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WNP-2 RADIOACTIVE EFFLUENT RELEASE REPORT

JANUARY THROUGH DECEMBER 1993

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

LICENSE NO. NPF-21

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1.0 INTRODUCTION

This report is submitted in compliance with 10CFR50.36a(a)(2) and Technical Specification 6.9.1.11. It includes a summary of the quantities of radioactive liquid and gaseous effluents and solid radwaste released from WNP-2 during the previous twelve months of operation. Effluent data is summarized on a quarterly basis.

2.0 LIQUID EFFLUENTS

The radwaste liquid effluents were released in "batch mode" during the reporting period. Twenty eight (28) liquid batch releases occurred during the first calendar quarter, 41 batch releases were performed during the second calendar quarter. There were 77 releases during the third calendar quarter and 55 releases in the fourth calendar quarter. The total time period for the batch releases was 399 hours, with the maximum, minimum and average time periods for a release being 5.33, 0.75, and 1.98 hours, respectively. The volume of dilution water considered is assumed to be the total volume of recirculating cooling tower blowdown flow for the period. The average flow rate of the Columbia River during January through December 1993 was $9.3\text{E}+04$ cubic feet per second.

Computer runs were performed to verify compliance with Offsite Dose Calculation Manual (ODCM) limits. The first quarter calculated dose for the maximum individual (adult age group) was $9.3\text{E}-04$ mrem whole body and $1.8\text{E}-03$ to the maximum organ. The second quarter was $3.7\text{E}-02$ whole body and $5.9\text{E}-02$ to the maximum organ. The third quarter was $7.5\text{E}-02$ mrem whole body and $1.2\text{E}-01$ mrem to the maximum organ and the fourth quarter calculated dose was $6.7\text{E}-03$ mrem whole body and $9.8\text{E}-03$ mrem to the maximum organ.

The liquid batch releases were recirculated prior to sampling. A representative sample was obtained and analyzed for each batch release. A composite of the batch samples for each quarter was analyzed for strontium and iron. The methods used for measuring the total radioactivity were gamma spectroscopy, liquid scintillation and proportional counting. Table 2-1 provides a summation of all liquid releases during this reporting period.

The percent of MPC limit in Table 2-1 is based on the total of the MPC fractions using the nuclides in Table 2-2 and the concentrations listed in the former 10CFR20, Appendix B, Table 2, Column 2.

Estimated total errors are listed in Table 2-1, and are propagated from individual error estimates of sample activity, sample volume, tank volume, and tank homogeneity. The estimated total errors were calculated by obtaining the square root of the sum of the squares of the individual error contributions and multiplying by 1.96 for a 95 percent confidence level.

A storm drain pond is located approximately 1500 feet northeast of the WNP-2. No routine releases of water containing radioactivity occurs to the storm drain pond. However, there are pathways which could contribute to tritium being found. Some normal sources, such as HVAC air wash units and steam releases which could condense on building roofs, could provide a source of tritium. A gradual buildup of other radioactive materials from extremely low levels of effluent activity is expected. The levels of tritium, and other radionuclides present and anticipated, are an insignificant contribution to site doses.

While the storm drain pond is not intended to be a radioactive liquid disposal area, some accumulation of radioactive materials will occur through these unpreventable paths. Although the storm drain pond is within the site boundary, there is a physical barrier (fence) to restrict unauthorized entry. There are also administrative controls to prevent intentional release of radioactive materials to this pond. Since there is no occupancy of the storm drain pond area, and no consumption of the water, there is no actual dose from the release of the described radioactivity to the pond. Even under worst case assumptions, the tritium produced doses were calculated to be less than 0.02 millirem per year.

This storm drain pond is a sample station within the Radiological Environmental Monitoring Program (REMP).

WNP-2 LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES
Report Period: January - December 1993

Table 2-1

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year	Est Total Error* %
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A. Fission and activation products

Total release (not including tritium, gases, alpha) (Ci)	7.0E-03	6.8E-02	1.1E-01	1.8E-02	2.1E-01	2.2E+01
Average diluted concentration during period (uCi/ml)	6.8E-09	8.6E-08	1.1E-07	1.9E-08	5.4E-08	
Percent of MPC limit (%)	4.4E-02	4.0E-01	5.3E-01	7.6E-02	2.6E-01	

B. Tritium

Total release (Ci)	1.3E+01	7.7E+00	7.9E+00	5.6E+00	3.4E+01	2.2E+01
Average diluted concentration during period (uCi/ml)	1.3E-05	9.7E-06	7.5E-06	5.9E-06	9.0E-06	
Percent of MPC limit (%)	4.3E-01	3.2E-01	2.5E-01	2.0E-01	3.0E-01	

C. Dissolved and entrained gases

Total release (Ci)	<2.3E-04	1.2E-04	3.4E-03	1.4E-03	5.0E-03	2.2E+01
Average diluted concentration during period (uCi/ml)	<2.3E-10	1.5E-10	3.2E-09	1.5E-09	1.3E-09	
Percent of MPC limit (%)	<1.2E-04	7.5E-05	1.6E-03	7.5E-04	6.5E-04	

D. Gross alpha radioactivity

Total release (Ci)	5.9E-11	1.3E-10	2.1E-10	1.2E-10	5.2E-10	2.3E+01
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E.

Volume of waste prior to dilution (liters)	1.6E+06	2.4E+06	4.4E+06	3.1E+06	1.1E+07	1.5E+01
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F.

Volume of dilution water used during period (liters)	1.0E+09	7.9E+08	1.0E+09	9.5E+08	3.8E+09	1.5E+01
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* At 95% confidence level

WNP-2 LIQUID EFFLUENTS - SOURCE TERMS
Report Period: January - December 1993

Table 2-2

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
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A. Fission and activation products

Strontium-89	5.9E-05	6.0E-05	1.7E-04	2.6E-04	5.5E-04
Strontium-90	8.4E-06	1.3E-05	1.4E-05	2.2E-05	5.7E-05
Cesium-134	1.9E-05	2.0E-03	3.9E-03	4.4E-04	6.3E-03
Cesium-137	5.0E-05	5.3E-03	1.2E-02	1.1E-03	1.9E-02
Iodine-131	9.1E-05	4.2E-04	8.2E-04	<5.5E-05	1.3E-03
Cobalt-58	2.6E-04	2.4E-03	2.1E-03	3.8E-04	5.2E-03
Cobalt-60	2.0E-03	2.5E-02	3.2E-02	1.3E-02	7.2E-02
Iron-59	<1.2E-04	<2.9E-04	<1.6E-04	<1.2E-04	<2.9E-04
Zinc-65	1.8E-03	2.4E-02	3.8E-02	1.3E-03	6.5E-02
Manganese-54	2.4E-04	5.8E-03	5.0E-03	6.0E-04	1.2E-02
Chromium-51	3.8E-04	5.1E-04	7.8E-04	<4.1E-04	1.7E-03
Zirconium-Niobium-95	<6.3E-05	<3.3E-04	<1.9E-04	<1.3E-04	<3.3E-04
Molybdenum-99	<5.0E-04	<2.4E-03	<1.4E-03	<8.9E-04	<2.4E-03
Technetium-99m	4.1E-06	<1.2E-04	4.2E-04	<4.0E-05	4.2E-04
Barium-Lanthanum-140	<1.8E-04	6.9E-04	4.6E-06	<2.3E-04	6.9E-04
Cerium-141	<7.2E-05	<1.7E-04	<9.2E-05	<5.9E-05	<1.7E-04
Cerium-144	<2.7E-04	<1.1E-03	<5.2E-04	<4.2E-04	<1.1E-03
Iron-55	1.9E-03	1.5E-03	8.3E-04	5.0E-04	4.7E-03
Others					
Na-24	7.6E-05	4.1E-04	1.5E-03	<5.2E-05	2.0E-03
Copper-64	<1.0E-02	<2.0E-02	1.5E-02	<1.2E-02	1.5E-02
ANTIMONY-124	<9.3E-05	<3.1E-04	1.3E-04	2.8E-05	1.6E-04
ANTIMONY-125	<1.1E-04	<4.0E-04	8.6E-05	<2.5E-04	8.6E-05
Total for period (above)*	7.0E-03	6.8E-02	1.1E-01	1.8E-02	2.1E-01

B. Dissolved and entrained gases

Xenon-133	<1.2E-04	<1.0E-04	1.2E-03	1.9E-04	1.4E-03
Xenon-135	<2.3E-04	1.2E-04	2.2E-03	1.2E-03	3.5E-03

C. Tritium

Tritium	1.3E+01	7.7E+00	7.9E+00	5.6E+00	3.4E+01
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* Less than (<) values are not included in the totals.

