-51	No Data	No Data	8.90E-09	4.94E-09	1.35E-09	9.02E-09	4.72E-07
Mn-54	No Data	1.07E-05	2.85E-06	No Data	3.00E-06	No Data	8.98E-06
Mn-56	No Data	3.34E-07	7.54E-08	No Data	4.04E-07	No Data	4.84E-05
Fe-55	1.15E-05	6.10E-06	1.89E-06	No Data	No Data	3.45E-06	1.13E-06
Fe-59	1.65E-05	2.67E-05	1.33E-05	No Data	No Data	7.74E-06	2.78E-05
Co-57	No Data	4.93E-07	9.98E-07	No Data	No Data	No Data	4.04E-06
Co-58	No Data	1.80E-06	5.51E-06	No Data	No Data	No Data	1.05E-05
Co-60	No Data	5.29E-06	1.56E-05	No Data	No Data	No Data	2.93E-05
Ni-59	4.02E-05	1.07E-05	6.82E-06	No Data	No Data	No Data	7.10E-07
Ni-63	5.38E-04	2.88E-05	1.83E-05	No Data	No Data	No Data	1.94E-06
Ni-65	2.22E-06	2.09E-07	1.22E-07	No Data	No Data	No Data	2.56E-05
Cu-64	No Data	2.45E-07	1.48E-07	No Data	5.92E-07	No Data	1.15E-05
Zn-65	1.37E-05	3.65E-05	2.27E-05	No Data	2.30E-05	No Data	6.41E-06
Zn-69m	7.10E-07	1.21E-06	1.43E-07	No Data	7.03E-07	No Data	3.94E-05
Zn-69	4.38E-08	6.33E-08	5.85E-09	No Data	3.84E-08	No Data	3.99E-06
Se-79	No Data	8.43E-06	1.87E-06	No Data	1.37E-05	No Data	5.53E-07
Br-82	No Data	No Data	7.55E-06	No Data	No Data	No Data	No Data
Br-83	No Data	No Data	1.71E-07	No Data	No Data	No Data	No Data
Br-84	No Data	No Data	1.98E-07	No Data	No Data	No Data	No Data
Br-85	No Data	No Data	9.12E-09	No Data	No Data	No Data	No Data
Rb-86	No Data	6.70E-05	4.12E-05	No Data	No Data	No Data	4.31E-06
Rb-87	No Data	3.95E-05	1.83E-05	No Data	No Data	No Data	5.92E-07
Rb-88	No Data	1.90E-07	1.32E-07	No Data	No Data	No Data	9.32E-09
Rb-89	No Data	1.17E-07	1.04E-07	No Data	No Data	No Data	1.02E-09
Sr-89	1.32E-03	No Data	3.77E-05	No Data	No Data	No Data	5.11E-05
Sr-90	2.56E-02	No Data	5.15E-04	No Data	No Data	No Data	2.29E-04
Sr-91	2.40E-05	No Data	9.06E-07	No Data	No Data	No Data	5.30E-05
Sr-92	9.03E-06	No Data	3.62E-07	No Data	No Data	No Data	1.71E-04
Y-90	4.11E-08	No Data	1.10E-09	No Data	No Data	No Data	1.17E-04
Y-91m	3.82E-10	No Data	1.39E-11	No Data	No Data	No Data	7.48E-07
Y-91	6.02E-07	No Data	1.61E-08	No Data	No Data	No Data	8.02E-05
Y-92	3.60E-09	No Data	1.03E-10	No Data	No Data	No Data	1.04E-04
Y-93	1.14E-08	No Data	3.13E-10	No Data	No Data	No Data	1.70E-04

[1] Data presented in this Table are from Reference 9.

TABLE A-17 (continued)

