INDIANA MICHIGAN POWER
A unit of American Electric Power

Indiana Michigan Power
Cook Nuclear Plant
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Bridgman, MI 49106
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U. S. Nuclear Regulatory Commission
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Washington, DC 20555-0001

Donald C. Cook Nuclear Plant Units 1 and 2
ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
JANUARY 1, 2004 THROUGH DECEMBER 31, 2004

In accordance with Technical Specification (TS) 6.9.1.7, Indiana Michigan Power Company hereby submits the Annual Radioactive Effluent Release Report for Donald C. Cook Nuclear Plant (CNP). This report covers the period January 1, 2004, through December 31, 2004.

The calculations in this report were performed in accordance with the CNP Offsite Dose Calculation Manual (ODCM). There have been no revisions made to the ODCM during this reporting period.

There are no new commitments in this submittal. Should you have any questions, please contact Mr. Michael K. Scarpello, Supervisor of Nuclear Licensing, at (269) 466-2649.

Sincerely,

John A. Zwolinski
Safety Assurance Director

DMB/rdw

Attachment

IE48

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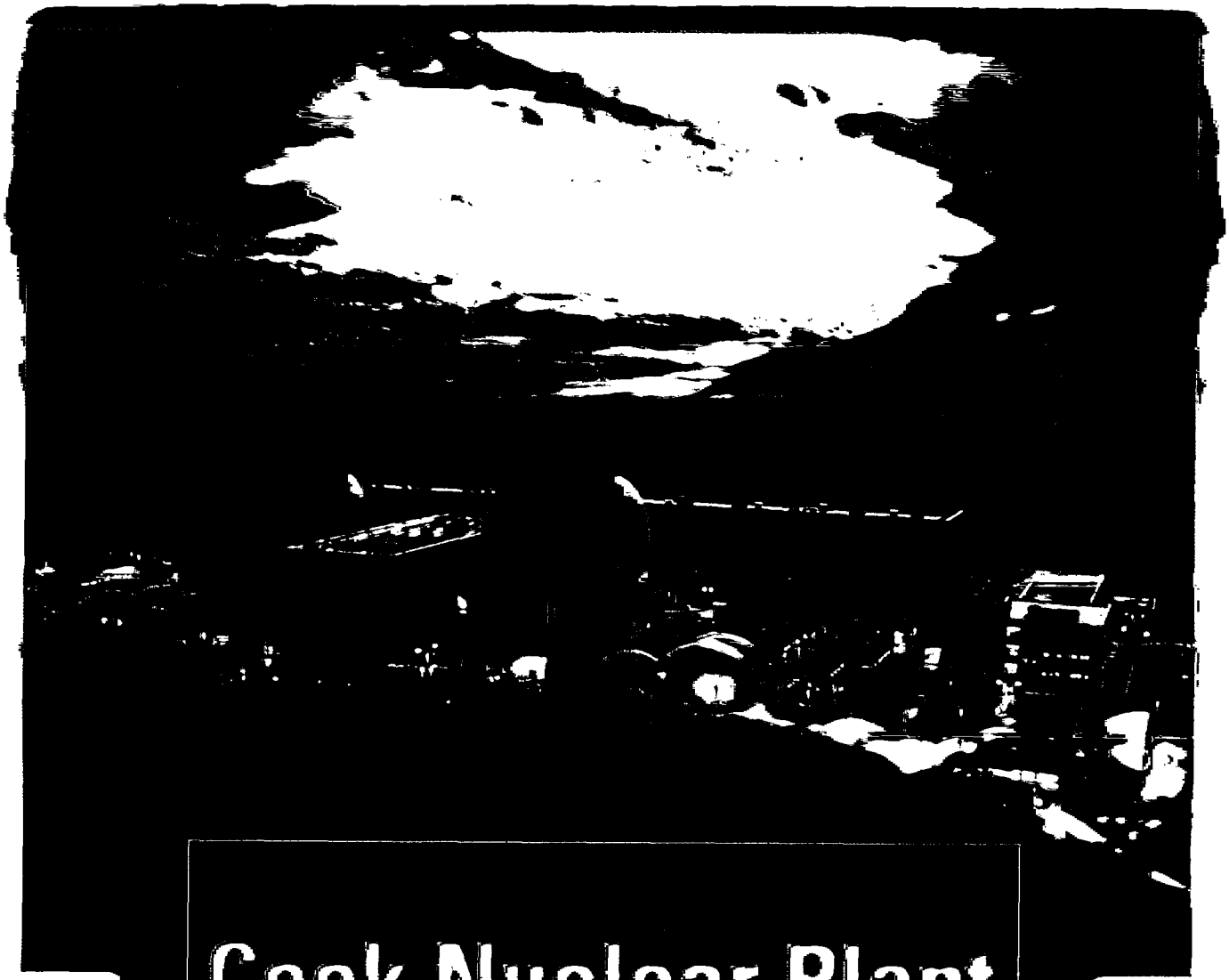
NRC Resident Inspector

ATTACHMENT TO AEP:NRC:5691-01

DONALD C. COOK NUCLEAR PLANT UNITS 1 AND 2
ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
JANUARY 1, 2004 THROUGH DECEMBER 31, 2004



Cook Nuclear Plant
Nuclear Generation Group

Annual Radioactive Effluent Release Report

January 1, 2004 through December 31, 2004

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I. INTRODUCTION

This report discusses the radioactive discharges from Unit 1 and Unit 2 of the Donald C. Cook Nuclear Plant (CNP) during 2004. This is in accordance with the requirements of CNP Technical Specification 6.9.1.7.

The table below summarizes the pertinent statistics concerning the Plant's operation during the period from January 1 to December 31, 2004. The data in this table and the descriptive information on plant operation are based upon the respective Unit's Monthly Operating Reports and Control Room (PowerView) Logs for 2004.

Parameter	Unit 1	Unit 2
Gross Electrical Energy Generation (MWH)	9,134,920	8,201,538
Unit Service Factor (%)	97.8	84.3
Unit Capacity Factor - MDC Net (%)	100.5	85.3

Unit 1 entered the reporting period in Mode 1 at 100 percent (%) Rated Thermal Power (RTP). Small power adjustments were made to facilitate main turbine valve testing throughout the year. On 3/30/04 the unit was manually shutdown to repair a small steam leak at the pressurizer upper manway. The unit attained criticality on 4/6/04 and returned to 100% RTP on 4/8/04. The unit exited the reporting period at 100% RTP.

Unit 2 entered the reporting period in Mode 3 following a reactor trip on 12/30/03. The unit attained criticality on 1/4/04 and returned to 100% RTP on 1/6/04. Small power adjustments were made to facilitate main turbine valve testing throughout the year. On 3/29/04 the reactor automatically tripped from 100% power due to a voltage transient in the Rod Control System that occurred when the breaker racking tool made contact with energized components inside the breaker cubicle while restoring from test procedure, 2-IHP-4030-STP-511, "Train 'B' RPS And ESF Reactor Trip Breaker And SSPS Automatic Trip/Actuation Logic Functional Test". The unit attained criticality on 4/2/04 and 100% RTP was achieved on 4/5/04. On 4/8/04, during a planned power reduction, the reactor automatically tripped from approximately 50% power due to a turbine trip as a result of a high-high water level in #24 steam generator while removing the East Main Feed Pump from service. The unit attained criticality on 4/12/04 and returned to 100% RTP on 4/15/04. The unit entered scheduled U2C15 refueling outage on 10/1/04. The unit attained criticality on 11/9/04 and returned to 100% RTP on 11/14/04. On 11/22/04 the unit was manually shutdown to replace a faulty pressurizer manway gasket that was leaking. The unit attained criticality on 11/28/04 and returned to 100% RTP on 11/30/04. The unit exited the reporting period at 100% RTP.

II. RADIOACTIVE RELEASES AND RADIOLOGICAL IMPACT ON MAN

Since a number of release points are common to both units, the release data from both units are combined to form this two-unit, Annual Radioactive Effluent Release Report. Appendix A1.1 through A2.4 of this report present the information in accordance with Section 6.9.1.7 of Appendix A to the Facility Operating Licenses, as specified in the Technical Specification, Regulatory Guide 1.21 and 10 CFR Part 50, Appendix I.

The "MIDAS System" is a computer code that calculates doses due to radionuclides that were released from CNP.

All liquid and gaseous releases were well within Offsite Dose Calculation Manual limits and Federal Limits.

There were no abnormal liquid or gaseous releases.

Liquid Releases

During 2004 there were 64 liquid batch releases. During the first quarter there were 13 liquid batch releases. During the second quarter there were 13. During the third quarter there were 14. During the fourth quarter there were 24.