3.0 GASEOUS EFFLUENTS

The gaseous radwaste effluents from WNP-2 were released from three (3) release points:

1. Main Plant Vent - mixed mode release
2. Turbine Building - ground level release
3. Radwaste Building - ground level release

The gaseous source terms from each release point are listed in Tables 3-1, 3-2, and 3-3. Table 3-4 provides a summation of the total activity released, the average release rate, the percent of ODCM Requirement For Operability limit, gross alpha radioactivity and the estimated total error associated with the measurements of radioactivity in the gaseous effluents.

Radioactivity measurements for gaseous effluent releases are performed for fission and activation gases by collecting the samples on charcoal traps and analyzing them using gamma spectroscopy. Tritium is sampled by freeze trapping and analyzed by liquid scintillation counting. Particulates and iodines are sampled using particulate filters and charcoal cartridges. Both are analyzed using gamma spectroscopy. E_{bar} was 0.433 mev per disintegration.

Total error estimates are propagated from individual error estimates of sample volume, sample activity and effluent flow rate measurements. The overriding uncertainty in all cases is in the measurement of the effluent and sample volumes. The estimated error was determined to be 36 percent at the 95 percent confidence level.

The percent of ODCM limit for fission and activation gases (air dose) was determined for locations 1 through 9 and was based on quarterly limits of ten (10) millirads for beta and five (5) millirads for gamma. Locations 1 through 9 were used to determine the most restrictive value to be used in Table 3-4 for each quarter.

The percent of ODCM limit calculations for iodines, particulates with half-lives greater than eight (8) days and tritium are based on the quarterly limit of 7.5 mrem to any organ. Locations 4 through 9 were used to determine the most restrictive value to be used in Table 3-4 for each quarter.

Calculations were performed for releases using the NRC GASPAR II computer program and parameters as outlined in the ODCM. Quarterly doses were determined at the following locations:



WNP-2 GASEOUS EFFLUENTS BY LOCATION
1993

Table 3-0A

Location	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year
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1. Site Boundary (ground and inhalation pathways)
1.2 miles

Beta air dose (mrad)	5.2E-02	2.2E-03	1.0E-02	3.4E-03	6.8E-02
% ODCM limit	0.52	0.02	0.10	0.03	0.34
Gamma air dose (mrad)	8.8E-02	1.2E-03	1.0E-02	2.9E-03	1.0E-01
% ODCM limit	1.76	0.02	0.20	0.06	1.02
Highest organ dose (mrem)	9.6E-02	2.9E-02	2.6E-02	2.7E-02	1.8E-01
% ODCM limit	1.28	0.39	0.35	0.36	1.19

2. Beyond Site Boundary* (ground and inhalation pathways)
3.3-3.9 miles ESE

Beta air dose (mrad)	2.5E-03	7.0E-04	9.1E-04	6.8E-04	4.8E-03
% ODCM limit	0.03	0.01	0.01	0.01	0.02
Gamma air dose (mrad)	3.4E-03	1.1E-03	1.5E-03	6.9E-04	6.7E-03
% ODCM limit	0.07	0.02	0.03	0.01	0.07
Highest organ dose (mrem)	1.8E-02	4.1E-03	2.5E-03	2.1E-03	2.7E-02
% ODCM limit	0.24	0.05	0.03	0.03	0.18

3. Beyond Site Boundary** (ground and inhalation pathways)
3.0 miles ESE

Beta air dose (mrad)	1.8E-03	8.3E-04	2.2E-03	8.4E-04	5.7E-03
% ODCM limit	0.02	0.01	0.02	0.01	0.03
Gamma air dose (mrad)	1.5E-03	1.4E-03	3.7E-03	1.3E-03	7.9E-03
% ODCM limit	0.03	0.03	0.07	0.03	0.08
Highest organ dose (mrem)	1.4E-02	4.2E-03	2.7E-03	2.8E-03	2.4E-02
% ODCM limit	0.19	0.06	0.04	0.04	0.16

4. Land Use Census Location (ground, inhalation, and vegetable pathways)
4.5 miles ESE

Beta air dose (mrad)	1.5E-03	1.6E-04	6.0E-04	4.8E-04	2.7E-03
% ODCM limit	0.02	0.00	0.01	0.00	0.01
Gamma air dose (mrad)	1.9E-03	1.1E-04	9.5E-04	4.2E-04	3.4E-03
% ODCM limit	0.04	0.00	0.02	0.01	0.03
Highest organ dose (mrem)	3.1E-02	9.8E-03	7.6E-03	5.2E-03	5.4E-02
% ODCM limit	0.41	0.13	0.10	0.07	0.36

* At location having the highest X/Q values for mixed mode release

** At location having the highest X/Q values for ground level release

WNP-2 GASEOUS EFFLUENTS BY LOCATION
1993

Table 3-0B

Location	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year
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5. Land Use Census Location (ground, inhalation, and meat pathways)
6.4 miles SE

Beta air dose (mrad)	1.2E-03	9.7E-05	4.8E-03	2.5E-04	6.3E-03
% ODCM limit	0.01	0.00	0.05	0.00	0.03
Gamma air dose (mrad)	1.5E-03	5.7E-05	5.4E-03	3.1E-04	7.3E-03
% ODCM limit	0.03	0.00	0.11	0.01	0.07
Highest organ dose (mrem)	9.1E-03	5.5E-03	9.1E-04	1.2E-03	1.7E-02
% ODCM limit	0.12	0.07	0.01	0.02	0.11

6. Land Use Census Location (ground, inhalation, and vegetable pathways)
4.2 miles ESE

Beta air dose (mrad)	1.8E-03	2.1E-04	6.8E-04	8.3E-04	3.5E-03
% ODCM limit	0.02	0.00	0.01	0.01	0.02
Gamma air dose (mrad)	2.4E-03	1.7E-04	1.1E-03	1.2E-03	4.8E-03
% ODCM limit	0.05	0.00	0.02	0.02	0.05
Highest organ dose (mrem)	3.6E-02	1.2E-02	8.8E-03	6.0E-03	6.3E-02
% ODCM limit	0.48	0.16	0.12	0.08	0.42

7. Land Use Census Location (ground and inhalation pathways)
4.3 miles NE

Beta air dose (mrad)	2.4E-04	2.5E-04	1.9E-04	7.4E-05	7.5E-04
% ODCM limit	0.00	0.00	0.00	0.00	0.00
Gamma air dose (mrad)	1.7E-04	4.1E-04	2.2E-04	6.5E-05	8.7E-04
% ODCM limit	0.00	0.01	0.00	0.00	0.01
Highest organ dose (mrem)	1.8E-03	1.0E-03	7.1E-04	6.0E-04	4.1E-03
% ODCM limit	0.02	0.01	0.01	0.01	0.03

8. Land Use Census Location (ground, inhalation, and vegetable pathways)
4.1 miles ENE

Beta air dose (mrad)	1.0E-03	1.2E-04	2.7E-04	3.5E-04	1.7E-03
% ODCM limit	0.01	0.00	0.00	0.00	0.01
Gamma air dose (mrad)	1.1E-03	7.8E-05	4.3E-04	3.6E-04	2.0E-03
% ODCM limit	0.02	0.00	0.01	0.01	0.02
Highest organ dose (mrem)	1.8E-02	7.1E-03	3.2E-02	3.5E-03	6.1E-02
% ODCM limit	0.24	0.09	0.43	0.05	0.40

WNP-2 GASEOUS EFFLUENTS BY LOCATION
1993

Table 3-0C

Location	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year
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9. Land Use Census Location (ground, inhalation and cow milk pathways)
7.2 miles ESE

Beta air dose (mrad)	6.6E-04	7.6E-05	1.6E-04	2.1E-04	1.1E-03
% ODCM limit	0.01	0.00	0.00	0.00	0.01
Gamma air dose (mrad)	7.1E-04	5.1E-05	1.8E-04	1.6E-04	1.1E-03
% ODCM limit	0.01	0.00	0.00	0.00	0.01
Highest organ dose (mrem)	7.2E-03	9.4E-03	5.8E-03	1.8E-03	2.4E-02
% ODCM limit	0.10	0.13	0.08	0.02	0.16

In addition to the reactor facility, WNP-2 has a permanent laundry facility located approximately 0.75 miles from the reactor building. Its ventilation system contains HEPA filters on the discharge and is continuously monitored for particulates. Also, the backup chemistry laboratory within the Emergency Operations Facility (EOF) is located adjacent to the laundry facility. The radiochemical hood within the backup chemistry lab contains HEPA filters and is monitored for radioactive releases when in operation. Gamma spectrometry indicated no radioactive material present other than that attributable to natural background.

The Auxiliary Boiler and associated heating steam system has been included in the Offsite Dose Calculation Manual (ODCM) as a possible unmonitored source of radioactive effluent when in operation. Its operation as a contaminated system should be at or below $2 \text{ E}+06$ picocuries per liter in the Auxiliary Boiler water. Tritium is the primary radionuclide present; the estimated steam leakrate, determined by the difference between makeup and blowdown waters, would have produced <0.3 percent of the Turbine Building Tritium releases.