INGESTION DOSE FACTORS FOR CHILD [1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Zr-93	1.67E-07	6.25E-09	4.45E-09	No Data	2.42E-08	No Data	2.37E-06
Zr-95	1.16E-07	2.55E-08	2.27E-08	No Data	3.65E-08	No Data	2.66E-05
Zr-97	6.99E-09	1.01E-09	5.96E-10	No Data	1.45E-09	No Data	1.53E-04
Nb-93m	1.05E-07	2.62E-08	8.61E-09	No Data	2.83E-08	No Data	3.95E-06
Nb-95	2.25E-08	8.76E-09	6.26E-09	No Data	8.23E-09	No Data	1.62E-05
Nb-97	2.17E-10	3.92E-11	1.83E-11	No Data	4.35E-11	No Data	1.21E-05
Mo-93	No Data	2.41E-05	8.65E-07	No Data	6.35E-06	No Data	1.22E-06
Mo-99	No Data	1.33E-05	3.29E-06	No Data	2.84E-05	No Data	1.10E-05
Tc-99m	9.23E-10	1.81E-09	3.00E-08	No Data	2.63E-08	9.19E-10	1.03E-06
Tc-99	5.35E-07	5.96E-07	2.14E-07	No Data	7.02E-06	5.27E-08	6.25E-06
Tc-101	1.07E-09	1.12E-09	1.42E-08	No Data	1.91E-08	5.92E-10	3.56E-09
Ru-103	7.31E-07	No Data	2.81E-07	No Data	1.84E-06	No Data	1.89E-05
Ru-105	6.45E-08	No Data	2.34E-08	No Data	5.67E-07	No Data	4.21E-05
Ru-106	1.17E-05	No Data	1.46E-06	No Data	1.58E-05	No Data	1.82E-04
Rh-105	5.14E-07	2.76E-07	2.36E-07	No Data	1.10E-06	No Data	1.71E-05
Pd-107	No Data	4.72E-07	4.01E-08	No Data	3.95E-06	No Data	9.37E-07
Pd-109	No Data	5.67E-07	1.70E-07	No Data	3.04E-06	No Data	3.35E-05
Ag-110m	5.39E-07	3.64E-07	2.91E-07	No Data	6.78E-07	No Data	4.33E-05
Ag-111	2.48E-07	7.76E-08	5.12E-08	No Data	2.34E-07	No Data	4.75E-05
Cd-113m	No Data	1.02E-05	4.34E-07	No Data	1.05E-05	No Data	2.63E-05
Cd-115m	No Data	5.89E-06	2.51E-07	No Data	4.38E-06	No Data	8.01E-05
Sn-123	1.33E-04	1.65E-06	3.24E-06	1.75E-06	No Data	No Data	6.52E-05
Sn-125	3.55E-05	5.35E-07	1.59E-06	5.55E-07	No Data	No Data	1.10E-04
Sn-126	3.33E-04	4.15E-06	9.46E-06	1.14E-06	No Data	No Data	2.50E-05
Sb-124	1.11E-05	1.44E-07	3.89E-06	2.45E-08	No Data	6.16E-06	6.94E-05
Sb-125	7.16E-06	5.52E-08	1.50E-06	6.63E-09	No Data	3.99E-06	1.71E-05
Sb-126	4.40E-06	6.73E-08	1.58E-06	2.58E-08	No Data	2.10E-06	8.87E-05
Sb-127	1.06E-06	1.64E-08	3.68E-07	1.18E-08	No Data	4.60E-07	5.97E-05
Te-125m	1.14E-05	3.09E-06	1.52E-06	3.20E-06	No Data	No Data	1.10E-05
Te-127m	2.89E-05	7.78E-06	3.43E-06	6.91E-06	8.24E-05	No Data	2.34E-05
Te-127	4.71E-07	1.27E-07	1.01E-07	3.26E-07	1.34E-06	No Data	1.84E-05
Te-129m	4.87E-05	1.36E-05	7.56E-06	1.57E-05	1.43E-04	No Data	5.94E-05
Te-129	1.34E-07	3.74E-08	3.18E-08	9.56E-08	3.92E-07	No Data	8.34E-06
Te-131m	7.20E-06	2.49E-06	2.65E-06	5.12E-06	2.41E-05	No Data	1.01E-04
Te-131	8.30E-08	2.53E-08	2.47E-08	6.35E-08	2.51E-07	No Data	4.36E-07
Te-132	1.01E-05	4.47E-06	5.40E-06	6.51E-06	4.15E-05	No Data	4.50E-05
Te-133m	1.87E-07	7.56E-08	9.37E-08	1.45E-07	7.18E-07	No Data	5.77E-06
Te-134	1.29E-07	5.80E-08	7.74E-08	1.02E-07	5.37E-07	No Data	5.89E-07
I-129	1.39E-05	8.53E-06	7.62E-06	5.58E-03	1.44E-05	No Data	4.29E-07
I-130	2.92E-06	5.90E-06	3.04E-06	6.50E-04	8.82E-06	No Data	2.76E-06
I-131	1.72E-05	1.73E-05	9.83E-06	5.72E-03	2.84E-05	No Data	1.54E-06
I-132	8.00E-07	1.47E-06	6.76E-07	6.82E-05	2.25E-06	No Data	1.73E-06
I-133	5.92E-06	7.32E-06	2.77E-06	1.36E-03	1.22E-05	No Data	2.95E-06
I-134	4.19E-07	7.78E-07	3.58E-07	1.79E-05	1.19E-06	No Data	5.16E-07
I-135	1.75E-06	3.15E-06	1.49E-06	2.79E-04	4.83E-06	No Data	2.40E-06

[1] Data presented in this Table are from Reference 9.

TABLE A-17 (continued)