Estimated doses (in millirem) to maximally exposed individuals via the liquid release pathways are given in appendix 1.2 of this report.

Gaseous Releases

During the first quarter of 2004 there were no batch releases from Waste Gas Decay Tanks (GDT) and 82 Containment Pressure Reliefs (CPR). During the second quarter there was one batch release from a GDT, one from a containment purge and 75 CPR. During the third quarter there were four batch releases from GDT and 66 CPR. During the fourth quarter there were three batch releases from GDT, four from containment purges and 59 CPR. CPR continue to be listed as batch releases in accordance with Nuclear Regulatory Commission Inspections 50-315/89016 (DRSS) and 50-316/8917 (DRSS). There were a total of eight GDT, five unit purges and 282 CPR during 2004.

In calculating the dose consequences for continuous and batch gaseous releases during 2004, the meteorological data measured at the time of the release were used.

The estimated doses (in millirem) to maximally exposed individuals via the gaseous release pathways are given in Appendix 1.2 of this report.

Solid Waste Disposition

There were 13 shipments of radioactive waste made during 2004. This included shipments made from the site and the various radioactive waste processors to the ultimate disposal site.

III. METEOROLOGICAL

Appendices A2.1, A2.2, A2.3, and A2.4 of this report contain the cumulative joint frequency distribution tables of wind speed and wind direction, corresponding to the various atmospheric stability classes for the first, second, third and fourth quarters of 2004. Hourly meteorological data is available for review and/or inspection upon request.

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IV. OFFSITE DOSE CALCULATION MANUAL (ODCM) CHANGES

The Offsite Dose Calculation Manual, PMP-6010-OSD-001, was not changed during the report period.

V. TOTAL DOSE

Section 3.2.5 of the ODCM requires that the dose or dose commitment to a real individual from all uranium fuel cycle sources in Berrien County be limited to no more than 25 millirem to the total body or any organ (except the thyroid, which is limited to no more than 75 millirem) over a period of 12 consecutive months to show conformance with the requirements of 40 CFR Part 190. The maximum cumulative dose to an individual from liquid and gaseous effluents during 2004 was well within the ODCM limits. Measurements using thermoluminescent dosimeters at 11 offsite stations indicate that the dose due to direct radiation is consistent with preoperational and current control (background) levels. This information is evaluated and documented in the Annual Radiological Environmental Operating Report for 2004.

The annual dose to the maximum individual will be estimated by first, summing the quarterly total body air dose, the quarterly skin air dose, the quarterly critical organ dose from iodines and particulates, the quarterly total body dose from liquid effluents, the quarterly critical organ dose from liquid effluents, and the Radiological Environmental Monitoring Program onsite direct radiation TLD data. These quarterly values will be summed and compared to the annual limit. The table that follows here represents the above verbal description:

Dose	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Total Body or any organ (I&P)	1.77E-02	3.17E-02	5.08E-02	5.79E-02
Total Body (Air)	2.10E-04	1.70E-04	3.90E-04	8.20E-05
Skin (Air)	5.30E-04	4.90E-04	1.70E-03	2.10E-04
Total Body (liquid)	6.25E-03	4.94E-03	3.16E-03	1.14E-02
Maximum organ (liquid)	7.60E-03	5.02E-03	3.21E-03	1.17E-02
Direct Radiation	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	3.23E-02	4.23E-02	5.93E-02	8.13E-02
Cumulative Total Dose (Total Body or any other organ) mrem				2.15E-01
Annual Dose Limit (mrem)				2.50E+01
Percent of Limit				8.61E-01

For individuals that are within the site boundary, the occupancy time is sufficiently low to compensate for any increase in the atmospheric diffusion factor above that for the site boundary.

VI. RADIATION MONITORS INOPERABLE GREATER THAN 30 DAYS

There were no radiation monitors inoperable for greater than 30 days while there was a release via that pathway.

VII. CONCLUSION

Based on the information presented in this report, it is concluded that CNP Units 1 and 2 performed their intended design function

with no demonstrable adverse affect on the health and safety of the general public.

VIII. ERRATA

Corrections were made to 1998 data due to initially not including Fe-55 and Sr-90 release data as well as errors in performing the third quarter dose calculations due to using the incorrect time span. This is documented in Condition Report 04300028. The fourth quarter of 2003 was revised to include the Fe-55 data that was not available at the time of last year's submission and the dose was not affected.

2004 Effluent and Waste Disposal Annual Report

SUPPLEMENTAL INFORMATION

Facility: Donald C. Cook Nuclear Plant
Licensee: Indiana Michigan Power Company

1 REGULATORY LIMITS

1.1 Noble Gases

The air dose in unrestricted areas due to noble gases released in gaseous effluents shall be limited to the following:

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

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

1.2 Iodines - Particulates

The dose to a member of the public from radioiodines, radioactive materials in particulate form, and radionuclides other than noble gases with half-lives greater than eight days in gaseous effluents released to unrestricted areas shall be limited to the following:

1.2.1 During any calendar quarter to ≤ 7.5 mrem to any organ.

1.2.2 During any calendar year to ≤ 15 mrem to any organ.

1.3 Liquid Effluents

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

1.3.1 During any calendar quarter to ≤ 1.5 mrem to the total body and to ≤ 5 mrem to any organ.

1.3.2 During any calendar year to ≤ 3 mrem to the total body and to ≤ 10 mrem to any organ.

1.4 Total Dose

The dose or dose commitment to a real individual from all uranium fuel cycle 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 12 consecutive months.

2 MAXIMUM PERMISSIBLE CONCENTRATIONS

2.1 Gaseous Effluents

The dose rate due to radioactive materials released in gaseous effluents from the site shall be limited to the following:

2.1.1 For noble gases: ≤ 500 mrem/yr to the total body and ≤ 3000 mrem/yr to the skin.

2.1.2 For all radioiodines and for all radioactive materials in particulate form and radionuclides (other than noble gases) with half-lives greater than eight days: ≤ 1500 mrem/yr to any organ.

The above limits are provided to insure that radioactive material discharged in gaseous effluents will not result in the exposure of an individual in an unrestricted area to annual average concentrations exceeding the limits in 10 CFR Part 20, Appendix B, Table 2, Column 1.

2.2 Liquid Effluents

The concentration of radioactive material released at any time from the site to unrestricted areas shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table 2, Column 2, for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2×10^{-4} µCi/ml total activity.

3 AVERAGE ENERGY

The average energy ($\bar{E}$) of the radionuclide mixture in releases of fission and activation gases as defined in Regulatory Guide 1.21, Appendix B, Section A.3 is not applicable because the limits used for gaseous releases are based on calculated dose to members of the public.

4 MEASUREMENTS and APPROXIMATIONS of TOTAL RADIOACTIVITY

4.1 Fission and Activation Gases

Sampled and analyzed on a 4096 channel analyzer and HpGe detector. Tritium analysis is performed using liquid scintillation counter.

4.2 Iodines

Sampled on iodine adsorbing media and analyzed on a 4096 channel analyzer and HpGe detector.

4.3 Particulates

Sampled on a glass filter and analyzed on a 4096 channel analyzer and HpGe detector. Sr-89 and Sr-90 analyses performed by offsite vendor.

4.4 Liquid Effluents

Sampled and analyzed on a 4096 channel analyzer and HpGe detector. Tritium analysis is performed using liquid scintillation counter. Fe-55, Sr-89 and Sr-90 analyses performed by offsite vendor.