Operation of the Auxiliary Boiler as a contaminated system does not increase the probability of the occurrence of an accident previously evaluated because safe shutdown and accident occurrence are not directly affected by its operation. Periodic sampling of the concentration of Tritium in the Auxiliary Boiler water will be tracked and trended to assure compliance to the $2 \text{ E}+06$ picocurie per liter source term.

Three strontium quarterly composite samples for the first quarter of the year, were lost due to the lack of chemical yield factors. The results for the Turbine Building and two of the three Radwaste Building vents were lost, PER 293-422 was initiated. The strontium values from the previous quarter were used for effluent calculations. The strontium levels for the following quarter were also compared with the previous quarter. There was no indication of a change in release rate for the quarter in which the sample data was lost. Strontium levels are an indication of a leveled release.

Concern about the release of Tritium from steam vents and its condensation onto roof surfaces was addressed in PER 293-050. The concern was addressed in ODCM amendment 14, August 1993, which discussed the design bases of the HVAC system and its environmental effects. The effluent condensations due to natural events allows water to be sent to a storm-drain pond; as stated on Page 2 of this report, the radiological consequences are insignificant.

Recalibration of the REA Elevated Release Duct Isokinetic Flow and Sampling Control System by a maintenance routine was missed and identified by PER 293-1421. The system surveillance for flow control was carried out and found still in tolerance. The maintenance task was completed and the system returned to service.

There were no abnormal releases of gaseous effluent during this reporting period.

WNP-2 GASEOUS EFFLUENTS - SOURCE TERMS
Mixed Mode Releases - Main Plant Vent
Report Period: January - December 1993

Table 3-1A

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
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A. Fission gases

Krypton-85	<3.0E+01	<3.7E+01	<2.6E+01	<3.5E+01	<3.7E+01
Krypton-85m	2.0E+00	<1.6E-01	9.7E-01	5.2E-01	3.5E+00
Krypton-87	8.5E-01	<2.6E-01	3.2E+00	<5.2E-01	4.0E+00
Krypton-88	1.2E+00	<7.1E-01	1.7E+00	8.1E-02	3.0E+00
Xenon-133	7.2E+00	8.5E-02	4.9E-01	2.4E+00	1.0E+01
Xenon-133m	<1.1E+00	<8.6E-01	8.5E-02	<1.4E+00	8.5E-02
Xenon-135	2.1E+00	3.2E-01	1.1E+00	9.5E-01	4.5E+00
Xenon-135m	3.7E+00	<7.1E-01	4.6E+00	4.0E-01	8.7E+00
Xenon-138	6.2E-01	<1.4E+00	3.7E+01	<1.6E+00	3.7E+01
Others					
Argon-41	5.6E-01	1.1E-01	8.7E+00	3.9E+00	1.3E+01
Xenon-137	<7.7E+00	<9.2E+00	1.5E+01	<5.6E+00	1.5E+01
Total for period (above)*	1.8E+01	5.1E-01	7.3E+01	8.3E+00	1.0E+02

B. Iodines

Iodine-131	5.4E-03	1.3E-03	9.6E-04	2.4E-04	7.9E-03
Iodine-132	2.8E-03	<6.8E-05	<3.3E-05	<4.5E-05	2.8E-03
Iodine-133	2.4E-02	3.6E-03	1.5E-03	9.4E-04	3.0E-02
Iodine-134	<3.4E-04	<2.1E-04	<8.5E-05	<1.5E-04	<3.4E-04
Iodine-135	1.9E-03	<1.9E-04	<1.0E-04	<1.3E-04	1.9E-03
Total for period (above)*	3.4E-02	4.9E-03	2.5E-03	1.2E-03	4.3E-02

* Less than (<) values are not included in the totals.

WNP-2 GASEOUS EFFLUENTS - SOURCE TERMS
Mixed Mode Releases - Main Plant Vent
Report Period: January - December 1993

Table 3-1B

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
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C. Particulates

Strontium-89	5.7E-05	5.5E-05	3.4E-05	4.7E-05	1.9E-04
Strontium-90	<1.0E-06	<1.0E-06	<1.1E-04	<1.8E-07	<1.1E-04
Cesium-134	6.7E-06	<5.5E-05	<1.9E-05	<2.7E-05	6.7E-06
Cesium-137	7.2E-06	<5.8E-05	<2.8E-05	<3.5E-05	7.2E-06
Barium-Lanthanum-140	1.0E-04	<2.4E-04	3.8E-04	5.0E-05	5.3E-04
Molybdenum-99	<1.1E-03	<4.6E-04	<2.4E-04	<3.0E-04	<1.1E-03
Cerium-141	<1.3E-04	<1.5E-05	<1.5E-05	<2.2E-05	<1.3E-04
Cerium-144	<4.0E-04	<2.1E-04	<1.0E-04	<1.3E-04	<4.0E-04
Cobalt-58	<1.5E-04	<4.0E-05	<3.6E-05	<2.0E-05	<1.5E-04
Cobalt-60	4.7E-05	<1.0E-04	7.4E-05	<4.5E-05	1.2E-04
Iron-59	<4.3E-04	<1.2E-04	<4.9E-05	<7.0E-05	<4.3E-04
Manganese-54	<1.7E-04	<3.4E-05	<1.7E-05	<2.6E-05	<1.7E-04
Zinc-65	3.3E-05	<9.8E-05	<3.6E-05	<5.9E-05	3.3E-05

Others

NONE

Total for period (above)*

Others with T 1/2 < 8 days

Barium-139	3.5E-02	8.5E-03	1.4E-02	2.1E-02	7.9E-02
Strontium-91	1.2E-05	<8.6E-05	<4.6E-05	<7.0E-05	1.2E-05
Cesium-138	1.2E-02	<4.6E-04	4.0E+00	2.9E-03	4.0E+00
Rubidium-89	9.7E-04	<3.1E-03	1.4E-04	<6.6E-03	1.1E-03
Bromine-82	<2.1E-03	<4.3E-05	8.3E-06	<3.8E-05	8.3E-06
Total with T 1/2 < 8 days*	4.8E-02	8.5E-03	4.0E+00	2.4E-02	4.1E+00

D. Tritium

Tritium	7.1E+00	6.2E+00	3.6E+00	1.7E+00	1.9E+01
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Total building release	2.5E+01	6.7E+00	7.6E+01	1.0E+01	1.2E+02
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* Less than (<) values are not included in the totals.

WNP-2 GASEOUS EFFLUENTS - SOURCE TERMS
 Ground Level Releases - Turbine Building
 Report Period: January - December 1993

Table 3-2A

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
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A. Fission gases

Krypton-85	<1.4E+02	<7.8E+01	<4.2E+03	<1.5E+02	<4.2E+03
Krypton-85m	<5.2E-01	<8.1E-01	<1.4E+01	<3.5E-01	<1.4E+01
Krypton-87	<8.4E-01	<1.5E+00	<8.2E+01	<1.6E+00	<8.2E+01
Krypton-88	<2.0E+00	<5.8E+00	<7.8E+01	<1.0E+00	<7.8E+01
Xenon-133	1.8E+00	1.8E+00	<5.8E+01	<2.2E+00	3.6E+00
Xenon-133m	<4.6E+00	<6.6E+00	<1.2E+02	<4.1E+00	<1.2E+02
Xenon-135	1.7E+00	7.4E-01	<2.4E+01	1.1E+00	3.5E+00
Xenon-135m	2.0E+00	2.0E+00	<5.1E+02	1.1E+00	5.1E+00
Xenon-138	6.8E+00	2.3E+00	<9.5E+02	<3.2E+00	9.1E+00
Others					
NONE					
Total for period (above)*	1.2E+01	6.8E+00	0.0E+00	2.2E+00	2.1E+01

B. Iodines

Iodine-131	2.3E-03	1.1E-03	3.2E-04	3.6E-04	4.1E-03
Iodine-132	6.3E-03	3.7E-03	<2.1E-04	<1.9E-04	9.9E-03
Iodine-133	9.6E-03	7.1E-03	1.6E-03	3.0E-03	2.1E-02
Iodine-134	<7.8E-04	<1.1E-03	<5.1E-04	<3.0E-04	<1.1E-03
Iodine-135	1.2E-02	4.6E-03	<5.3E-04	4.9E-04	1.7E-02
Total for period (above)*	3.0E-02	1.6E-02	1.9E-03	3.8E-03	5.2E-02

* Less than (<) values are not included in the totals.