INGESTION DOSE FACTORS FOR CHILD [1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Cs-134m	8.44E-08	1.25E-07	8.16E-08	No Data	6.59E-08	1.09E-08	1.58E-07
Cs-134	2.34E-04	3.84E-04	8.10E-05	No Data	1.19E-04	4.27E-05	2.07E-06
Cs-135	8.30E-05	5.78E-05	5.93E-06	No Data	2.04E-05	6.81E-06	4.33E-07
Cs-136	2.35E-05	6.46E-05	4.18E-05	No Data	3.44E-05	5.13E-06	2.27E-06
Cs-137	3.27E-04	3.13E-04	4.62E-05	No Data	1.02E-04	3.67E-05	1.96E-06
Cs-138	2.28E-07	3.17E-07	2.01E-07	No Data	2.23E-07	2.40E-08	1.46E-07
Cs-139	1.45E-07	1.61E-07	7.74E-08	No Data	1.21E-07	1.22E-08	1.45E-11
Ba-139	4.14E-07	2.21E-10	1.20E-08	No Data	1.93E-10	1.30E-10	2.39E-05
Ba-140	8.31E-05	7.28E-08	4.85E-06	No Data	2.37E-08	4.34E-08	4.21E-05
Ba-141	2.00E-07	1.12E-10	6.51E-09	No Data	9.69E-11	6.58E-10	1.14E-07
Ba-142	8.74E-08	6.29E-11	4.88E-09	No Data	5.09E-11	3.70E-11	1.14E-09
La-140	1.01E-08	3.53E-09	1.19E-09	No Data	No Data	No Data	9.84E-05
La-141	1.36E-09	3.17E-10	6.88E-11	No Data	No Data	No Data	7.05E-05
La-142	5.24E-10	1.67E-10	5.23E-11	No Data	No Data	No Data	3.31E-05
Ce-141	3.97E-08	1.98E-08	2.94E-09	No Data	8.68E-09	No Data	2.47E-05
Ce-143	6.99E-09	3.79E-06	5.49E-10	No Data	1.59E-09	No Data	5.55E-05
Ce-144	2.08E-06	6.52E-07	1.11E-07	No Data	3.61E-07	No Data	1.70E-04
Pr-143	3.93E-08	1.18E-08	1.95E-09	No Data	6.39E-09	No Data	4.24E-05
Pr-144	1.29E-10	3.99E-11	6.49E-12	No Data	2.11E-11	No Data	8.59E-08
Nd-147	2.79E-08	2.26E-08	1.75E-09	No Data	1.24E-08	No Data	3.58E-05
Pm-147	3.18E-07	2.27E-08	1.22E-08	No Data	4.01E-08	No Data	9.19E-06
Pm-148m	1.03E-07	2.05E-08	2.05E-08	No Data	3.04E-08	No Data	5.78E-05
Pm-148	3.02E-08	3.63E-09	2.35E-09	No Data	6.17E-09	No Data	9.70E-05
Pm-149	6.49E-09	6.90E-10	3.74E-10	No Data	1.22E-09	No Data	4.71E-05
Pm-151	2.92E-09	3.55E-10	2.31E-10	No Data	6.02E-10	No Data	4.03E-05
Sm-151	2.56E-07	3.81E-08	1.20E-08	No Data	3.94E-08	No Data	5.53E-06
Sm-153	3.65E-09	2.27E-09	2.19E-10	No Data	6.91E-10	No Data	3.02E-05
Eu-152	6.15E-07	1.12E-07	1.33E-07	No Data	4.73E-07	No Data	1.84E-05
Eu-154	2.30E-06	2.07E-07	1.89E-07	No Data	9.09E-07	No Data	4.81E-05
Eu-155	4.82E-07	3.47E-08	2.72E-08	No Data	1.30E-07	No Data	8.69E-05
Eu-156	5.62E-08	3.01E-08	6.23E-09	No Data	1.94E-08	No Data	6.83E-05
Tb-160	1.66E-07	No Data	2.06E-08	No Data	4.94E-08	No Data	3.68E-05
Ho-166m	1.08E-06	2.26E-07	1.91E-07	No Data	3.22E-07	No Data	2.63E-05
W-181	4.23E-08	1.04E-08	1.43E-09	No Data	No Data	No Data	3.79E-07
W-185	1.73E-06	4.32E-07	6.05E-08	No Data	No Data	No Data	1.61E-05
W-187	4.29E-07	2.54E-07	1.14E-07	No Data	No Data	No Data	3.57E-05
Pb-210	4.75E-02	1.22E-02	2.09E-03	No Data	3.67E-02	No Data	2.30E-06
Bi-210	1.97E-06	1.02E-05	1.13E-06	No Data	1.15E-04	No Data	5.17E-05
Po-210	1.52E-03	2.43E-03	3.67E-04	No Data	7.56E-03	No Data	6.55E-05
Ra-223	2.12E-02	2.45E-05	4.24E-03	No Data	6.50E-04	No Data	3.38E-04
Ra-224	6.89E-03	1.25E-05	1.38E-03	No Data	3.31E-04	No Data	3.78E-04
Ra-225	2.80E-02	2.50E-05	5.59E-03	No Data	6.62E-04	No Data	3.21E-04
Ra-226	5.75E-01	1.84E-05	4.72E-01	No Data	4.88E-04	No Data	3.41E-04
Ra-228	3.85E-01	9.99E-06	4.32E-01	No Data	2.65E-04	No Data	5.81E-05

[1] Data presented in this Table are from Reference 9.

TABLE A-17 (continued)

INGESTION DOSE FACTORS FOR CHILD [1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Ac-225	1.88E-05	1.94E-05	1.26E-06	No Data	2.07E-06	No Data	4.31E-04
Ac-227	4.12E-03	6.63E-04	2.55E-04	No Data	1.46E-04	No Data	8.43E-05
Th-227	5.85E-05	7.96E-07	1.69E-06	No Data	4.22E-06	No Data	5.63E-04
Th-228	2.07E-03	2.65E-05	7.00E-05	No Data	1.38E-04	No Data	5.79E-04
Th-229	2.35E-02	5.91E-04	3.92E-04	No Data	2.89E-03	No Data	8.04E-05
Th-230	3.55E-03	1.78E-04	9.91E-05	No Data	8.67E-04	No Data	6.19E-05
Th-232	3.96E-03	1.52E-04	3.01E-06	No Data	7.41E-04	No Data	5.27E-05
Th-234	3.42E-07	1.51E-08	5.38E-09	No Data	8.01E-08	No Data	1.18E-04
Pa-231	7.07E-03	2.34E-04	2.81E-04	No Data	1.28E-03	No Data	7.37E-05
Pa-233	1.81E-08	2.82E-09	3.16E-09	No Data	1.04E-08	No Data	1.44E-05
U-232	1.76E-02	No Data	1.26E-03	No Data	1.34E-03	No Data	6.98E-05
U-233	3.72E-03	No Data	2.25E-04	No Data	6.10E-04	No Data	6.45E-05
U-234	3.57E-03	No Data	2.21E-04	No Data	5.98E-04	No Data	6.32E-05
U-235	3.42E-03	No Data	2.07E-04	No Data	5.61E-04	No Data	8.03E-05
U-236	3.42E-03	No Data	2.12E-04	No Data	5.73E-04	No Data	5.92E-05
U-237	2.36E-07	No Data	6.27E-08	No Data	6.81E-07	No Data	2.08E-05
U-238	3.27E-03	No Data	1.94E-04	No Data	5.24E-04	No Data	5.66E-05
Np-237	2.23E-03	1.47E-04	9.79E-05	No Data	6.05E-04	No Data	8.16E-05
Np-238	5.83E-08	1.18E-09	9.08E-10	No Data	3.76E-08	No Data	4.04E-05
Np-239	5.25E-09	3.77E-10	2.65E-10	No Data	1.09E-09	No Data	2.79E-05
Pu-238	1.19E-03	1.38E-04	3.16E-05	No Data	1.15E-04	No Data	7.50E-05
Pu-239	1.29E-03	1.38E-04	3.31E-05	No Data	1.22E-04	No Data	6.85E-05
Pu-240	1.28E-03	1.43E-04	3.31E-05	No Data	1.22E-04	No Data	6.98E-05
Pu-241	3.87E-05	1.58E-06	8.04E-07	No Data	2.96E-06	No Data	1.44E-06
Pu-242	1.19E-03	1.38E-04	3.19E-05	No Data	1.17E-04	No Data	6.71E-05
Pu-244	1.39E-03	1.58E-03	3.65E-05	No Data	1.35E-04	No Data	1.00E-04
Am-241	1.36E-03	1.17E-03	1.02E-04	No Data	6.23E-04	No Data	7.64E-05
Am-242m	1.40E-03	1.12E-03	1.04E-04	No Data	6.30E-04	No Data	9.61E-05
Am-243	1.34E-03	1.13E-03	9.83E-05	No Data	6.06E-04	No Data	8.95E-05
Cm-242	8.78E-05	7.01E-05	5.84E-06	No Data	1.87E-05	No Data	8.16E-05
Cm-243	1.28E-03	1.04E-03	8.24E-05	No Data	3.08E-04	No Data	8.03E-05
Cm-244	1.08E-03	8.74E-04	6.93E-05	No Data	2.54E-04	No Data	7.77E-05
Cm-245	1.67E-03	1.34E-03	1.05E-04	No Data	4.11E-04	No Data	7.24E-05
Cm-246	1.65E-03	1.34E-03	1.05E-04	No Data	4.10E-04	No Data	7.11E-05
Cm-247	1.61E-03	1.32E-03	1.03E-04	No Data	4.04E-04	No Data	9.35E-05
Cm-248	1.34E-02	1.09E-02	8.52E-04	No Data	3.33E-03	No Data	1.51E-03
Cf-252	1.05E-03	No Data	2.54E-05	No Data	No Data	No Data	2.96E-04