5 BATCH RELEASES

5.1 Liquid

5.1.1 Number of batch releases:

13 releases in the 1st quarter, 2004
13 releases in the 2nd quarter, 2004
14 releases in the 3rd quarter, 2004
24 releases in the 4th quarter, 2004

5.1.2 Total time period for batch releases:

10022 minutes

5.1.3 Maximum time for a batch release:

220 minutes

5.1.4 Average time period for batch release:

157 minutes

5.1.5 Minimum time period for a batch release:

14 minutes

5.1.6 Average stream flow during periods of release of effluent into a flowing stream:

7.39E+5 gpm circulating water

5.2 Gaseous

5.2.1 Number of batch releases:

82 releases in the 1st quarter, 2004
77 releases in the 2nd quarter, 2004
70 releases in the 3rd quarter, 2004
66 releases in the 4th quarter, 2004

5.2.2 Total time period for batch releases:

13313 minutes

5.2.3 Maximum time for a batch release:

354 minutes

5.2.4 Average time period for batch release:

45.1 minutes

5.2.5 Minimum time period for a batch release:

12 minutes

6 ABNORMAL RELEASES

6.1 Liquid

6.1.1 Number of Releases:

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
0	0	0	0

6.1.2 Total activity released (Ci):

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
0	0	0	0

6.2 Gaseous

6.2.1 Number of Releases:

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
0	0	0	0

6.2.2 Total activity released (Ci):

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
0	0	0	0

2004 EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES
CONTINUOUS MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1. FISSION GASES					
H3	Ci	3.66E+01	2.31E+01	2.03E+01	7.70E+01
KR85	Ci	--------	--------	--------	--------
XE133	Ci	1.98E+00	--------	--------	4.18E-01
Total for Period	Ci	3.86E+01	2.31E+01	2.03E+01	7.74E+01

Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
2. IODINES					
I131	Ci	--------	--------	4.30E-07	2.68E-06
I132	Ci	--------	--------	--------	1.42E-04
Total for Period	Ci	--------	--------	4.30E-07	1.45E-04

3. PARTICULATES					
CO58	Ci	--------	1.41E-06	--------	--------
CS137	Ci	--------	--------	--------	--------
*AG110M	Ci	--------	--------	--------	--------
Total for Period	Ci	--------	1.41E-06	--------	--------

* DENOTES SUPPLEMENTAL ISOTOPES

2004 EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES
BATCH MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1. FISSION GASES					
H3	Ci	1.62E-01	3.97E-01	3.21E-02	4.18E-01
AR41	Ci	3.91E-02	3.39E-02	4.05E-02	2.93E-02
KR85M	Ci	--------	--------	--------	7.69E-04
KR85	Ci	--------	7.00E-02	2.05E-01	1.84E-01
XE131M	Ci	--------	3.14E-02	--------	7.64E-04
XE133M	Ci	3.45E-03	3.94E-02	1.16E-03	2.32E-03
XE133	Ci	1.09E+00	3.19E+00	6.25E-01	1.06E+00
XE135	Ci	3.96E-03	6.34E-02	2.03E-03	2.29E-02
Total for Period	Ci	1.30E+00	3.83E+00	9.06E-01	1.72E+00
2. IODINES					
Total for Period	Ci	--------	--------	--------	--------
3. PARTICULATES					
Total for Period	Ci	--------	--------	--------	--------

2004 EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

		Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Est. Total Error,%
A.	FISSION AND ACTIVATION GASES						
1.	Total Release	Ci	3.13E+00	3.43E+00	8.73E-01	1.72E+00	16.6
2.	Average release rate for period	uCi/sec	3.98E-01	4.36E-01	1.10E-01	2.16E-01	
3.	Percent of applicable limit	% Gamma % Beta	7.26E-03 8.74E-03	1.36E-02 1.89E-02	1.42E-02 2.18E-02	2.84E-03 3.41E-03	
B.	IODINES						
1.	Total I-131	Ci	0.00E+00	0.00E+00	4.30E-07	2.68E-06	22.6
2.	Average release rate for period	uCi/sec	0.00E+00	0.00E+00	5.41E-08	3.37E-07	
3.	Percent of applicable limit	%	0.00E+00	0.00E+00	6.78E-01	7.73E-01	
C.	PARTICULATES						
1.	Particulates with half lives>8 days	Ci	0.00E+00	1.41E-06	0.00E+00	0.00E+00	22.9
2.	Average release rate for period	uCi/sec	0.00E+00	1.79E-07	0.00E+00	0.00E+00	
3.	Percent of applicable limit	%	0.00E+00	4.22E-01	0.00E+00	0.00E+00	
4.	Gross alpha radioactivity	Ci	<9.24E-07	<1.01E-06	<1.35E-06	<1.06E-06	N/A
D.	TRITIUM						
1.	Total Release	Ci	3.69E+01	2.35E+01	2.03E+01	7.74E+01	10.7
2.	Average release rate for period	uCi/sec	4.69E+00	2.99E+00	2.56E+00	9.73E+00	
3.	Percent of applicable limit	%	2.36E-01	4.22E-01	6.78E-01	7.73E-01	

2004 EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
LIQUID EFFLUENTS
CONTINUOUS MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
H3	Ci	7.43E-02	3.13E-02	1.34E-01	1.46E-01

BATCH MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
H3	Ci	1.99E+02	1.88E+02	1.33E+02	3.57E+02
CR51	Ci	2.76E-04	--------	--------	4.41E-05
MN54	Ci	2.49E-04	8.87E-05	1.43E-05	3.62E-05
FE55	Ci	3.37E-03	5.83E-04	1.36E-03	--------
CO57	Ci	3.02E-05	1.21E-05	2.03E-05	1.46E-06
CO58	Ci	2.51E-03	1.10E-03	8.65E-04	2.90E-03
CO60	Ci	2.64E-03	9.48E-04	6.26E-04	6.83E-04
ZN65	Ci	6.36E-04	1.96E-04	--------	--------
ZR95	Ci	1.04E-04	2.32E-05	1.79E-06	1.64E-05
NB95	Ci	2.47E-04	5.33E-05	1.79E-06	2.91E-05
MO99	Ci	--------	--------	--------	1.15E-06
TC99M	Ci	--------	--------	--------	1.18E-06
AG110M	Ci	1.36E-04	4.02E-05	7.86E-05	1.39E-04
SB124	Ci	8.83E-05	2.51E-06	--------	6.31E-03
SB125	Ci	2.08E-04	6.24E-05	1.36E-05	9.00E-03
CS134	Ci	1.98E-05	--------	--------	2.23E-06
CS137	Ci	1.99E-04	2.08E-05	2.34E-05	1.13E-04
*SN113	Ci	1.68E-05	--------	--------	--------
*SN117M	Ci	--------	--------	--------	8.79E-05
*SB126	Ci	--------	--------	--------	2.57E-05
*XE133	Ci	--------	2.35E-05	--------	--------

* DENOTES SUPPLEMENTAL ISOTOPES

2004 EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES
BATCH MODE

		Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Est. Total Error,%
A.	FISSION AND ACTIVATION PRODUCTS						
1.	Total Release	Ci	1.07E-02	3.13E-03	3.00E-03	1.93E-02	12.6
2.	Average diluted concentration during period	uCi/ml	1.79E-09	5.49E-10	4.52E-10	1.99E-09	
3.	Percent of applicable limit	%	2.42E-02	7.92E-03	4.56E-03	1.77E-02	
B.	TRITIUM						
1.	Total Release	Ci	1.99E+02	1.88E+02	1.33E+02	3.57E+02	10.1
2.	Average diluted concentration during period	uCi/ml	3.32E-05	3.30E-05	2.00E-05	3.69E-05	
3.	Percent of applicable limit	%	3.32E+00	3.30E+00	2.00E+00	3.69E+00	
C.	DISSOLVED AND ENTRAINED GASES						
1.	Total Release	Ci	0.00E+00	2.35E-05	0.00E+00	0.00E+00	20.1
2.	Average diluted concentration during period	uCi/ml	0.00E+00	4.12E-12	0.00E+00	0.00E+00	
3.	Percent of applicable limit	%	0.00E+00	2.06E-06	0.00E+00	0.00E+00	
D.	GROSS ALPHA RADIOACTIVITY TOTAL RELEASE	Ci	<4.09E-05	<3.32E-05	<6.46E-05	<1.13E-04	N/A
E.	VOLUME OF WASTE RELEASED	Liters	7.69E+05	6.02E+05	7.55E+05	1.33E+06	2.00
F.	VOLUME OF DILUTION WATER USED DURING PERIOD	Liters	6.00E+09	5.70E+09	6.65E+09	9.68E+09	3.48

2004 EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES
CONTINUOUS MODE

		Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Est. Total Error,%
A.	FISSION AND ACTIVATION PRODUCTS						
1.	Total Release	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
2.	Average diluted concentration during period	uCi/ml	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.	Percent of applicable limit	%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
B.	TRITIUM						
1.	Total Release	Ci	7.43E-02	3.13E-02	1.34E-01	1.46E-01	11.8
2.	Average diluted concentration during period	uCi/ml	9.67E-11	3.83E-11	1.60E-10	2.33E-10	
3.	Percent of applicable limit	%	9.67E-06	3.83E-06	1.60E-05	2.33E-05	
C.	DISSOLVED AND ENTRAINED GASES						
1.	Total Release	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
2.	Average diluted concentration during period	uCi/ml	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.	Percent of applicable limit	%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
D.	GROSS ALPHA RADIOACTIVITY TOTAL RELEASE	Ci	<4.76E-03	<4.34E-03	<6.69E-03	<6.46E-03	N/A
E.	VOLUME OF WASTE RELEASED	Liters	3.12E+07	2.49E+07	3.41E+07	4.04E+07	2.00
F.	VOLUME OF DILUTION WATER USED DURING PERIOD	Liters	7.69E+11	8.18E+11	8.36E+11	6.23E+11	3.48