WNP-2 GASEOUS EFFLUENTS - SOURCE TERMS
 Ground Level Releases - Turbine Building
 Report Period: January - December 1993

Table 3-2B

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
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C. Particulates

Strontium-89	8.8E-04	7.8E-04	5.7E-04	8.6E-04	3.1E-03
Strontium-90	5.1E-06	4.5E-06	2.4E-06	<2.1E-06	1.2E-05
Cesium-134	<7.5E-05	<3.2E-04	<1.4E-04	<4.1E-04	<4.1E-04
Cesium-137	<1.2E-04	<4.4E-04	<1.8E-04	<5.1E-04	<5.1E-04
Barium-Lanthanum-140	2.4E-03	1.3E-03	3.1E-03	1.2E-02	1.9E-02
Molybdenum-99	<9.9E-04	<3.2E-03	<1.5E-03	<9.5E-03	<9.5E-03
Cerium-141	<2.0E-04	<3.3E-04	<9.2E-05	<3.8E-04	<3.8E-04
Cerium-144	<4.9E-04	<1.9E-03	<6.8E-04	<2.4E-03	<2.4E-03
Cobalt-58	<2.0E-04	<3.0E-04	<1.7E-04	<4.8E-04	<4.8E-04
Cobalt-60	<8.0E-05	<4.0E-04	<1.4E-04	<4.4E-04	<4.4E-04
Iron-59	<2.0E-04	<8.9E-04	<2.0E-04	<7.9E-04	<8.9E-04
Manganese-54	<6.4E-05	<2.7E-04	<5.9E-05	<2.8E-04	<2.8E-04
Zinc-65	<1.8E-04	<4.9E-04	<3.0E-04	<7.1E-04	<7.1E-04

Others

NONE

Total for period (above)*	3.3E-03	2.1E-03	3.7E-03	1.3E-02	2.2E-02
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Others with T 1/2 < 8 days

Strontium-91	7.7E-04	1.7E-04	1.7E-04	4.8E-04	1.6E-03
Rubidium-89	6.1E-04	<5.0E-04	4.4E-07	<1.4E-03	6.1E-04
Cesium-138	1.2E+00	1.8E-01	1.7E+00	7.3E-01	3.8E+00
Barium-139	6.5E-01	2.7E-01	7.2E-01	3.1E-01	1.9E+00
Total with T 1/2 < 8 days*	1.9E+00	4.5E-01	2.4E+00	1.0E+00	5.8E+00

D. Tritium

Tritium	4.2E+01	4.1E+01	3.3E+01	1.3E+01	1.3E+02
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Total building release	5.5E+01	4.8E+01	3.3E+01	1.5E+01	1.5E+02
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* Less than (<) values are not included in the totals.

WNP-2 GASEOUS EFFLUENTS - SOURCE TERMS
 Ground Level Releases - Radwaste Building
 Report Period: January - December 1993

Table 3-3A

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
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A. Fission gases

Krypton-85	<2.9E+01	<2.6E+01	<1.3E+03	<4.9E+01	<1.3E+03
Krypton-85m	<1.5E-01	<2.5E-01	<4.1E+00	<2.2E-01	<4.1E+00
Krypton-87	<2.2E+00	<3.9E-01	<4.8E+00	<6.7E+00	<6.7E+00
Krypton-88	<4.8E+00	<6.9E-01	<8.3E+00	<1.1E+01	<1.1E+01
Xenon-133	3.9E+00	8.9E-01	1.2E+00	<1.0E+01	6.0E+00
Xenon-133m	<6.2E+00	<2.0E+00	<2.2E+01	<2.5E+01	<2.5E+01
Xenon-135	3.4E+00	9.5E-01	3.7E+00	8.8E-01	8.9E+00
Xenon-135m	2.0E+00	<2.6E-01	8.2E-01	3.0E-01	3.1E+00
Xenon-138	2.8E+00	<1.8E+00	<1.1E+01	<7.8E+00	2.8E+00
Others					
NONE					
Total for period (above)*	1.2E+01	1.8E+00	5.7E+00	1.2E+00	2.1E+01

B. Iodines

Iodine-131	5.9E-04	1.6E-04	1.4E-04	1.0E-04	9.9E-04
Iodine-132	1.6E-04	1.4E-05	3.7E-06	4.2E-05	2.2E-04
Iodine-133	1.6E-03	8.2E-04	6.4E-04	6.6E-04	3.7E-03
Iodine-134	<1.3E-04	<2.7E-05	<1.9E-04	<3.8E-05	<1.9E-04
Iodine-135	4.9E-04	4.2E-04	8.2E-05	2.7E-04	1.3E-03
Total for period (above)*	2.9E-03	1.4E-03	8.6E-04	1.1E-03	6.2E-03

* Less than (<) values are not included in the totals.

WNP-2 GASEOUS EFFLUENTS - SOURCE TERMS
 Ground Level Releases - Radwaste Building
 Report Period: January - December 1993

Table 3-3B

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
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C. Particulates

Strontium-89	1.4E-06	2.0E-04	1.4E-05	1.9E-07	2.1E-04
Strontium-90	<4.1E-07	3.3E-06	1.5E-06	<5.3E-07	4.7E-06
Cesium-134	<6.8E-04	<4.4E-05	<4.9E-05	<3.0E-05	<6.8E-04
Cesium-137	<5.6E-04	<5.4E-05	<6.4E-05	<3.6E-05	<5.6E-04
Barium-Lanthanum-140	<1.5E-03	<1.7E-04	<2.2E-04	<9.5E-05	<1.5E-03
Molybdenum-99	<6.7E-03	<5.4E-04	<6.3E-04	<4.7E-04	<6.3E-03
Cerium-141	<3.9E-04	<3.6E-05	<3.8E-05	<2.4E-05	<3.9E-04
Cerium-144	<2.0E-03	<1.7E-04	<2.1E-04	<1.3E-04	<2.0E-03
Cobalt-58	<6.4E-04	<3.7E-05	<3.9E-05	<2.4E-05	<6.4E-04
Cobalt-60	<1.4E-03	<7.3E-05	<7.4E-05	<3.9E-05	<1.4E-03
Iron-59	<2.1E-03	<1.2E-04	<1.3E-04	<7.5E-05	<2.1E-03
Manganese-54	<5.8E-04	<3.6E-05	<3.9E-05	<2.3E-05	<5.8E-04
Zinc-65	<1.7E-03	<8.9E-05	<9.7E-05	<5.6E-05	<1.7E-03
Others					
NONE					
Total for period (above)*	1.4E-06	2.0E-04	1.5E-05	1.9E-07	2.2E-04
Others with T 1/2 < 8 days					
NONE					

D. Tritium

Tritium	1.2E+00	8.3E-01	9.4E-01	3.3E-01	3.3E+00
Total building release	1.3E+01	2.7E+00	6.7E+00	1.5E+00	2.4E+01

* Less than (<) values are not included in the totals.

WNP-2 GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
Report Period: January - December 1993

Table 3-4

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year	Est Total Error**
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A. Fission and activation gases

Total release (Ci)	4.3E+01	9.2E+00	7.8E+01	1.2E+01	1.4E+02	3.6E+01
Average release rate (uCi/s)	5.5E+00	1.2E+00	9.9E+00	1.5E+00	4.5E+00	
Percent of ODCM limit (%)	1.8E+00	2.8E-02	2.0E-01	5.8E-02	1.0E+00	

B. Iodines

Total release (Ci)	6.7E-02	2.3E-02	5.2E-03	6.1E-03	1.0E-01	3.6E+01
Average release rate (uCi/s)	8.6E-03	2.9E-03	6.6E-04	7.6E-04	3.2E-03	
Percent of ODCM limit (%) **	4.8E-01	1.6E-01	4.3E-01	8.0E-02	4.2E-01	

C. Particulates

Particulates with half-lives >8 days (Ci)	3.5E-03	2.3E-03	4.2E-03	1.3E-02	2.3E-02	3.6E+01
Average release rate (uCi/s)	4.5E-04	3.0E-04	5.2E-04	1.7E-03	7.4E-04	
Percent of ODCM limit (%) **	4.8E-01	1.6E-01	4.3E-01	8.0E-02	4.2E-01	
Gross alpha radioactivity	6.2E-11	1.5E-11	3.3E-11	2.4E-11	1.3E-10	

D. Tritium

Total release (Ci)	5.1E+01	4.8E+01	3.7E+01	1.5E+01	1.5E+02	3.6E+01
Average release rate (uCi/s)	6.5E+00	6.1E+00	4.7E+00	1.9E+00	4.8E+00	
Percent of ODCM limit (%) **	4.8E-01	1.6E-01	4.3E-01	8.0E-02	4.2E-01	

* At 95% confidence level

** Percent of limit based on combined Iodines,
Particulates with half-lives greater than
8 days and Tritium.

WNP-2 GASEOUS EFFLUENTS - BATCH RELEASES

Table 3-5

Report Period: January - December

1993

Type	Number	Total Time (hrs)	Maximum Time (hrs)	Minimum Time (hrs)	Mean Time (hrs)
Purge	19	86.4	25.0	0.2	4.5
Vent	52	88.4	12.5	0.4	1.7