[1] Data presented in this Table are from Reference 9.

TABLE A-18

INGESTION DOSE FACTORS FOR INFANT [1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
H-3	No Data	1.76E-07	1.76E-07	1.76E-07	1.76E-07	1.76E-07	1.76E-07
Be-10	1.71E-05	2.49E-06	5.16E-07	No Data	1.64E-06	No Data	2.78E-05
C-14	2.37E-05	5.06E-06	5.06E-06	5.06E-06	5.06E-06	5.06E-06	5.06E-06
N-13	5.85E-08	5.85E-08	5.85E-08	5.85E-08	5.85E-08	5.85E-08	5.85E-08
F-18	5.19E-06	No Data	4.43E-07	No Data	No Data	No Data	1.22E-06
Na-22	9.83E-05	9.83E-05	9.83E-05	9.83E-05	9.83E-05	9.83E-05	9.83E-05
Na-24	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05
P-32	1.70E-03	1.00E-04	6.59E-05	No Data	No Data	No Data	2.30E-05
Ca-41	3.74E-04	No Data	4.08E-05	No Data	No Data	No Data	1.01E-07
Sc-46	3.75E-08	5.41E-08	1.69E-08	No Data	3.56E-08	No Data	3.53E-05
Cr-51	No Data	No Data	1.41E-08	9.20E-09	2.01E-09	1.79E-08	4.11E-07
Mn-54	No Data	1.99E-05	4.51E-06	No Data	4.41E-06	No Data	7.31E-06
Mn-56	No Data	8.18E-07	1.41E-07	No Data	7.03E-07	No Data	7.43E-05
Fe-55	1.39E-05	8.98E-06	2.40E-06	No Data	No Data	4.39E-06	1.14E-06
Fe-59	3.08E-05	5.38E-05	2.12E-05	No Data	No Data	1.59E-05	2.57E-05
Co-57	No Data	1.15E-06	1.87E-06	No Data	No Data	No Data	3.92E-06
Co-58	No Data	3.60E-06	8.98E-06	No Data	No Data	No Data	8.97E-06
Co-60	No Data	1.08E-05	2.55E-05	No Data	No Data	No Data	2.57E-05
Ni-59	4.73E-05	1.45E-05	8.17E-06	No Data	No Data	No Data	7.16E-07
Ni-63	6.34E-04	3.92E-05	2.20E-05	No Data	No Data	No Data	1.95E-06
Ni-65	4.70E-06	5.32E-07	2.42E-07	No Data	No Data	No Data	4.05E-05
Cu-64	No Data	6.09E-07	2.82E-07	No Data	1.03E-06	No Data	1.25E-05
Zn-65	1.84E-05	6.31E-05	2.91E-05	No Data	3.06E-05	No Data	5.33E-05
Zn-69m	1.50E-06	3.06E-06	2.79E-07	No Data	1.24E-06	No Data	4.24E-05
Zn-69	9.33E-08	1.68E-07	1.25E-08	No Data	6.98E-08	No Data	1.37E-05
Se-79	No Data	2.10E-05	3.90E-06	No Data	2.43E-05	No Data	5.58E-07
Br-82	No Data	No Data	1.27E-05	No Data	No Data	No Data	No Data
Br-83	No Data	No Data	3.63E-07	No Data	No Data	No Data	No Data
Br-84	No Data	No Data	3.82E-07	No Data	No Data	No Data	No Data
Br-85	No Data	No Data	1.94E-08	No Data	No Data	No Data	No Data
Rb-86	No Data	1.70E-04	8.40E-05	No Data	No Data	No Data	4.35E-06
Rb-87	No Data	8.88E-05	3.52E-05	No Data	No Data	No Data	5.98E-07
Rb-88	No Data	4.98E-07	2.73E-07	No Data	No Data	No Data	4.85E-07
Rb-89	No Data	2.86E-07	1.97E-07	No Data	No Data	No Data	9.74E-08
Sr-89	2.51E-03	No Data	7.20E-05	No Data	No Data	No Data	5.16E-05
Sr-90	2.83E-02	No Data	5.74E-04	No Data	No Data	No Data	2.31E-04
Sr-91	5.00E-05	No Data	1.81E-06	No Data	No Data	No Data	5.92E-05
Sr-92	1.92E-05	No Data	7.13E-07	No Data	No Data	No Data	2.07E-04
Y-90	8.69E-08	No Data	2.33E-09	No Data	No Data	No Data	1.20E-04
Y-91m	8.10E-10	No Data	2.76E-11	No Data	No Data	No Data	2.70E-06
Y-91	1.13E-06	No Data	3.01E-08	No Data	No Data	No Data	8.10E-05
Y-92	7.65E-09	No Data	2.15E-10	No Data	No Data	No Data	1.46E-04
Y-93	2.43E-08	No Data	6.62E-10	No Data	No Data	No Data	1.92E-04

[1] Data presented in this Table are from Reference 9.