Revised 2003 EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
LIQUID EFFLUENTS
CONTINUOUS MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
H3	Ci	1.89E-02	2.68E-01	2.39E-02	1.63E-02

BATCH MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
H3	Ci	1.76E+02	5.41E+02	2.75E+02	2.52E+02
NA24	Ci	6.22E-05	3.23E-06	9.66E-05	1.90E-04
CR51	Ci	6.02E-05	4.53E-04	7.03E-05	5.10E-04
MN54	Ci	1.08E-05	1.04E-04	1.12E-04	1.76E-04
FE55	Ci	9.89E-04	8.27E-04	1.64E-03	1.79E-03
CO57	Ci	1.14E-06	3.48E-06	2.69E-06	2.01E-06
CO58	Ci	1.70E-03	2.85E-03	1.47E-03	3.21E-03
CO60	Ci	1.25E-03	2.12E-03	2.02E-03	3.17E-03
ZN65	Ci	--------	7.95E-05	2.73E-04	1.00E-04
ZR95	Ci	5.52E-05	7.71E-05	1.10E-04	7.60E-05
NB95	Ci	6.04E-05	2.73E-04	2.75E-04	1.97E-04
AG110M	Ci	3.44E-04	4.59E-04	3.09E-04	3.06E-04
SN113	Ci	--------	--------	1.45E-05	--------
SB124	Ci	4.73E-03	8.56E-03	3.47E-03	6.38E-03
SB125	Ci	4.24E-03	7.29E-03	4.57E-03	6.76E-03
I131	Ci	2.91E-05	--------	--------	--------
CS134	Ci	--------	1.62E-04	2.31E-05	2.91E-04
CS136	Ci	--------	--------	--------	1.73E-06
CS137	Ci	5.59E-06	6.87E-04	1.62E-04	2.32E-03
*AG108M	Ci	4.04E-06	5.38E-06	--------	9.09E-06
*SN117M	Ci	--------	3.30E-04	7.77E-05	4.43E-05
*SB122	Ci	--------	2.93E-06	--------	2.07E-04
*SB126	Ci	--------	3.17E-05	--------	--------
*XE133	Ci	--------	9.13E-06	1.80E-05	2.15E-05

* DENOTES SUPPLEMENTAL ISOTOPES 4th Quarter revised to add Fe55.

Revised 2003 EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES
BATCH MODE

		Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Est. Total Error,%
A.	FISSION AND ACTIVATION PRODUCTS						
1.	Total Release	Ci	1.35E-02	2.43E-02	1.46E-02	2.55E-02	12.1
2.	Average diluted concentration during period	uCi/ml	2.71E-09	2.73E-09	1.34E-09	2.32E-09	
3.	Percent of applicable limit	%	2.86E-02	3.70E-02	1.58E-02	4.65E-02	
B.	TRITIUM						
1.	Total Release	Ci	1.76E+02	5.41E+02	2.75E+02	2.52E+02	10.1
2.	Average diluted concentration during period	uCi/ml	3.52E-05	6.07E-05	2.52E-05	2.29E-05	
3.	Percent of applicable limit	%	3.52E+00	6.07E+00	2.52E+00	2.29E+00	
C.	DISSOLVED AND ENTRAINED GASES						
1.	Total Release	Ci	0.00E+00	9.13E-06	1.80E-05	2.15E-05	28.9
2.	Average diluted concentration during period	uCi/ml	0.00E+00	1.02E-12	1.65E-12	1.95E-12	
3.	Percent of applicable limit	%	0.00E+00	5.12E-07	8.26E-07	9.77E-07	
D.	GROSS ALPHA RADIOACTIVITY TOTAL RELEASE	Ci	<2.80E-05	<6.48E-05	<5.30E-05	<9.73E-05	N/A
E.	VOLUME OF WASTE RELEASED	Liters	6.11E+05	1.41E+06	1.15E+06	1.45E+06	2.00
F.	VOLUME OF DILUTION WATER USED DURING PERIOD	Liters	5.00E+09	8.92E+09	1.09E+10	1.10E+10	3.48

4th quarter revised adding Fe55 results, dose did not change.

Revised 1998 EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
LIQUID EFFLUENTS
BATCH MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
H3	Ci	5.00E+01	5.25E+01	5.62E+01	1.57E+02
CR51	Ci	7.26E-04	--------	--------	--------
MN54	Ci	9.55E-04	1.94E-03	7.15E-04	1.49E-03
FE55	Ci	5.10E-04	8.27E-03	1.98E-03	2.16E-02
CO57	Ci	1.16E-04	1.13E-04	3.51E-05	1.48E-05
CO58	Ci	2.10E-02	6.73E-03	2.34E-03	9.47E-04
CO60	Ci	1.08E-02	7.26E-03	6.10E-03	1.95E-02
ZN65	Ci	4.37E-04	--------	--------	3.79E-04
Sr90	Ci	--------	3.08E-05	--------	--------
ZR95	Ci	5.08E-04	--------	--------	4.43E-05
NB95	Ci	1.03E-03	8.23E-05	--------	6.12E-05
AG110M	Ci	2.07E-02	1.06E-02	9.43E-03	1.58E-02
SB124	Ci	7.35E-03	3.56E-04	8.17E-05	--------
SB125	Ci	1.38E-02	2.99E-03	2.80E-03	3.07E-03
CS134	Ci	9.92E-06	2.45E-04	--------	--------
CS137	Ci	1.02E-05	3.10E-04	3.83E-05	3.62E-06
*AG108M	Ci	7.09E-05	6.40E-05	2.29E-05	1.26E-04
*SN113	Ci	4.26E-05	--------	--------	--------
*SN117M	Ci	1.06E-05	--------	--------	--------

* DENOTES SUPPLEMENTAL ISOTOPES

Revised due to inclusion of Fe-55 and Sr-90 data.

Revised 1998 EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES
BATCH MODE

		Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Est. Total Error,%
A.	FISSION AND ACTIVATION PRODUCTS						
1.	Total Release	Ci	7.79E-02	3.89E-02	2.35E-02	6.29E-02	15.5
2.	Average diluted concentration during period	uCi/ml	1.20E-08	4.65E-09	2.29E-09	1.89E-08	
3.	Percent of applicable limit	%	1.51E-01	6.53E-02	3.81E-02	2.89E-01	
B.	TRITIUM						
1.	Total Release	Ci	5.00E+01	5.25E+01	5.62E+01	1.57E+02	10.1
2.	Average diluted concentration during period	uCi/ml	7.68E-06	6.28E-06	5.47E-06	4.72E-05	
3.	Percent of applicable limit	%	7.68E-01	6.28E-01	5.47E-01	4.72E+00	
C.	DISSOLVED AND ENTRAINED GASES						
1.	Total Release	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
2.	Average diluted concentration during period	uCi/ml	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.	Percent of applicable limit	%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
D.	GROSS ALPHA RADIOACTIVITY TOTAL RELEASE	Ci	<9.30E-05	<1.70E-05	<1.24E-04	<1.20E-04	N/A
E.	VOLUME OF WASTE RELEASED	Liters	1.02E+06	1.99E+06	2.13E+06	7.18E+05	2.00
F.	VOLUME OF DILUTION WATER USED DURING PERIOD	Liters	6.51E+09	8.37E+09	1.03E+10	3.33E+09	3.48

Revised due to inclusion of Fe-55 and Sr-90 data.

2004 Effluent and Waste Disposal Annual Report
Solid Waste and Irradiated Fuel Shipments

Solid Waste Shipped Offsite for Burial or Disposal			
1) Type of Waste	Unit	Estimated amount	Estimated Total Error, %
a) Spent resins, filters, sludge, evaporator bottoms, etc.	m^3 Curies	2.67E+00 2.71E+01	1.00E+00 3.75E+00
b) Dry compressible waste, contaminated equipment, etc.	m^3 Curies	5.19E+02 1.39E+02	1.00E+00 6.48E+00
c) Irradiated components, control rods, etc.	m^3 Curies	N/A	N/A
d) Other	m^3 Curies	N/A	N/A

2) Estimate of Principle Radionuclide Composition				
a)	Cs-134	4 %	Ni-63	10 %
	Cs-137	27 %	Sb-125	1 %
	Fe-55	12 %	H-3	15 %
	Co-60	28 %	Mn-54	3 %
b)	Pu-241	1 %	Fe-55	14 %
	Tc-99	1 %	Ni-63	9 %
	Co-60	75 %		

3) Solid Waste Disposition		
No. of Shipments	Mode of Transportation	Destination
2	Truck	Barnwell, SC
11	10 Truck & 1 Train	Clive, UT

4) Type of Containers used for Shipment: Containers used were excepted, exempt, and Type A packages for shipments.