4.0 SOLID RADWASTE (Required by ODCM)

A: CLASS A

1. Container Volumes

*	B-25 Box	92.5 ft ³
*	55 gal Drum	7.5 ft ³
*	55 gal Drum with overpack	11.6 ft ³
*	EL-142 Poly HIC	132.4 ft ³
*	ES-190 Steel Liner	170.2 ft ³

2. Total Curies

*	2.15E+02 Ci
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3. Principal Radionuclides

<u>Nuclide</u>	<u>Percent</u>	<u>Curie</u>
Co-60	4.27E+01	9.17E+01
Zn-65	2.32E+01	4.98E+01
Fe-55	1.85E+01	3.99E+01
Ni-63	4.89E+00	1.05E+01
Cs-137	3.08E+00	6.61E+00
C-14	2.25E+00	4.83E+00
Mn-54	2.03E+00	4.36E+00
CS-134	1.19E+00	2.54E+00
Co-58	6.22E-01	1.34E+00
Sr-89	5.94E-01	1.28E+00
H-3	3.93E-01	8.50E-01
Cr-51	2.93E-01	6.30E-01
Ba/La-140	1.11E-01	2.39E-01

4. Source

*	Resins	1.87E+02 Ci
*	DAW	2.65E+01 Ci
*	Irradiated Components	None
*	Other (Solidified Liquids)	1.67E+00 Ci

5. Type of Container

*	All containers shipped as LSA
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6. Solidification Agent

- * Aquaset used to solidify 270.2 ft³ of aqueous liquid.

B. Class B

1. Container Volumes

- * EL-142 132.4 ft³

2. Total Curies

- * 8.26E+02 Ci

3. Principal Radionuclides

<u>Nuclide</u>	<u>Percent</u>	<u>Curies</u>
Zn-65	3.45E+01	2.85E+02
Co-60	3.10E+01	2.56E+02
Fe-55	1.61E+01	1.33E+02
Cr-51	4.46E+00	3.68E+01
Cs-137	3.44E+00	2.84E+01
Co-58	3.07E+00	2.53E+01
Mn-54	2.57E+00	2.12E+01
Ni-63	2.31E+00	1.91E+01
Cd-109	8.67E-01	7.16E+00
Ba/La-140	3.92E-01	3.24E+00
Nb-95	3.11E-01	2.57E+00
I-131	2.02E-01	1.66E+00
Zr-95	1.83E-01	1.52E+00
Sr-89	1.54E-01	1.27E+00
Cs-134	1.32E-01	1.09E+00

4. Source

- * Resins

5. Type of Container

- * All containers shipped as LSA

6. Solidification Agent

- * None

C. CLASS C

- * None

4.1 SOLID RADWASTE (Required by Reg. Guide 1.21)

TABLE 4-1

WNP-2 SOLID WASTE SHIPMENTS

JANUARY - DECEMBER 1993

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL

1. Type of Waste

Waste Stream	Unit	Annual Cumulative	Est. Total Error %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m ³ Ci	1.74E+02 1.01E+03	2.5E+01
b. Dry active waste, contaminated equip., etc.	m ³ Ci	2.44E+02 2.65E+01	2.5E+01
c. Irradiated components, control rods, etc.	m ³ Ci	NO SHIPMENT	
d. Other, (solidified liquid)	m ³ Ci	7.65E+00 1.67E+00	2.5E+01

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

a. Dewatered Spent Resins

Nuclide	%	Ci
Co-60	3.37E+01	3.42E+02
Zn-65	3.29E+01	3.34E+02
Fe-55	1.51E+01	1.53E+02
Cr-51	3.68E+00	3.73E+01
Cs-137	3.45E+00	3.49E+01
Ni-63	2.92E+00	2.96E+01
Co-58	2.63E+00	2.66E+01
Mn-54	2.52E+00	2.55E+01
Cd-109	7.07E-01	7.16E+00
C-14	5.36E-01	5.43E+00
Cs-134	3.58E-01	3.63E+00
Ba/La-140	3.43E-01	3.47E+00

b. Dry Active Waste (DAW)

Nuclide	%	Ci
Fe-55	7.10E+01	1.84E+01
Co-60	2.27E+01	5.90E+00
Zn-65	3.70E+00	9.61E-01
H-3	1.48E+00	3.85E-01
Cs-137	4.61E-01	1.20E-01
Sb-125	3.17E-01	8.25E-02
Mn-54	2.66E-01	6.93E-02

c. Irradiated Components - None



d. Other Waste (Solidified Liquid)

Nuclide	%	Ci
Fe-55	7.00E+01	1.17E+00
Co-60	9.84E+00	1.65E-01
Cr-51	9.31E+00	1.56E-01
Zn-65	7.46E+00	1.25E-01
Co-58	1.13E+00	1.89E-02
I-131	6.78E-01	1.14E-02
Ba/La-140	5.10E-01	8.54E-03
Mn-54	4.16E-01	6.96E-03

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
46	Tractor - Trailer via Public Highway	US Ecology, Inc. P.O. Box 638 Hanford Res. Richland, WA. 99352

5.0 METEOROLOGY

The meteorological data contained in Tables 5-1 through 5-10 were obtained from the WNP-2 meteorological tower located 2500 ft west of WNP-2. Data was recovered from 33 ft and 245 ft levels. The meteorological data is a composite file from both the manual and automated data recovery systems for the calendar year 1993.

The year 1993 was drier, warmer and the winds calmer than 1992. Precipitation was near normal for 1993 with the occurrence of fog and haze and blowing dust much less than 1992. There were few arctic outbreaks of cold air. 1993 was very rainy in the fall. Snowfall and rain were below normal. In summary, the dispersive environment for WNP-2 for 1993 was below normal.

The automated data recovery system continued to function at greater than 90 percent joint data recovery when power was provided by WNP-2 to the meteorological tower system. Power outages contributed to a total data recovery near 90 percent for 1993. All significant outages coincided with scheduled and unscheduled power outages at WNP-2. Lightning strikes and thunderstorms were of minor concern and had no significant effect on meteorological tower operations. Backup alternative power was added in 1993.

Tables 5-1 through 5-8 list the joint frequency distributions at the 33 ft and the 245 ft levels for 1993 by quarter with 5-9 and 5-10 listing the annual joint frequency distributions for 1993. The NRC stability classes A-G and seven wind categories along with the 16 wind sectors were used to prepare each joint frequency table. The annual joint frequency tables should be used to evaluate any vents and purges during 1993 as the releases were random in time.

Calibrations performed in 1993 produced no values exceeding WNP-2 FSAR meteorological equipment tolerances. Therefore, no corrections have been applied to the raw data.

WNP-2 TABLE 5-1 33 FIRST QUARTER 1993

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS A								
UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.049
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS B								
UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS C								
UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.195	0.000	0.195
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.19

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS D								
UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.049	0.000	0.000	0.049	0.049	0.097	0.049	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.049	0.390
3.13	0.000	0.049	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.049	0.000	0.049	0.049	0.000	0.439	0.195	0.877
5.36	0.097	0.049	0.000	0.000	0.000	0.000	0.000	0.097	0.000	0.000	0.000	0.097	0.049	0.195	0.487	0.731	1.803
8.05	0.049	0.292	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.341	0.390	1.121
10.73	0.000	0.341	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.049	0.000	0.439
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.097	0.000	0.097
TOTAL	0.15	0.78	0.15	0.00	0.05	0.05	0.10	0.15	0.05	0.05	0.00	0.15	0.10	0.19	1.41	1.36	4.73

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION										ATMOSPHERIC STABILITY CLASS E							
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.097	0.097	0.097	0.097	0.146	0.049	0.000	0.000	0.097	0.097	0.049	0.097	0.244	0.049	0.049	0.195	1.462
1.34	1.316	1.072	0.731	0.487	0.195	0.146	0.634	0.634	1.072	0.731	0.731	0.487	0.682	1.170	1.657	1.949	13.694
3.13	2.290	1.852	1.559	0.244	0.049	0.292	1.121	2.437	1.511	0.536	0.292	0.097	0.341	1.072	5.312	4.630	23.635
5.36	1.706	0.634	0.292	0.000	0.000	0.097	0.341	1.316	0.877	0.097	0.244	0.244	0.536	1.511	3.314	2.047	13.255
8.05	0.487	0.634	0.097	0.000	0.000	0.000	0.049	0.146	0.634	0.731	0.146	0.000	0.195	0.682	1.511	0.585	5.897
10.73	0.244	0.097	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.195	0.000	0.000	0.000	0.000	0.049	0.049	0.634
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	6.14	4.39	2.78	0.83	0.39	0.58	2.14	4.53	4.19	2.39	1.46	0.93	2.00	4.48	11.89	9.45	58.58