TABLE A-18 (continued)

INGESTION DOSE FACTORS FOR INFANT [1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Zr-93	1.93E-07	9.19E-09	5.54E-09	No Data	2.71E-08	No Data	2.39E-06
Zr-95	2.06E-07	5.02E-08	3.56E-08	No Data	5.41E-08	No Data	2.50E-05
Zr-97	1.48E-08	2.54E-09	1.16E-09	No Data	2.56E-09	No Data	1.62E-04
Nb-93m	1.23E-07	3.33E-08	1.04E-08	No Data	3.25E-08	No Data	3.98E-06
Nb-95	4.20E-08	1.73E-08	1.00E-08	No Data	1.24E-08	No Data	1.46E-05
Nb-97	4.59E-10	9.79E-11	3.53E-11	No Data	7.65E-11	No Data	3.09E-05
Mo-93	No Data	5.65E-05	1.82E-06	No Data	1.13E-05	No Data	1.21E-06
Mo-99	No Data	3.40E-05	6.63E-06	No Data	5.08E-05	No Data	1.12E-05
Tc-99m	1.92E-09	3.96E-09	5.10E-08	No Data	4.26E-08	2.07E-09	1.15E-06
Tc-99	1.08E-06	1.46E-06	4.55E-07	No Data	1.23E-05	1.42E-07	6.31E-06
Tc-101	2.27E-09	2.86E-09	2.83E-08	No Data	3.40E-08	1.56E-09	4.86E-07
Ru-103	1.48E-06	No Data	4.95E-07	No Data	3.08E-06	No Data	1.80E-05
Ru-105	1.36E-07	No Data	4.58E-08	No Data	1.00E-06	No Data	5.41E-05
Ru-106	2.41E-05	No Data	3.01E-06	No Data	2.85E-05	No Data	1.83E-04
Rh-105	1.09E-06	7.13E-07	4.79E-07	No Data	1.98E-06	No Data	1.77E-05
Pd-107	No Data	1.19E-06	8.45E-08	No Data	6.79E-06	No Data	9.46E-07
Pd-109	No Data	1.50E-06	3.62E-07	No Data	5.51E-06	No Data	3.68E-05
Ag-110m	9.96E-07	7.27E-07	4.81E-07	No Data	1.04E-06	No Data	3.77E-05
Ag-111	5.20E-07	2.02E-07	1.07E-07	No Data	4.22E-07	No Data	4.82E-05
Cd-113m	No Data	1.77E-05	6.52E-07	No Data	1.34E-05	No Data	2.66E-05
Cd-115m	No Data	1.42E-05	4.93E-07	No Data	7.41E-06	No Data	8.09E-05
Sn-123	2.49E-04	3.89E-06	6.50E-06	3.91E-06	No Data	No Data	6.58E-05
Sn-125	7.41E-05	1.38E-06	3.29E-06	1.36E-06	No Data	No Data	1.11E-04
Sn-126	5.53E-04	7.26E-06	1.80E-05	1.91E-06	No Data	No Data	2.52E-05
Sb-124	2.14E-05	3.15E-07	6.63E-06	5.68E-08	No Data	1.34E-05	6.60E-05
Sb-125	1.23E-05	1.19E-07	2.53E-06	1.54E-08	No Data	7.12E-06	1.64E-05
Sb-126	8.06E-06	1.58E-07	2.91E-06	6.19E-08	No Data	5.07E-06	8.35E-05
Sb-127	2.23E-06	3.98E-08	6.90E-07	2.84E-08	No Data	1.15E-06	5.91E-05
Te-125m	2.33E-05	7.79E-06	3.15E-06	7.84E-06	No Data	No Data	1.11E-05
Te-127m	5.85E-05	1.94E-05	7.08E-06	1.69E-05	1.44E-04	No Data	2.36E-05
Te-127	1.00E-06	3.35E-07	2.15E-07	8.14E-07	2.44E-06	No Data	2.10E-05
Te-129m	1.00E-04	3.43E-05	1.54E-05	3.84E-05	2.50E-04	No Data	5.97E-05
Te-129	2.84E-07	9.79E-08	6.63E-08	2.38E-07	7.07E-07	No Data	2.27E-05
Te-131m	1.52E-05	6.12E-06	5.05E-06	1.24E-05	4.21E-05	No Data	1.03E-04
Te-131	1.76E-07	6.50E-08	4.94E-08	1.57E-07	4.50E-07	No Data	7.11E-06
Te-132	2.08E-05	1.03E-05	9.61E-06	1.52E-05	6.44E-05	No Data	3.81E-05
Te-133m	3.91E-07	1.79E-07	1.71E-07	3.45E-07	1.22E-06	No Data	1.93E-05
Te-134	2.67E-07	1.34E-07	1.38E-07	2.39E-07	9.03E-07	No Data	3.06E-06
I-129	2.86E-05	2.12E-05	1.55E-05	1.36E-02	2.51E-05	No Data	4.24E-07
I-130	6.00E-06	1.32E-05	5.30E-06	1.48E-03	1.45E-05	No Data	2.83E-06
I-131	3.59E-05	4.23E-05	1.86E-05	1.39E-02	4.94E-05	No Data	1.51E-06
I-132	1.66E-06	3.37E-06	1.20E-06	1.58E-04	3.76E-06	No Data	2.73E-06
I-133	1.25E-05	1.82E-05	5.33E-06	3.31E-03	2.14E-05	No Data	3.08E-06
I-134	8.69E-07	1.78E-06	6.33E-07	4.15E-05	1.99E-06	No Data	1.84E-06
I-135	3.64E-06	7.24E-06	2.64E-06	6.49E-04	8.07E-06	No Data	2.62E-06

[1] Data presented in this Table are from Reference 9.