5) Solidification Agent: There were no solidifications performed during this report period.

2004 Effluent and Waste Disposal Annual Report Yearly Release Rates

GASES		
Fission and Activation Gases	Total Release	9.15E+00 Curies
	Average Release Rate	2.89E-01 µCi/sec
	% of Applicable Limits	γ 1.90E-02 % β 2.64E-02 %
Iodines	Total I-131 Release	3.11E-06 Curies
	Average Release Rate	9.83E-08 µCi/sec
	% of Applicable Limit	1.05E+00 %
Particulates	Total Release	1.41E-06 Curies
	Average Release Rate	4.46E-08 µCi/sec
	% of Applicable Limit	1.05E+00 %
LIQUIDS		
Fission and Activation Products	Total Release	3.61E-02 Curies
	Average Diluted Concentration	1.29E-9 µCi/ml
	% of Applicable Limits	Total Body 8.58E-01 % Organ 2.75E-01 %

Revised 1998 Effluent and Waste Disposal Annual Report Yearly Release Rates

GASES		
Fission and Activation Gases	Total Release	1.06E+00 Curies
	Average Release Rate	3.35E-02 µCi/sec
	% of Applicable Limits	γ 3.19E-04 % β 1.81E-02 %
Iodines	Total I-131 Release	0.00E+00 Curies
	Average Release Rate	0.00E+00 µCi/sec
	% of Applicable Limit	0.00E+00 %
Particulates	Total Release	1.64E-05 Curies
	Average Release Rate	5.20E-07 µCi/sec
	% of Applicable Limit	7.80E-01 %
LIQUIDS		
Fission and Activation Products	Total Release	1.68E-01 Curies
	Average Diluted Concentration	5.88E-9 µCi/ml
	% of Applicable Limits	Total Body 8.11E-01 % Organ 5.30E-01 %

Revised due to inclusion of Fe-55 and Sr-90 data.

Summary of Maximum Individual Doses

First Quarter 2004

EFFLUENT	APPLICABLE ORGAN	ESTIMATED DOSE (mrem)	AGE GROUP	LOCATION DIST DIR (M) (Toward)	% OF APPLICABLE LIMIT	LIMIT (mrem) QTR
Liquid	Total Body	6.25E-03	Child	Receptor 1	4.17E-01	1.5E+0
Liquid	GI-Tract	7.60E-03	Adult	Receptor 1	1.52E-01	5.0E+0
Noble Gas	Air Dose (Gamma-mrad)	3.63E-04	Any Age	651 (N)	7.26E-03	5.0E+0
Noble Gas	Air dose (Beta-mrad)	8.74E-04	Any Age	651 (N)	8.74E-03	1.0E+1
Iodines and Particulates	Total Body	1.77E-02	Child	659 (N)	2.36E-01	7.5E+0

Summary of Maximum Individual Doses

Second Quarter 2004

EFFLUENT	APPLICABLE ORGAN	ESTIMATED DOSE (mrem)	AGE GROUP	LOCATION DIST DIR (M) (Toward)	% OF APPLICABLE LIMIT	LIMIT (mrem) QTR
Liquid	Total Body	4.94E-03	Child	Receptor 1	3.29E-01	1.5E+0
Liquid	GI-Tract	5.02E-03	Child	Receptor 1	1.00E-01	5.0E+0
Noble Gas	Air Dose (Gamma-mrad)	6.82E-04	Any Age	594 (S)	1.36E-02	5.0E+0
Noble Gas	Air dose (Beta-mrad)	1.89E-03	Any Age	594 (S)	1.89E-02	1.0E+1
Iodines and Particulates	Total Body	3.17E-02	Child	659 (N)	4.23E-01	7.5E+0

Summary of Maximum Individual Doses

Third Quarter 2004

EFFLUENT	APPLICABLE ORGAN	ESTIMATED DOSE (mrem)	AGE GROUP	LOCATION DIST DIR (M) (Toward)	% OF APPLICABLE LIMIT	LIMIT (mrem) QTR
Liquid	Total Body	3.16E-03	Child	Receptor 1	2.11E-01	1.5E+0
Liquid	Liver	3.21E-03	Child	Receptor 1	6.42E-02	5.0E+0
Noble Gas	Air Dose (Gamma-mrad)	7.08E-04	Any Age	651 (N)	1.42E-02	5.0E+0
Noble Gas	Air dose (Beta-mrad)	2.18E-03	Any Age	651 (N)	2.18E-02	1.0E+1
Iodines and Particulates	Total Body	5.08E-02	Child	659 (N)	6.78E-01	7.5E+0

Summary of Maximum Individual Doses

Fourth Quarter 2004

EFFLUENT	APPLICABLE ORGAN	ESTIMATED DOSE (mrem)	AGE GROUP	LOCATION DIST DIR (M) (Toward)	% OF APPLICABLE LIMIT	LIMIT (mrem) QTR
Liquid	Total Body	1.14E-02	Child	Receptor 1	7.61E-01	1.5E+0
Liquid	Liver	1.17E-02	Child	Receptor 1	2.34E-01	5.0E+0
Noble Gas	Air Dose (Gamma-mrad)	1.42E-04	Any Age	651 (N)	2.84E-03	5.0E+0
Noble Gas	Air dose (Beta-mrad)	3.41E-04	Any Age	651 (N)	3.41E-03	1.0E+1
Iodines and Particulates	Total Body	5.79E-02	Child	659 (N)	7.73E-01	7.5E+0

Summary of Maximum Individual Doses

Revised First Quarter 1998

EFFLUENT	APPLICABLE ORGAN	ESTIMATED DOSE (mrem)	AGE GROUP	LOCATION DIST DIR (M) (Toward)	% OF APPLICABLE LIMIT	LIMIT (mrem) QTR
Liquid	Total Body	4.32E-03	Child	Receptor 1	2.88E-01	1.5E+0
Liquid	GI-Tract	3.03E-02	Adult	Receptor 1	6.06E-01	5.0E+0
Noble Gas	Air Dose (Gamma-mrad)	0.00E+00	Any Age	N/A	0.00E+00	5.0E+0
Noble Gas	Air dose (Beta-mrad)	0.00E+00	Any Age	N/A	0.00E+00	1.0E+1
Iodines and Particulates	Total Body	9.77E-03	Child	659 (N)	1.30E-01	7.5E+0

Revised with the addition of Fe-55

Summary of Maximum Individual Doses

Revised Second Quarter 1998

EFFLUENT	APPLICABLE ORGAN	ESTIMATED DOSE (mrem)	AGE GROUP	LOCATION DIST DIR (M) (Toward)	% OF APPLICABLE LIMIT	LIMIT (mrem) QTR
Liquid	Total Body	7.82E-03	Adult	Receptor 1	5.21E-01	1.5E+0
Liquid	Liver	9.75E-03	Child	Receptor 1	1.95E-01	5.0E+0
Noble Gas	Air Dose (Gamma-mrad)	2.68E-05	Any Age	617 (NNE)	5.36E-04	5.0E+0
Noble Gas	Air dose (Beta-mrad)	3.04E-03	Any Age	617 (NNE)	3.04E-02	1.0E+1
Iodines and Particulates	Liver	2.72E-02	Child	659 (N)	3.63E-01	7.5E+0

Revised with the addition of Fe-55 and Sr-90

Summary of Maximum Individual Doses

Revised Third Quarter 1998

EFFLUENT	APPLICABLE ORGAN	ESTIMATED DOSE (mrem)	AGE GROUP	LOCATION DIST DIR (M) (Toward)	% OF APPLICABLE LIMIT	LIMIT (mrem) QTR
Liquid	Total Body	3.18E-03	Child	Receptor 1	2.12E-01	1.5E+0
Liquid	GI-Tract	3.39E-03	Child	Receptor 1	6.79E-02	5.0E+0
Noble Gas	Air Dose (Gamma-mrad)	4.42E-06	Any Age	617 (NNE)	8.84E-05	5.0E+0
Noble Gas	Air dose (Beta-mrad)	5.01E-04	Any Age	617 (NNE)	5.01E-04	1.0E+1
Iodines and Particulates	Total Body	5.68E-02	Child	659 (N)	7.57E-01	7.5E+0

Revised with the addition of Fe-55.