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION										ATMOSPHERIC STABILITY CLASS F							
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.195	0.000	0.049	0.097	0.097	0.000	0.000	0.049	0.097	0.097	0.049	0.195	0.049	0.146	0.097	0.097	1.316
1.34	0.682	0.536	0.536	0.244	0.146	0.097	0.146	0.536	0.390	0.341	0.536	0.390	0.780	0.975	2.485	1.170	9.990
3.13	1.316	0.926	0.828	0.146	0.000	0.000	0.487	1.754	1.706	0.341	0.146	0.049	0.097	0.780	2.047	1.121	11.745
5.36	0.000	0.000	0.487	0.000	0.000	0.000	0.292	1.023	0.439	0.195	0.049	0.049	0.146	0.487	0.682	0.097	3.947
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.146	0.097	0.097	0.000	0.000	0.049	0.049	0.049	0.000	0.487
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.341	0.000	0.000	0.000	0.000	0.000	0.000	0.341
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	2.19	1.46	1.90	0.49	0.24	0.10	0.93	3.51	2.73	1.41	0.78	0.68	1.12	2.44	5.36	2.49	27.83

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION										ATMOSPHERIC STABILITY CLASS G							
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.049	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.049	0.000	0.000	0.049	0.097	0.000	0.049	0.000	0.341
1.34	0.195	0.195	0.146	0.049	0.049	0.049	0.097	0.097	0.292	0.292	0.146	0.146	0.244	0.487	0.536	0.585	3.606
3.13	0.195	0.390	0.097	0.049	0.000	0.000	0.049	0.195	0.195	0.000	0.000	0.049	0.195	0.292	0.682	0.877	3.265
5.36	0.000	0.000	0.195	0.000	0.000	0.000	0.000	0.195	0.000	0.000	0.000	0.000	0.000	0.244	0.731	0.049	1.413
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.44	0.63	0.44	0.10	0.05	0.05	0.15	0.49	0.54	0.29	0.15	0.24	0.54	1.02	2.00	1.51	8.63

TOTAL HOURS CONSIDERED ARE 2052

OWIND MEASURED AT 10.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	8.9	7.3	5.3	1.4	0.7	0.8	3.4	8.7	7.5	4.1	2.4	2.0	3.8	8.1	20.9	14.8	100.0

OVERALL WIND SPEED FREQUENCY

MAX WIND SPEED (M/S): 0.268 1.341 3.129 5.364 8.047 10.729 11.176

Ave WIND SPEED (M/S): 0.134 0.805 2.235 4.247 6.706 9.388 10.952

WIND SPEED FREQUENCY: 3.12 27.68 39.52 20.47 7.70 1.41 0.10

THE CONVERSION FACTOR APPLIED TO THE WIND SPEED CLASSES IS 0.447



WNP-2 TABLE 5-2 QUARTER 1 1993 245 FT

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS A								
QUMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.049
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS B								
QUMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS C								
QUMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.196	0.000	0.196
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.20

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS D								
QUMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.049	0.000	0.000	0.000	0.000	0.000	0.049	0.000	0.000	0.098
1.34	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.049	0.000	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.147
3.13	0.000	0.098	0.000	0.000	0.000	0.049	0.000	0.049	0.000	0.000	0.098	0.000	0.049	0.098	0.293	0.049	0.782
5.36	0.049	0.049	0.000	0.000	0.000	0.000	0.000	0.098	0.049	0.000	0.000	0.000	0.049	0.293	0.587	0.489	1.662
8.05	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.049	0.000	0.000	0.098	0.049	0.440	0.391	1.075	
10.73	0.098	0.391	0.098	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.147	0.098	0.831
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.24	0.54	0.10	0.00	0.00	0.05	0.00	0.24	0.10	0.05	0.10	0.10	0.10	0.49	1.47	1.03	4.59

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS E								
UWMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.196	0.147	0.098	0.147	0.000	0.000	0.000	0.000	0.098	0.049	0.147	0.000	0.000	0.000	0.049	0.000	0.929
1.34	1.271	0.929	0.489	0.684	0.391	0.440	0.489	0.489	0.880	0.538	0.244	0.049	0.391	0.587	0.880	0.782	9.531
3.13	2.493	2.542	1.124	0.293	0.196	0.049	0.978	1.271	1.320	1.124	0.391	0.244	0.293	0.782	3.226	3.910	20.235
5.36	1.466	0.538	0.342	0.000	0.000	0.000	0.342	1.662	1.662	0.684	0.147	0.147	0.098	1.075	3.470	3.666	15.298
8.05	0.538	0.293	0.000	0.000	0.000	0.000	0.147	0.244	0.342	0.342	0.196	0.244	0.293	1.466	2.981	1.075	8.162
10.73	0.196	0.782	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.684	0.196	0.049	0.244	0.831	0.733	0.391	4.106
11.18	0.000	0.049	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.049	0.000	0.049	0.098	0.049	0.000	0.440
TOTAL	6.16	5.28	2.10	1.12	0.59	0.49	1.96	3.67	4.30	3.52	1.37	0.73	1.37	4.84	11.39	9.82	58.70

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS F								
UWMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.049	0.000	0.000	0.098	0.049	0.049	0.098	0.000	0.049	0.098	0.049	0.196	0.000	0.049	0.000	0.782
1.34	0.538	0.342	0.293	0.440	0.196	0.440	0.244	0.538	0.489	0.489	0.391	0.147	0.342	0.098	0.880	0.831	6.696
3.13	1.711	1.124	0.880	0.489	0.049	0.196	0.587	1.173	1.222	0.782	0.147	0.098	0.049	0.391	0.733	1.808	11.437
5.36	0.342	0.391	0.293	0.049	0.000	0.000	0.196	0.880	0.733	0.244	0.049	0.000	0.098	0.342	0.782	0.880	5.279
8.05	0.098	0.147	0.000	0.000	0.000	0.000	0.000	0.244	0.538	0.244	0.049	0.098	0.098	0.587	0.635	0.147	2.884
10.73	0.000	0.000	0.049	0.000	0.000	0.000	0.000	0.049	0.000	0.147	0.000	0.000	0.049	0.293	0.147	0.000	0.733
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	2.69	2.05	1.52	0.98	0.34	0.68	1.08	2.98	2.98	1.96	0.73	0.39	0.83	1.71	3.23	3.67	27.81

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS G								
UWMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.049	0.049	0.000	0.049	0.000	0.000	0.147	0.098	0.440
1.34	0.391	0.293	0.098	0.196	0.000	0.147	0.049	0.244	0.147	0.196	0.147	0.000	0.049	0.244	0.147	0.293	2.639
3.13	0.391	0.391	0.147	0.049	0.049	0.098	0.000	0.244	0.049	0.147	0.000	0.000	0.049	0.147	0.244	0.147	2.151
5.36	0.000	0.342	0.049	0.049	0.000	0.000	0.000	0.049	0.147	0.049	0.000	0.000	0.049	0.293	0.391	0.293	1.711
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.049	0.000	0.000	0.000	0.000	0.244	0.831	0.440	1.662
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.049	0.000	0.000	0.049
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.78	1.08	0.29	0.29	0.05	0.24	0.05	0.64	0.44	0.44	0.15	0.05	0.15	0.98	1.76	1.27	8.65

TOTAL HOURS CONSIDERED ARE 2046

OWIND MEASURED AT 10.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	9.9	8.9	4.0	2.4	1.0	1.5	3.1	7.6	7.8	6.0	2.3	1.3	2.4	8.0	18.0	15.8	100.0

OVERALL WIND SPEED FREQUENCY

MAX WIND SPEED (M/S):	0.268	1.341	3.129	5.364	8.047	10.729	11.176
AVE WIND SPEED (M/S):	0.134	0.805	2.235	4.247	6.706	9.388	10.952
WIND SPEED FREQUENCY:	2.25	19.01	34.60	24.00	13.78	5.91	0.44

THE CONVERSION FACTOR APPLIED TO THE WIND SPEED CLASSES IS 0.447

TABLE 5-3 WNP-2 33 FT SECOND QUARTER 1993

[illegible][illegible][illegible]

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS D								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050
1.34	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100
3.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.100
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.050	0.050	0.149	0.000	0.050	0.000	0.398
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.348	0.448	0.100	0.199	0.050	0.000	0.000	1.144
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.846	0.100	0.050	0.000	0.100	0.000	0.000	1.194
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.20	1.29	0.60	0.20	0.35	0.15	0.05	0.00	2.99