TABLE A-18 (continued)

INGESTION DOSE FACTORS FOR INFANT [1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Cs-134m	1.76E-07	2.93E-07	1.48E-07	No Data	1.13E-07	2.60E-08	2.32E-07
Cs-134	3.77E-04	7.03E-04	7.10E-05	No Data	1.81E-04	7.42E-05	1.91E-06
Cs-135	1.33E-04	1.21E-04	6.30E-06	No Data	3.44E-05	1.31E-05	4.37E-07
Cs-136	4.59E-05	1.35E-04	5.04E-05	No Data	5.38E-05	1.10E-05	2.05E-06
Cs-137	5.22E-04	6.11E-04	4.33E-05	No Data	1.64E-04	6.64E-05	1.91E-06
Cs-138	4.81E-07	7.82E-07	3.79E-07	No Data	3.90E-07	6.09E-08	1.25E-06
Cs-139	3.10E-07	4.24E-07	1.62E-07	No Data	2.19E-07	3.30E-08	2.66E-08
Ba-139	8.81E-07	5.84E-10	2.55E-08	No Data	3.51E-10	3.54E-10	5.58E-05
Ba-140	1.71E-04	1.71E-07	8.81E-06	No Data	4.06E-08	1.05E-07	4.20E-05
Ba-141	4.25E-07	2.91E-10	1.34E-08	No Data	1.75E-10	1.77E-10	5.19E-06
Ba-142	1.84E-07	1.53E-10	9.06E-09	No Data	8.81E-11	9.26E-11	7.59E-07
La-140	2.11E-08	8.32E-09	2.14E-09	No Data	No Data	No Data	9.77E-05
La-141	2.89E-09	8.38E-10	1.46E-10	No Data	No Data	No Data	9.61E-05
La-142	1.10E-09	4.04E-10	9.67E-11	No Data	No Data	No Data	6.86E-05
Ce-141	7.87E-08	4.80E-08	5.65E-09	No Data	1.48E-08	No Data	2.48E-05
Ce-143	1.48E-08	9.82E-06	1.12E-09	No Data	2.86E-09	No Data	5.73E-05
Ce-144	2.98E-06	1.22E-06	1.67E-07	No Data	4.93E-07	No Data	1.71E-04
Pr-143	8.13E-08	3.04E-08	4.03E-09	No Data	1.13E-08	No Data	4.29E-05
Pr-144	2.74E-10	1.06E-10	1.38E-11	No Data	3.84E-11	No Data	4.93E-06
Nd-147	5.53E-08	5.68E-08	3.48E-09	No Data	2.19E-08	No Data	3.60E-05
Pm-147	3.88E-07	3.27E-08	1.59E-08	No Data	4.88E-08	No Data	9.27E-06
Pm-148m	1.65E-07	4.18E-08	3.28E-08	No Data	4.80E-08	No Data	5.44E-05
Pm-148	6.32E-08	9.13E-09	4.60E-09	No Data	1.09E-08	No Data	9.74E-05
Pm-149	1.38E-08	1.81E-09	7.90E-10	No Data	2.20E-09	No Data	4.86E-05
Pm-151	6.18E-09	9.01E-10	4.56E-10	No Data	1.07E-09	No Data	4.17E-05
Sm-151	2.90E-07	6.67E-08	1.44E-08	No Data	4.53E-08	No Data	5.58E-06
Sm-153	7.72E-09	5.97E-09	4.58E-10	No Data	1.25E-09	No Data	3.12E-05
Eu-152	6.74E-07	1.79E-07	1.51E-07	No Data	5.02E-07	No Data	1.59E-05
Eu-154	2.64E-06	3.67E-07	2.20E-07	No Data	9.95E-07	No Data	4.58E-05
Eu-155	5.42E-07	6.25E-08	3.23E-08	No Data	1.40E-07	No Data	8.37E-05
Eu-156	1.14E-07	7.06E-08	1.12E-08	No Data	3.26E-08	No Data	6.67E-05
Tb-160	2.59E-07	No Data	3.24E-08	No Data	7.37E-08	No Data	3.45E-05
Ho-166m	1.25E-06	2.69E-07	2.13E-07	No Data	3.57E-07	No Data	2.66E-05
W-181	8.85E-08	2.72E-08	3.04E-09	No Data	No Data	No Data	3.82E-07
W-185	3.62E-06	1.13E-06	1.29E-07	No Data	No Data	No Data	1.62E-05
W-187	9.03E-07	6.28E-07	2.17E-07	No Data	No Data	No Data	3.69E-05
Pb-210	5.28E-02	1.42E-02	2.38E-03	No Data	4.33E-02	No Data	2.32E-06
Bi-210	4.16E-06	2.68E-05	2.39E-06	No Data	2.08E-04	No Data	5.27E-05
Po-210	3.10E-03	5.93E-03	7.41E-04	No Data	1.26E-02	No Data	6.61E-05
Ra-223	4.41E-02	6.42E-05	8.82E-03	No Data	1.17E-03	No Data	3.43E-04
Ra-224	1.46E-02	3.29E-05	2.91E-03	No Data	6.00E-04	No Data	3.86E-04
Ra-225	5.78E-02	6.52E-05	1.15E-02	No Data	1.19E-03	No Data	3.24E-04
Ra-226	6.20E-01	4.76E-05	5.14E-01	No Data	8.71E-04	No Data	3.44E-04
Ra-228	4.32E-01	2.58E-05	4.86E-01	No Data	4.73E-04	No Data	5.86E-05

[1] Data presented in this Table are from Reference 9.