Summary of Maximum Individual Doses

Revised Fourth Quarter 1998

EFFLUENT	APPLICABLE ORGAN	ESTIMATED DOSE (mrem)	AGE GROUP	LOCATION DIST DIR (M) (Toward)	% OF APPLICABLE LIMIT	LIMIT (mrem) QTR
Liquid	Total Body	9.10E-03	Child	Receptor 1	6.06E-01	1.5E+0
Liquid	GI-Tract	9.57E-03	Child	Receptor 1	1.91E-01	5.0E+0
Noble Gas	Air Dose (Gamma-mrad)	7.28E-07	Any Age	651 (N)	1.46E-05	5.0E+0
Noble Gas	Air dose (Beta-mrad)	8.26E-05	Any Age	651 (N)	8.26E-04	1.0E+1
Iodines and Particulates	Liver	2.33E-02	Child	659 (N)	3.11E-01	7.5E+0

Revised with the addition of Fe-55.

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/1/04 - 3/31/04
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	12	7	0	0	0	20
NNE	3	7	4	0	0	0	14
NE	2	8	4	0	0	0	14
ENE	3	8	8	0	0	0	19
E	3	15	6	0	0	0	24
ESE	2	9	4	0	0	0	15
SE	5	19	5	0	0	0	29
SSE	3	12	17	0	0	0	33
S	2	6	15	3	0	0	26
SSW	0	3	4	0	0	0	7
SW	0	9	14	7	0	0	30
WSW	1	22	24	6	0	0	53
W	3	12	5	1	0	0	21
WNW	4	10	3	0	0	0	17
NW	2	11	1	0	0	0	14
NNW	4	19	15	0	0	0	38
TOTAL	38	182	136	17	0	0	374

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 50

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/1/04 - 3/31/04
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	3	2	0	0	0	8
NNE	0	0	0	0	0	0	0
NE	1	1	1	0	0	0	3
ENE	0	6	1	0	0	0	7
E	0	4	6	0	0	0	10
ESE	0	3	1	0	0	0	4
SE	0	8	2	0	0	0	10
SSE	1	6	5	0	0	0	12
S	1	7	5	1	0	0	14
SSW	1	2	7	0	0	0	10
SW	0	3	3	0	0	0	6
WSW	2	5	5	5	0	0	17
W	3	4	3	2	0	0	12
WNW	1	3	3	0	0	0	7
NW	1	5	2	0	0	0	8
NNW	3	6	3	0	0	0	12
TOTAL	17	66	49	8	0	0	140

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 50

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/1/04 - 3/31/04
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED SP10M DIRECTION DIR10M LAPSE DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	5	0	0	0	0	6
NNE	1	3	0	0	0	0	4
NE	1	3	2	0	0	0	6
ENE	0	4	2	0	0	0	6
E	2	4	3	0	0	0	9
ESE	4	10	0	0	0	0	14
SE	3	7	0	0	0	0	10
SSE	0	3	2	0	0	0	5
S	2	4	7	1	0	0	14
SSW	0	1	8	0	0	0	9
SW	0	2	5	0	0	0	7
WSW	1	2	2	3	0	0	8
W	3	6	11	2	0	0	22
WNW	1	3	15	1	0	0	20
NW	5	9	7	0	0	0	21
NNW	0	9	6	0	0	0	15
TOTAL	24	75	70	7	0	0	176

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 50

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/1/04 - 3/31/04
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	12	28	7	2	0	0	51
NNE	10	15	2	0	0	0	27
NE	7	20	0	0	0	0	27
ENE	12	19	23	0	0	0	54
E	13	19	11	0	0	0	43
ESE	13	31	5	0	0	0	49
SE	14	31	19	0	0	0	64
SSE	13	21	19	0	0	0	54
S	7	20	33	7	0	0	67
SSW	3	15	28	3	3	0	52
SW	5	16	36	2	0	0	59
WSW	12	22	30	4	0	0	68
W	15	33	39	7	0	0	94
WNW	6	36	27	3	0	0	72
NW	9	43	36	0	0	0	88
NNW	14	39	30	0	0	0	83
TOTAL	165	408	345	28	3	0	952

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 50

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/1/04 - 3/31/04
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	9	2	0	0	0	0	11
NNE	4	4	0	0	0	0	9
NE	11	4	0	0	0	0	18
ENE	14	19	1	0	0	0	35
E	19	6	2	0	0	0	27
ESE	10	2	2	0	0	0	14
SE	19	14	3	0	0	0	37
SSE	22	21	11	0	0	0	55
S	17	24	24	2	0	0	69
SSW	6	2	12	0	1	0	22
SW	7	12	1	1	0	0	22
WSW	6	3	9	0	0	0	18
W	2	0	1	0	0	0	3
WNW	0	5	1	0	0	0	6
NW	3	1	0	0	0	0	4
NNW	1	0	0	0	0	0	1
TOTAL	150	119	67	3	1	0	351

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 50

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/1/04 - 3/31/04
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	0	0	0	0
NNE	1	1	0	0	0	0	2
NE	2	0	0	0	0	0	2
ENE	5	5	0	0	0	0	12
E	6	1	0	0	0	0	8
ESE	8	0	0	0	0	0	8
SE	12	2	0	0	0	0	15
SSE	11	6	0	0	0	0	22
S	9	2	0	0	0	0	13
SSW	0	0	0	0	0	0	1
SW	1	0	0	0	0	0	1
WSW	0	0	0	0	0	0	0
W	1	0	0	0	0	0	1
WNW	0	0	0	0	0	0	0
NW	1	0	0	0	0	0	1
NNW	1	0	0	0	0	0	1
TOTAL	58	17	0	0	0	0	87

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 50

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/1/04 - 3/31/04
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	0	0	0	0
NNE	1	0	0	0	0	0	1
NE	2	0	0	0	0	0	2
ENE	2	0	0	0	0	0	2
E	5	0	0	0	0	0	5
ESE	7	0	0	0	0	0	7
SE	9	0	0	0	0	0	11
SSE	11	1	0	0	0	0	14
S	6	3	0	0	0	0	9
SSW	1	0	0	0	0	0	1
SW	1	0	0	0	0	0	1
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	1	0	0	0	0	0	1
NNW	0	0	0	0	0	0	0
TOTAL	46	4	0	0	0	0	54

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 50

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/1/04 - 3/31/04
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	26	50	16	2	0	0	96
NNE	20	30	6	0	0	0	57
NE	26	36	7	0	0	0	72
ENE	36	61	35	0	0	0	135
E	48	49	28	0	0	0	126
ESE	44	55	12	0	0	0	111
SE	62	81	29	0	0	0	176
SSE	61	70	54	0	0	0	185
S	44	66	84	14	0	0	212
SSW	11	23	59	3	4	0	102
SW	14	42	59	10	0	0	126
WSW	22	54	70	18	0	0	164
W	27	55	59	12	0	0	153
WNW	12	57	49	4	0	0	122
NW	22	69	46	0	0	0	137
NNW	23	73	54	0	0	0	150
TOTAL	498	871	667	63	4	0	2134

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 50

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/1/04 - 6/30/04
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6	54	26	0	0	0	86
NNE	2	2	1	0	0	0	5
NE	0	4	1	0	0	0	5
ENE	3	5	4	1	0	0	13
E	1	8	1	0	0	0	10
ESE	1	11	5	0	0	0	17
SE	1	14	3	0	0	0	18
SSE	5	13	0	0	0	0	18
S	2	26	33	9	1	0	71
SSW	2	9	26	6	2	0	45
SW	1	45	44	0	0	0	90
WSW	8	24	11	2	0	0	45
W	9	26	10	0	0	0	45
WNW	5	30	3	0	0	0	38
NW	7	32	2	0	0	0	41
NNW	22	79	32	1	0	0	134
TOTAL	75	382	202	19	3	0	681

PERIODS OF CALM(HOURS): 26
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 3

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/1/04 - 6/30/04
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	4	4	0	0	0	9
NNE	0	1	0	0	0	0	1
NE	1	0	0	0	0	0	1
ENE	0	1	0	0	0	0	1
E	1	2	0	0	0	0	3
ESE	2	1	0	0	0	0	3
SE	1	1	0	0	0	0	2
SSE	0	1	0	0	0	0	1
S	1	0	4	0	0	0	5
SSW	0	3	4	2	0	0	9
SW	0	5	4	0	0	0	9
WSW	0	3	0	0	0	0	3
W	0	2	0	0	0	0	2
WNW	0	3	0	0	0	0	3
NW	1	2	0	0	0	0	3
NNW	6	9	0	0	0	0	15
TOTAL	14	38	16	2	0	0	70

PERIODS OF CALM(HOURS): 26
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 3

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/1/04 - 6/30/04
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	4	1	0	0	0	6
NNE	2	2	0	0	0	0	4
NE	1	0	0	0	0	0	1
ENE	1	0	0	0	0	0	1
E	1	0	0	0	0	0	1
ESE	0	2	0	0	0	0	2
SE	0	0	0	0	0	0	0
SSE	1	1	0	0	0	0	2
S	1	7	1	0	1	0	10
SSW	0	4	6	1	0	0	11
SW	2	7	6	1	0	0	16
WSW	1	1	1	0	0	0	3
W	1	1	0	0	0	0	2
WNW	1	2	0	0	0	0	3
NW	0	0	0	0	0	0	0
NNW	0	5	0	0	0	0	5
TOTAL	13	36	15	2	1	0	67