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

OMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.050	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100
1.34	0.199	0.149	0.149	0.050	0.050	0.249	0.299	0.398	0.448	0.398	0.249	0.299	0.149	0.398	0.398	0.498	4.378
3.13	0.945	0.846	0.299	0.348	0.100	0.398	1.194	2.139	1.990	1.144	0.995	1.045	0.945	1.144	0.896	1.144	15.572
5.36	0.697	0.995	0.697	0.199	0.100	0.100	1.343	2.388	4.030	1.891	0.597	0.995	0.945	1.393	1.493	0.697	18.557
8.05	0.249	0.199	0.149	0.000	0.000	0.000	0.348	1.194	2.289	1.194	0.498	0.846	0.498	1.443	0.547	0.100	9.552
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.149	0.547	0.498	0.249	0.100	0.697	0.199	0.000	2.488
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.199	0.000	0.000	0.249
TOTAL	2.14	2.19	1.29	0.60	0.30	0.75	3.18	6.17	8.96	5.17	2.84	3.43	2.64	5.27	3.53	2.44	50.90

ATMOSPHERIC STABILITY CLASS E

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

OMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.050	0.000	0.100	0.100	0.050	0.000	0.100	0.000	0.050	0.000	0.000	0.000	0.000	0.100	0.000	0.547
1.34	0.746	0.697	0.299	0.498	0.498	0.746	0.995	0.597	0.448	0.547	0.597	0.448	0.398	0.896	0.647	0.647	9.701
3.13	0.597	1.244	0.647	0.249	0.398	0.746	1.891	2.488	2.040	1.095	0.746	0.796	0.597	1.144	1.443	0.896	17.015
5.36	0.050	0.100	0.100	0.050	0.050	0.199	0.796	1.990	0.846	1.841	0.348	0.249	0.547	1.045	0.498	0.100	8.806
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.149	0.199	0.199	0.000	0.050	0.050	0.149	0.050	0.000	0.846
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	1.39	2.09	1.04	0.90	1.04	1.74	3.68	5.32	3.53	3.73	1.69	1.54	1.59	3.23	2.74	1.64	36.92

ATMOSPHERIC STABILITY CLASS F

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

OMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.050	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.149
1.34	0.299	0.100	0.000	0.149	0.100	0.000	0.249	0.149	0.100	0.000	0.000	0.149	0.000	0.149	0.000	0.398	1.841
3.13	0.199	0.348	0.448	0.100	0.000	0.050	0.547	0.995	0.846	0.149	0.249	0.050	0.000	0.199	0.746	1.144	6.070
5.36	0.050	0.000	0.100	0.000	0.000	0.000	0.050	0.448	0.199	0.100	0.000	0.000	0.050	0.000	0.050	0.100	1.144
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.60	0.45	0.55	0.25	0.15	0.05	0.85	1.59	1.14	0.25	0.25	0.20	0.05	0.35	0.85	1.64	9.20

ATMOSPHERIC STABILITY CLASS G

TOTAL HOURS CONSIDERED ARE 2010

WIND MEASURED AT 10.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	4.1	4.7	2.9	1.7	1.5	2.6	7.8	13.1	13.8	10.4	5.4	5.4	4.6	9.0	7.2	5.7	100.0

OVERALL WIND SPEED FREQUENCY

MAX WIND SPEED (M/S):	0.268	1.341	3.129	5.364	8.047	10.729	11.176
AVE WIND SPEED (M/S):	0.134	0.805	2.235	4.247	6.706	9.388	10.952
WIND SPEED FREQUENCY:	0.85	16.02	38.76	28.91	11.54	3.68	0.25
THE CONVERSION FACTOR APPLIED TO THE WIND SPEED CLASSES IS	0.447						

TABLE 5-4 WNP-2 245FT SECOND QUARTER 1993

[illegible][illegible][illegible]

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS D								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.051	0.153
3.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.000	0.051	0.000	0.000	0.000	0.102
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.203	0.051	0.153	0.051	0.000	0.000	0.509
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.610	0.661	0.102	0.153	0.102	0.000	0.000	1.628
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.254	0.000	0.051	0.000	0.051	0.000	0.000	0.356
TOTAL	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.10	0.92	0.97	0.20	0.36	0.20	0.00	0.05	2.85

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

UOMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051
1.34	0.203	0.203	0.051	0.000	0.051	0.051	0.203	0.102	0.102	0.305	0.203	0.203	0.051	0.356	0.254	0.305	2.645
3.13	0.763	0.763	0.356	0.102	0.102	0.203	0.509	1.424	1.170	0.865	0.610	1.017	0.712	1.017	0.509	0.763	10.885
5.36	0.712	1.017	0.661	0.305	0.102	0.203	0.865	2.136	2.747	2.594	0.916	0.712	0.966	1.017	1.272	0.916	17.141
8.05	0.458	0.458	0.356	0.102	0.000	0.000	0.356	0.916	2.798	2.950	0.865	0.814	0.560	1.119	0.661	0.305	12.716
10.73	0.000	0.000	0.051	0.000	0.000	0.000	0.051	0.102	0.763	0.916	0.712	0.814	0.661	1.526	0.254	0.000	5.849
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102	0.102	0.254	0.000	0.000	0.356	0.000	0.000	0.814
TOTAL	2.14	2.44	1.48	0.51	0.25	0.51	1.98	4.68	7.68	7.73	3.56	3.56	2.95	5.39	2.95	2.29	50.10

ATMOSPHERIC STABILITY CLASS E

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

UOMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.102	0.254
1.34	0.560	0.305	0.254	0.356	0.560	0.305	0.661	0.407	0.509	0.102	0.254	0.203	0.458	0.305	0.254	0.254	5.748
3.13	0.763	1.017	0.610	0.356	0.458	0.407	0.865	1.475	1.882	0.966	0.407	0.712	0.509	0.407	0.407	0.610	11.851
5.36	0.610	0.560	0.254	0.153	0.153	0.509	0.865	1.221	0.966	0.458	0.509	0.763	0.814	1.017	0.763	0.356	9.969
8.05	0.000	0.203	0.102	0.000	0.000	0.051	0.407	0.560	1.119	1.119	1.068	0.305	0.560	1.221	0.203	0.153	7.070
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.254	0.763	0.153	0.153	0.305	1.017	0.102	0.000	2.747
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	1.93	2.09	1.22	0.86	1.17	1.27	2.90	3.66	4.73	3.41	2.39	2.14	2.64	3.97	1.78	1.48	37.64

ATMOSPHERIC STABILITY CLASS F

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

UOMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.051	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102
1.34	0.051	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.051	0.000	0.102	0.102	0.000	0.051	0.051	0.000	0.458
3.13	0.305	0.102	0.102	0.153	0.153	0.000	0.102	0.254	0.102	0.407	0.305	0.203	0.051	0.153	0.102	0.254	2.747
5.36	0.458	0.153	0.102	0.305	0.000	0.000	0.000	0.712	0.153	0.356	0.407	0.153	0.153	0.305	0.153	0.509	3.917
8.05	0.000	0.153	0.051	0.102	0.000	0.000	0.051	0.356	0.203	0.102	0.000	0.000	0.051	0.254	0.203	0.458	1.984
10.73	0.000	0.000	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.051	0.000	0.000	0.203
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.81	0.41	0.36	0.61	0.15	0.05	0.20	1.32	0.51	0.86	0.81	0.46	0.31	0.81	0.51	1.22	9.41

ATMOSPHERIC STABILITY CLASS G

TOTAL HOURS CONSIDERED ARE 1966

OWIND MEASURED AT 10.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	4.9	4.9	3.1	2.0	1.6	1.9	5.1	9.7	13.0	12.9	7.7	6.4	6.3	10.4	5.2	5.0	100.0

OVERALL WIND SPEED FREQUENCY

MAX WIND SPEED (M/S):	0.268	1.341	3.129	5.364	8.047	10.729	11.176
AVE WIND SPEED (M/S):	0.134	0.805	2.235	4.247	6.706	9.388	10.952
WIND SPEED FREQUENCY:	0.41	9.00	25.58	31.13	22.28	10.43	1.17

TABLE 5-5 WNP-2 33 FT THIRD QUARTER 1993

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS A								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055
1.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.166	1.330	1.496
3.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.17	1.33	1.61

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS B								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055
3.13	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.000	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.111
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.06	0.00	0.00	0.00	0.06	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS C								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.166	0.166
3.13	0.055	0.000	0.000	0.000	0.000	0.055	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.166
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.06	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.33

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS D								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.055	0.000	0.055	0.055	0.055	0.000	0.000	0.332	0.609
3.13	0.055	0.055	0.055	0.000	0.055	0.000	0.000	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.277
5.36	0.997	0.055	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.111	0.166	0.000	1.385
8.05	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.055	0.000	0.000	0.000	0.166	0.055	0.388
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.000	0.000	0.000	0.055	0.055	0.000	0.166
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.776	0.000	0.776
TOTAL	1.11	0.11	0.11	0.00	0.06	0.00	0.06	0.06	0.11	0.06	0.11	0.06	0.06	0.17	1.16	0.39	3.60