TABLE A-18 (continued)

INGESTION DOSE FACTORS FOR INFANT [1]

mrem/pCi Inhaled

Nuclide	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Ac-225	3.92E-05	5.03E-05	2.63E-06	No Data	3.69E-06	No Data	4.36E-04
Ac-227	4.49E-03	7.67E-04	2.79E-04	No Data	1.56E-04	No Data	8.50E-05
Th-227	1.20E-04	2.01E-06	3.45E-06	No Data	7.41E-06	No Data	5.70E-04
Th-228	2.47E-03	3.38E-05	8.36E-05	No Data	1.58E-04	No Data	5.84E-04
Th-229	2.52E-02	6.33E-04	4.20E-04	No Data	3.03E-03	No Data	8.10E-05
Th-230	3.80E-03	1.90E-04	1.06E-04	No Data	9.12E-04	No Data	6.24E-05
Th-232	4.24E-03	1.63E-04	1.65E-06	No Data	7.79E-04	No Data	5.31E-05
Th-234	6.92E-07	3.77E-08	2.00E-08	No Data	1.39E-07	No Data	1.19E-04
Pa-231	7.57E-03	2.50E-04	3.02E-04	No Data	1.34E-03	No Data	7.14E-05
Pa-233	3.11E-08	6.09E-09	5.43E-09	No Data	1.67E-08	No Data	1.46E-05
U-232	2.42E-02	No Data	2.16E-03	No Data	2.37E-03	No Data	7.04E-05
U-233	5.08E-03	No Data	3.87E-04	No Data	1.08E-03	No Data	6.51E-05
U-234	4.88E-03	No Data	3.80E-04	No Data	1.06E-03	No Data	6.37E-05
U-235	4.67E-03	No Data	3.56E-04	No Data	9.93E-04	No Data	3.10E-05
U-236	4.67E-03	No Data	3.64E-04	No Data	1.01E-03	No Data	5.98E-05
U-237	4.95E-07	No Data	1.32E-07	No Data	1.23E-06	No Data	2.11E-05
U-238	4.47E-03	No Data	3.33E-04	No Data	9.28E-04	No Data	5.71E-05
Np-237	2.40E-03	1.59E-04	1.05E-04	No Data	6.34E-04	No Data	8.23E-05
Np-238	1.24E-07	3.12E-09	1.92E-09	No Data	6.81E-09	No Data	4.17E-05
Np-239	1.11E-08	9.93E-10	5.61E-10	No Data	1.98E-09	No Data	2.87E-05
Pu-238	1.28E-03	1.50E-04	3.40E-05	No Data	1.21E-04	No Data	7.57E-05
Pu-239	1.38E-03	1.55E-04	3.54E-05	No Data	1.28E-04	No Data	6.91E-05
Pu-240	1.38E-03	1.55E-04	3.54E-05	No Data	1.28E-04	No Data	7.04E-05
Pu-241	4.25E-05	1.76E-06	8.82E-07	No Data	3.17E-06	No Data	1.45E-06
Pu-242	1.28E-03	1.49E-04	3.41E-05	No Data	1.23E-04	No Data	6.77E-05
Pu-244	1.49E-03	1.71E-04	3.91E-05	No Data	1.41E-04	No Data	1.01E-04
Am-241	1.46E-03	1.27E-03	1.09E-04	No Data	6.55E-04	No Data	7.70E-05
Am-242m	1.51E-03	1.22E-03	1.13E-04	No Data	6.64E-04	No Data	9.69E-05
Am-243	1.44E-03	1.23E-03	1.06E-04	No Data	6.36E-04	No Data	9.03E-05
Cm-242	1.37E-04	1.27E-04	9.10E-06	No Data	2.62E-05	No Data	8.23E-05
Cm-243	1.40E-03	1.15E-03	8.98E-05	No Data	3.27E-04	No Data	8.10E-05
Cm-244	1.18E-03	9.70E-04	7.59E-05	No Data	2.71E-04	No Data	7.84E-05
Cm-245	1.79E-03	1.45E-03	1.13E-04	No Data	4.32E-04	No Data	7.30E-05
Cm-246	1.77E-03	1.45E-03	1.13E-04	No Data	4.31E-04	No Data	7.17E-05
Cm-247	1.73E-03	1.43E-03	1.11E-04	No Data	4.24E-04	No Data	9.43E-05
Cm-248	1.43E-02	1.18E-02	9.16E-04	No Data	3.50E-03	No Data	1.52E-03
Cf-252	1.22E-03	No Data	2.95E-05	No Data	No Data	No Data	2.99E-04

[1] Data presented in this Table are from Reference 9.

TABLE A-19

RECOMMENDED VALUES FOR GASEOUS EFFLUENTS [1]

Parameter Symbol	Parameter Description	Values
S	Attenuation factor that accounts for the shielding provided by residential structures	0.7 (maximum individual) 0.5 (average individual.) 1.0 (noble gas-gamma instantaneous dose) [2]
t_e	Time period that crops are exposed to contamination during growing season	
	i) for forage ingested by animals	720 hrs (30 days, for pasture grass) 1440 hr (60 days for stored feed) [3]
	ii) for crops ingested by man	1440 hrs (60 days)
t_f	Average transport time of activity from the feed into the milk and to the receptor	48 hr (2 days, maximum individual) 96 hr (4 days, average individual)
t_h	Time delay between harvest of vegetation or crops and ingestion	
	i) for forage ingested by animals	Zero (for pasture grass) 2160 hr (90 days for stored feed)
	ii) for crops ingested by man	24 hr (1 day, for leafy vegetables & max. individual) 1440 hr (60 days, for produce & max. individual) 336 hr (14 days, for average individual)
Y_v	Agricultural productivity by unit area (measured in wet weight)	
	i) for forage ingested by animals	0.42 kg/m^2 (for pasture grass) [3] 2.5 kg/m^2 (for stored feed) [3]
	ii) for crops ingested by man	2.0 kg/m^2

[1] All data presented in this table are from Reference 8, unless otherwise indicated.