PERIODS OF CALM(HOURS): 26
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 3

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/1/04 - 6/30/04
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	15	69	17	0	0	0	101
NNE	4	10	0	0	0	0	14
NE	6	3	4	0	0	0	13
ENE	3	4	2	0	0	0	9
E	2	5	1	0	0	0	8
ESE	8	18	2	0	0	0	28
SE	4	6	7	0	0	0	17
SSE	5	11	5	0	0	0	21
S	3	21	20	1	0	0	45
SSW	1	9	37	25	7	0	79
SW	5	20	25	0	0	0	50
WSW	5	4	7	0	0	0	16
W	5	3	1	0	0	0	9
WNW	5	7	0	0	0	0	12
NW	9	6	0	0	0	0	15
NNW	22	36	8	3	0	0	69
TOTAL	102	232	136	29	7	0	506

PERIODS OF CALM(HOURS): 26
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 3

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/1/04 - 6/30/04
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	17	13	0	0	0	0	30
NNE	12	10	0	0	0	0	22
NE	15	7	0	0	0	0	22
ENE	11	6	0	0	0	0	18
E	12	12	1	0	0	0	26
ESE	20	21	0	0	0	0	41
SE	18	21	3	0	0	0	42
SSE	16	33	1	0	0	0	50
S	18	61	9	2	0	0	91
SSW	7	11	5	0	0	0	23
SW	9	20	2	0	0	0	31
WSW	6	13	2	0	0	0	21
W	8	4	0	0	0	0	12
WNW	8	4	0	0	0	0	12
NW	10	5	0	0	0	0	15
NNW	16	8	1	0	0	0	25
TOTAL	203	249	24	2	0	0	481

PERIODS OF CALM(HOURS): 26
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 3

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/1/04 - 6/30/04
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	9	1	0	0	0	0	10
NNE	7	1	0	0	0	0	8
NE	9	0	0	0	0	0	9
ENE	14	3	0	0	0	0	17
E	10	2	0	0	0	0	12
ESE	18	5	0	0	0	0	23
SE	21	3	0	0	0	0	25
SSE	22	9	0	0	0	0	33
S	18	7	0	0	0	0	26
SSW	9	1	0	0	0	0	11
SW	4	1	0	0	0	0	6
WSW	4	0	0	0	0	0	4
W	3	0	0	0	0	0	3
WNW	4	0	0	0	0	0	4
NW	5	1	0	0	0	0	6
NNW	2	0	0	0	0	0	2
TOTAL	159	34	0	0	0	0	199

PERIODS OF CALM(HOURS): 26
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 3

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/1/04 - 6/30/04
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	0	0	0	0	0	2
NNE	1	0	0	0	0	0	1
NE	5	0	0	0	0	0	5
ENE	10	0	0	0	0	0	10
E	12	1	0	0	0	0	14
ESE	20	0	0	0	0	0	21
SE	9	0	0	0	0	0	11
SSE	21	1	0	0	0	0	27
S	33	0	0	0	0	0	39
SSW	23	1	0	0	0	0	25
SW	4	0	0	0	0	0	5
WSW	5	0	0	0	0	0	5
W	5	0	0	0	0	0	5
WNW	2	0	0	0	0	0	2
NW	3	0	0	0	0	0	3
NNW	2	0	0	0	0	0	2
TOTAL	157	3	0	0	0	0	177

PERIODS OF CALM(HOURS): 26
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 3

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/1/04 - 6/30/04
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	51	145	48	0	0	0	244
NNE	28	26	1	0	0	0	55
NE	37	14	5	0	0	0	56
ENE	42	19	6	1	0	0	69
E	39	30	3	0	0	0	74
ESE	69	58	7	0	0	0	135
SE	54	45	13	0	0	0	115
SSE	70	69	6	0	0	0	152
S	76	122	67	12	2	0	287
SSW	42	38	78	34	9	0	203
SW	25	98	81	1	0	0	207
WSW	29	45	21	2	0	0	97
W	31	36	11	0	0	0	78
WNW	25	46	3	0	0	0	74
NW	35	46	2	0	0	0	83
NNW	70	137	41	4	0	0	252
TOTAL	723	974	393	54	11	0	2181

PERIODS OF CALM(HOURS): 26
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 3

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/1/04 - 9/30/04
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	19	92	0	0	0	0	113
NNE	5	6	0	0	0	0	11
NE	5	13	2	0	0	0	20
ENE	4	7	0	0	0	0	11
E	9	8	0	0	0	0	17
ESE	3	5	0	0	0	0	8
SE	7	9	0	0	0	0	16
SSE	7	15	0	0	0	0	22
S	15	51	13	0	0	0	80
SSW	0	30	18	0	0	0	48
SW	11	56	10	0	0	0	78
WSW	8	38	11	0	0	0	57
W	16	36	0	0	0	0	52
WNW	13	12	0	0	0	0	26
NW	24	21	0	0	0	0	48
NNW	34	39	0	0	0	0	77
TOTAL	180	438	54	0	0	0	684

PERIODS OF CALM(HOURS): 276
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 7

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/1/04 - 9/30/04
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	4	0	0	0	0	6
NNE	2	0	0	0	0	0	2
NE	1	0	0	0	0	0	1
ENE	2	0	0	0	0	0	2
E	0	0	0	0	0	0	0
ESE	4	0	0	0	0	0	4
SE	0	0	0	0	0	0	0
SSE	1	0	0	0	0	0	1
S	3	5	1	0	0	0	10
SSW	1	5	1	0	0	0	7
SW	1	3	1	0	0	0	5
WSW	1	3	0	0	0	0	4
W	5	0	0	0	0	0	5
WNW	1	0	0	0	0	0	1
NW	2	0	0	0	0	0	4
NNW	2	2	0	0	0	0	4
TOTAL	28	22	3	0	0	0	56

PERIODS OF CALM(HOURS): 276
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 7

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/1/04 - 9/30/04
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	5	4	0	0	0	0	9
NNE	0	1	0	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	2	1	0	0	0	0	3
E	2	0	0	0	0	0	2
ESE	0	1	0	0	0	0	1
SE	0	1	0	0	0	0	1
SSE	1	0	0	0	0	0	1
S	6	4	1	0	0	0	11
SSW	0	6	2	0	0	0	8
SW	0	4	1	0	0	0	5
WSW	2	2	0	0	0	0	4
W	1	2	0	0	0	0	3
WNW	4	0	0	0	0	0	4
NW	4	1	0	0	0	0	5
NNW	5	2	0	0	0	0	7
TOTAL	32	29	4	0	0	0	65

PERIODS OF CALM(HOURS): 276
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 7

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/1/04 - 9/30/04
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	12	11	0	0	0	0	23
NNE	8	3	0	0	0	0	12
NE	4	3	0	0	0	0	7
ENE	2	2	0	0	0	0	4
E	1	1	0	0	0	0	2
ESE	8	2	0	0	0	0	10
SE	0	1	0	0	0	0	2
SSE	5	2	0	0	0	0	7
S	16	14	0	0	0	0	34
SSW	4	6	4	0	0	0	16
SW	6	11	5	0	0	0	22
WSW	0	11	3	0	0	0	14
W	6	22	0	0	0	0	28
WNW	3	3	0	0	0	0	6
NW	10	0	0	0	0	0	11
NNW	8	2	0	0	0	0	11
TOTAL	93	94	12	0	0	0	209

PERIODS OF CALM(HOURS): 276
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 7

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/1/04 - 9/30/04
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	37	12	0	0	0	0	51
NNE	28	15	0	0	0	0	43
NE	25	9	0	0	0	0	35
ENE	12	6	1	0	0	0	21
E	8	2	0	0	0	0	13
ESE	21	11	0	0	0	0	36
SE	7	0	0	0	0	0	10
SSE	16	1	0	0	0	0	20
S	48	33	3	0	0	0	90
SSW	9	11	4	1	0	0	29
SW	11	25	1	0	0	0	40
WSW	9	12	0	0	0	0	22
W	9	8	0	0	0	0	18
WNW	11	1	0	0	0	0	13
NW	12	4	0	0	0	0	16
NNW	8	1	0	0	0	0	9
TOTAL	271	151	9	1	0	0	466

PERIODS OF CALM(HOURS): 276
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 7

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/1/04 - 9/30/04
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	11	0	0	0	0	0	11
NNE	10	0	0	0	0	0	11
NE	18	0	0	0	0	0	19
ENE	18	0	0	0	0	0	21
E	28	0	0	0	0	0	31
ESE	35	4	0	0	0	0	43
SE	6	1	0	0	0	0	9
SSE	24	0	0	0	0	0	27
S	48	9	2	0	0	0	70
SSW	7	0	0	0	0	0	10
SW	4	1	0	0	0	0	13
WSW	3	0	0	0	0	0	5
W	0	1	0	0	0	0	7
WNW	3	0	0	0	0	0	3
NW	2	0	0	0	0	0	3
NNW	6	0	0	0	0	0	8
TOTAL	223	16	2	0	0	0	291

PERIODS OF CALM(HOURS): 276
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 7

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/1/04 - 9/30/04
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6	0	0	0	0	0	8
NNE	2	0	0	0	0	0	2
NE	13	0	0	0	0	0	18
ENE	28	0	0	0	0	0	36
E	41	0	0	0	0	0	61
ESE	37	0	0	0	0	0	56
SE	35	0	0	0	0	0	64
SSE	38	0	0	0	0	0	80
S	35	0	0	0	0	0	59
SSW	17	0	0	0	0	0	27
SW	1	0	0	0	0	0	5
WSW	4	0	0	0	0	0	5
W	1	0	0	0	0	0	2
WNW	1	0	0	0	0	0	1
NW	3	0	0	0	0	0	4
NNW	1	0	0	0	0	0	2
TOTAL	263	0	0	0	0	0	430

PERIODS OF CALM(HOURS): 276
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 7

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/1/04 - 9/30/04
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	92	123	0	0	0	0	221
NNE	55	25	0	0	0	0	82
NE	66	25	2	0	0	0	100
ENE	68	16	1	0	0	0	98
E	89	11	0	0	0	0	126
ESE	108	23	0	0	0	0	158
SE	55	12	0	0	0	0	102
SSE	92	18	0	0	0	0	158
S	171	116	20	0	0	0	354
SSW	38	58	29	1	0	0	145
SW	34	100	18	0	0	0	168
WSW	27	66	14	0	0	0	111
W	38	69	0	0	0	0	115
WNW	36	16	0	0	0	0	54
NW	57	26	0	0	0	0	91
NNW	64	46	0	0	0	0	118
TOTAL	1090	750	84	1	0	0	2201

PERIODS OF CALM(HOURS): 276
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 7

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/1/04 - 12/31/04
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6	16	0	0	0	0	22
NNE	1	4	1	0	0	0	6
NE	2	6	6	0	0	0	14
ENE	0	19	3	0	0	0	22
E	0	13	1	0	0	0	14
ESE	1	11	0	0	0	0	12
SE	0	14	0	0	0	0	14
SSE	1	10	7	1	0	0	19
S	0	10	10	0	0	0	20
SSW	0	4	5	0	0	0	9
SW	1	6	13	6	0	0	26
WSW	0	13	13	0	0	0	26
W	1	9	0	0	0	0	10
WNW	0	12	0	0	0	0	12
NW	0	15	0	0	0	0	15
NNW	4	16	4	0	0	0	24
TOTAL	17	178	63	7	0	0	265

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 0

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/1/04 - 12/31/04
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	1	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	3	1	2	0	0	0	6
ENE	0	5	0	0	0	0	5
E	0	6	1	0	0	0	7
ESE	0	0	0	0	0	0	0
SE	0	3	1	0	0	0	4
SSE	0	4	5	1	0	0	10
S	1	5	3	0	0	0	9
SSW	0	3	4	1	0	0	8
SW	0	2	1	1	0	0	4
WSW	1	2	4	1	0	0	8
W	0	3	1	0	0	0	4
WNW	1	3	0	0	0	0	4
NW	1	3	0	0	0	0	4
NNW	2	3	0	0	0	0	5
TOTAL	9	43	23	4	0	0	79

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 0

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/1/04 - 12/31/04
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1	2	2	0	0	5
NNE	0	3	0	0	0	0	3
NE	0	2	2	0	0	0	4
ENE	0	3	0	0	0	0	3
E	1	4	1	0	0	0	6
ESE	1	2	0	0	0	0	3
SE	2	3	0	0	0	0	5
SSE	2	9	2	1	0	0	14
S	0	6	5	0	0	0	11
SSW	1	6	6	0	0	0	13
SW	0	2	8	5	0	0	15
WSW	0	1	4	0	0	0	5
W	2	4	4	0	0	0	10
WNW	1	7	1	0	0	0	9
NW	1	8	1	0	0	0	10
NNW	2	3	1	0	0	0	6
TOTAL	13	64	37	8	0	0	122

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 0

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/1/04 - 12/31/04
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	8	26	7	1	0	0	42
NNE	6	13	6	0	0	0	25
NE	3	14	3	2	0	0	22
ENE	7	37	0	1	0	0	45
E	11	21	2	0	0	0	34
ESE	10	13	3	0	0	0	26
SE	6	30	6	0	0	0	42
SSE	9	47	16	0	0	0	72
S	2	49	47	6	0	0	104
SSW	1	21	51	6	0	0	79
SW	2	7	20	4	0	0	33
WSW	1	8	35	17	0	0	61
W	2	19	26	13	0	0	60
WNW	4	27	20	4	0	0	55
NW	4	25	27	2	0	0	58
NNW	9	33	44	3	0	0	89
TOTAL	85	390	313	59	0	0	847

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 0

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/1/04 - 12/31/04
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	8	16	1	0	0	0	25
NNE	10	9	7	0	0	0	26
NE	16	22	0	0	0	0	38
ENE	13	21	4	0	0	0	38
E	22	23	1	0	0	0	46
ESE	25	15	0	0	0	0	40
SE	22	26	1	0	0	0	49
SSE	29	28	19	0	0	0	76
S	12	46	16	1	0	0	75
SSW	3	27	24	4	0	0	58
SW	4	19	4	0	0	0	27
WSW	0	8	9	1	0	0	18
W	3	6	5	0	0	0	14
WNW	2	6	8	0	0	0	16
NW	5	5	3	0	0	0	13
NNW	6	9	5	1	0	0	21
TOTAL	180	286	107	7	0	0	580

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 0

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/1/04 - 12/31/04
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	1	0	0	0	0	4
NNE	3	0	0	0	0	0	3
NE	9	0	0	0	0	0	9
ENE	21	4	0	0	0	0	25
E	19	0	0	0	0	0	19
ESE	19	0	0	0	0	0	19
SE	10	1	0	0	0	0	11
SSE	17	1	0	0	0	0	18
S	9	7	0	0	0	0	16
SSW	1	0	0	0	0	0	1
SW	1	1	0	0	0	0	2
WSW	1	0	0	0	0	0	1
W	1	0	0	0	0	0	1
WNW	1	0	0	0	0	0	1
NW	1	0	0	0	0	0	1
NNW	1	0	0	0	0	0	1
TOTAL	117	15	0	0	0	0	132

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 0

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/1/04 - 12/31/04
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	0	0	0	0	0	1
NNE	1	0	0	0	0	0	1
NE	5	0	0	0	0	0	5
ENE	31	0	0	0	0	0	31
E	27	1	0	0	0	0	28
ESE	19	0	0	0	0	0	19
SE	40	1	0	0	0	0	41
SSE	25	0	0	0	0	0	25
S	19	5	0	0	0	0	24
SSW	3	0	0	0	0	0	3
SW	2	0	0	0	0	0	2
WSW	2	0	0	0	0	0	2
W	1	0	0	0	0	0	1
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
TOTAL	176	7	0	0	0	0	183

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 0

SITE: AEP COOK

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/1/04 - 12/31/04
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SP10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	26	60	11	3	0	0	100
NNE	21	29	14	0	0	0	64
NE	38	45	13	2	0	0	98
ENE	72	89	7	1	0	0	169
E	80	68	6	0	0	0	154
ESE	75	41	3	0	0	0	119
SE	80	78	8	0	0	0	166
SSE	83	99	49	3	0	0	234
S	43	128	81	7	0	0	259
SSW	9	61	90	11	0	0	171
SW	10	37	46	16	0	0	109
WSW	5	32	65	19	0	0	121
W	10	41	36	13	0	0	100
WNW	9	55	29	4	0	0	97
NW	12	56	31	2	0	0	101
NNW	24	64	54	4	0	0	146
TOTAL	597	983	543	85	0	0	2208

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION: 0
HOURS OF MISSING DATA: 0

OFF-SITE DOSE CALCULATION MANUAL

The Off-Site Dose Calculation Manual, PMP-6010-OSD-001, was not revised during this reporting period.