[2] From Reference 12.

[3] From Reference 4.

APPENDIX B

DEFINITION OF THE LOWER LIMIT OF DETECTION

For purposes of analyzing effluents and environmental samples for radioactivity, the lower limit of detection (LLD) is defined 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.

It should be recognized that the listed LLD is defined as an *a priori* (before the fact) limit representing the capability of the measurement system or analytical process, and not as an *a posteriori* (after the fact) limit for a particular measurement. Analyses should be performed in such a manner that the stated LLDs will be achieved under routine conditions. Usually, samples are counted for a period of time sufficient to ensure that the listed LLDs, based on normal analytical and counting parameters, are achieved.

Printouts of analytical results typically list the *a posteriori* minimum detectable concentration (MDC) which was actually achieved on a particular measurement. In those cases where a given sample MDC is less than or equal to the listed *a priori* LLD, the required LLD has been achieved. Occasionally background fluctuations, unavoidable small sample sizes, the presence of interfering radionuclides, or other uncontrollable circumstances may result in the MDC for a particular measurement not meeting the listed LLD. In such cases, the contributing factors shall be identified and described in the Semiannual Radioactive Effluent and Waste Disposal Report (for effluents) or the Annual Radiological Environmental Monitoring Report (for environmental samples).

The value of the counting standard deviation (s_b) used in the calculation of the LLD for a particular measurement system should be based on the actual observed standard deviation of the background counting rate or of the counting rate of an appropriate blank sample, rather than on an unverified, theoretically-predicted variance. One acceptable method for deriving s_b is as follows:

$$s_b = \sqrt{B/T}$$

where:

s_b = standard deviation of the background counting rate or of the counting rate of an appropriate blank sample (counts/minute);

B = background counting rate or counting rate of an appropriate blank sample (counts/minute);

T = counting time interval for sample analysis (minutes).

Lower Limit of Detection For Effluent Samples

For a particular measurement system or analytical process which may include radiochemical separation used to analyze effluent samples, the lower limit of detection is calculated as follows:

$$LLD_i = \frac{4.66\ s_b}{E\ V\ 2.22E6\ Y\ e^{-\lambda_i t}}$$

where:

LLD_i = *a priori* lower limit of detection for radionuclide i, (μCi/mL or μCi/g);

4.66 = combined numerical constant corresponding to 95% probability of detection, with 5% probability of falsely identifying background as a "real" signal;

s_b = standard deviation of the background counting rate or of the counting rate of an appropriate blank sample, (counts/minute);

E = counting efficiency, (counts/disintegration);

V = sample size, (milliliters or grams);

2.22E6 = conversion factor for disintegrations/minute per μCi;

Y = fractional radiochemical yield, when applicable;

λ_i = radioactive decay constant for radionuclide i, (hr^{-1});

t = elapsed time between the midpoint of sample collection and time of counting, (hr).

Typical values of E, V, Y, and t used for normal effluent sample analyses should be used in this calculation.

Lower Limit of Detection For Environmental Samples

For a particular measurement system or analytical process which may include radiochemical separation used to analyze effluent samples, the lower limit of detection is calculated as follows:

$$LLD_i = \frac{4.66\ s_b}{E\ V\ 2.22\ Y\ e^{-\lambda_i t}}$$

where:

LLD_i = *a priori* lower limit of detection for radionuclide i, (pCi/liter, pCi/m^3, or pCi/kg);

4.66 = combined numerical constant corresponding to 95% probability of detection, with 5% probability of falsely identifying background as a "real" signal;

s_b = standard deviation of the background counting rate or of the counting rate of an appropriate blank sample, (counts/minute);

E = counting efficiency, (counts/disintegration);

V = sample size, (liters, cubic meters, or kilograms);

2.22 = conversion factor for disintegrations/minute per pCi;

Y = fractional radiochemical yield, when applicable;

λ_i = radioactive decay constant for radionuclide i, (hr^{-1});

t = elapsed time between environmental sample collection or end of the sample collection period, and time of counting, (hr).

Typical values of E, V, Y, and t used for normal effluent sample analyses should be used in this calculation.

APPENDIX C

NRC SAFETY EVALUATION FOR ONSITE DISPOSAL OF SLIGHTLY CONTAMINATED CONSTRUCTION SOIL

In May 1993, the NRC approved a permit under 10CFR20.302 to allow Boston Edison Company to dispose of construction soil containing small amounts of cobalt-60 and cesium-137. This soil was disposed of via onsite burial at a location on Boston Edison property adjacent to the Pilgrim Station meteorological tower. Dose calculations performed as part of the permit application and within the NRC Safety Evaluation concluded that the maximum dose from the disposal area would be less than 0.1 mrem/year during the year of disposal. Doses during subsequent years through the time of site decommissioning would be less than 0.01 mrem/year. Such exposure levels are considered insignificant relative to radiation dose arising from naturally-occurring sources of radiation and radioactivity, and other exposure pathways arising from operation of Pilgrim Nuclear Power Station.

Complete details regarding the NRC permit for disposal, and the accompanying NRC Safety Evaluation, can be found in NRC Docket No. 50-293, "APPROVAL UNDER 10CFR20.302(a) RELOCATION AND PLACEMENT OF CONSTRUCTION SOIL WITH TRACES OF RESIDUAL RADIOACTIVITY ON SITE AT PILGRIM NUCLEAR POWER STATION (TAC NO. M85501)", dated May 4, 1993.