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS E								
DIRMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.055	0.000	0.000	0.000	0.055	0.000	0.055	0.000	0.000	0.055	0.000	0.055	0.055	0.000	0.000	0.332
1.34	0.166	0.000	0.111	0.055	0.222	0.277	0.166	0.055	0.277	0.166	0.332	0.332	0.222	0.166	0.055	0.942	3.546
3.13	1.330	0.776	0.554	0.055	0.111	0.166	1.053	1.330	1.274	1.330	1.274	0.665	1.053	0.665	1.551	1.440	14.626
5.36	1.551	0.720	0.332	0.055	0.111	0.111	1.163	2.050	3.490	2.105	2.050	0.776	0.665	1.939	1.385	1.330	19.834
8.05	0.554	0.000	0.000	0.000	0.000	0.000	0.111	0.332	1.939	1.163	0.277	0.277	0.665	1.994	1.108	0.222	8.643
10.73	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.496	0.055	0.000	0.166	0.388	0.388	0.055	2.604
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.000	0.055
TOTAL	3.66	1.55	1.00	0.17	0.44	0.61	2.49	3.82	6.98	6.26	4.04	2.05	2.83	5.26	4.49	3.99	49.64

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS F								
DIRMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.055	0.111	0.055	0.055	0.000	0.000	0.055	0.000	0.055	0.055	0.055	0.055	0.055	0.000	0.055	0.665
1.34	0.831	0.554	0.388	0.332	0.055	0.222	0.443	0.554	0.831	0.443	0.055	0.554	0.388	0.554	0.443	1.717	8.366
3.13	1.440	1.053	0.665	0.166	0.443	0.997	1.108	1.939	1.274	0.942	0.443	0.332	0.111	0.720	2.327	0.997	14.958
5.36	0.166	0.111	0.055	0.609	0.111	0.055	0.831	0.831	0.277	0.222	0.111	0.000	0.499	1.330	0.609	0.166	5.983
8.05	0.000	0.055	0.000	0.000	0.000	0.000	0.000	0.222	0.166	0.000	0.000	0.111	0.055	0.222	0.166	0.000	0.997
10.73	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	2.49	1.83	1.22	1.16	0.66	1.27	2.38	3.60	2.55	1.66	0.66	1.05	1.11	2.88	3.55	2.94	31.02

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS G								
DIRMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.055	0.055	0.000	0.111	0.055	0.000	0.055	0.055	0.000	0.055	0.000	0.000	0.055	0.000	0.000	0.499
1.34	0.388	0.499	0.665	0.166	0.055	0.055	0.111	0.332	0.277	0.055	0.055	0.000	0.222	0.222	0.277	1.773	5.152
3.13	1.219	0.720	0.554	0.055	0.000	0.000	0.111	0.831	0.554	0.111	0.111	0.000	0.000	0.222	0.665	0.942	6.094
5.36	0.000	0.000	0.111	0.000	0.000	0.000	0.111	0.554	0.443	0.000	0.000	0.055	0.000	0.277	0.222	0.111	1.884
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	1.61	1.27	1.39	0.22	0.17	0.11	0.33	1.77	1.33	0.17	0.22	-0.06	0.22	0.78	1.16	2.83	13.63

TOTAL HOURS CONSIDERED ARE 1805

WIND MEASURED AT 10.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	8.9	4.8	3.8	1.6	1.3	2.1	5.3	9.3	11.0	8.1	5.0	3.2	4.2	9.1	10.5	11.6	100.0

OVERALL WIND SPEED FREQUENCY

MAX WIND SPEED (M/S): 0.268 1.341 3.129 5.364 8.047 10.729 11.176

AVE WIND SPEED (M/S): 0.134 0.805 2.235 4.247 6.706 9.388 10.952

WIND SPEED FREQUENCY: 1.55 19.39 36.29 29.09 10.03 2.83 0.83

THE CONVERSION FACTOR APPLIED TO THE WIND SPEED CLASSES IS 0.447

TABLE 5-6 WNP-2 245 FT THIRD QUARTER 1993

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS A								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.057	0.000	0.115
3.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.433	0.000	0.000	0.000	0.000	0.000	0.000	0.057	0.057	1.548
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.00	0.06	0.00	0.00	0.00	0.00	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.06	1.66

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS B								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.057
3.13	0.000	0.000	0.000	0.000	0.057	0.000	0.000	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.115
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.06	0.00	0.00	0.00	0.06	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS C								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.13	0.057	0.000	0.000	0.000	0.000	0.000	0.057	0.172	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.287
5.36	0.000	0.000	0.000	0.000	0.000	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.057
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.06	0.00	0.00	0.00	0.00	0.06	0.06	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS D								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.000	0.000	0.057	0.000	0.057	0.057	0.057	0.000	0.000	0.057	0.057	0.000	0.000	0.344
3.13	0.000	0.057	0.000	0.057	0.000	0.000	0.000	0.344	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.459
5.36	1.032	0.172	0.000	0.000	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.057	0.172	0.000	1.491
8.05	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.115	0.000	0.000	0.057	0.115	0.057	0.401
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.057	0.000	0.000	0.000	0.000	0.000	0.057	0.000	0.115
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	1.09	0.23	0.00	0.06	0.06	0.06	0.00	0.40	0.11	0.06	0.11	0.00	0.06	0.17	0.34	0.06	2.81

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

OMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.057	0.000	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.115
1.34	0.115	0.057	0.057	0.115	0.057	0.057	0.115	0.057	0.115	0.000	0.287	0.172	0.057	0.172	0.057	0.172	1.663
3.13	0.803	0.803	0.229	0.287	0.172	0.115	0.688	1.663	0.917	1.376	0.860	1.032	0.573	0.516	1.261	0.860	12.156
5.36	1.548	1.376	0.172	0.287	0.172	0.172	1.147	1.663	3.326	2.695	2.064	0.516	0.803	1.089	1.147	1.376	19.553
8.05	0.287	0.057	0.000	0.000	0.000	0.000	0.287	1.032	2.752	1.319	0.803	0.344	0.860	0.975	0.803	0.688	10.206
10.73	0.401	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.344	0.860	0.344	0.344	0.459	1.376	0.631	0.000	4.759
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.057	0.115	0.287	0.057	0.057	0.573
TOTAL	3.15	2.29	0.46	0.69	0.40	0.40	2.24	4.47	7.45	6.25	4.36	2.47	2.87	4.42	3.96	3.15	49.03

ATMOSPHERIC STABILITY CLASS E

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

OMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.057	0.057	0.057	0.057	0.000	0.000	0.115	0.000	0.115	0.000	0.000	0.000	0.000	0.057	0.000	0.057	0.573
1.34	0.229	0.459	0.115	0.229	0.344	0.287	0.573	0.688	0.459	0.401	0.172	0.229	0.344	0.115	0.287	0.344	5.275
3.13	1.089	0.573	0.745	0.229	0.459	0.172	0.745	3.326	1.032	0.573	0.516	0.516	0.229	0.459	0.516	0.459	11.640
5.36	0.631	0.459	0.229	0.745	0.344	0.917	1.147	0.459	0.860	0.459	0.115	0.115	0.631	0.459	0.860	0.573	9.002
8.05	0.115	0.000	0.115	0.000	0.000	0.000	0.000	0.459	0.229	0.229	0.000	0.115	0.688	0.745	0.229	0.172	3.096
10.73	0.057	0.172	0.000	0.000	0.000	0.000	0.000	0.057	0.344	0.000	0.115	0.229	0.229	0.975	0.057	0.000	2.236
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.057	0.000	0.000	0.057
TOTAL	2.18	1.72	1.26	1.26	1.15	1.38	2.58	4.99	3.04	1.66	0.92	1.20	2.12	2.87	1.95	1.61	31.88

ATMOSPHERIC STABILITY CLASS F

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

OMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.057	0.057	0.115	0.000	0.057	0.057	0.172	0.000	0.229	0.344	0.115	0.057	0.115	0.229	0.000	0.115	1.720
3.13	0.459	0.459	0.344	0.229	0.115	0.000	0.401	1.892	0.803	0.573	0.287	0.115	0.229	0.057	0.057	0.459	6.479
5.36	0.229	0.172	0.287	0.287	0.057	0.000	0.115	0.229	0.573	0.172	0.057	0.000	0.057	0.229	0.688	0.631	3.784
8.05	0.115	0.057	0.000	0.057	0.000	0.000	0.000	0.172	0.344	0.000	0.057	0.000	0.057	0.344	0.459	0.229	1.892
10.73	0.000	0.000	0.172	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.057	0.000	0.000	0.229
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.86	0.75	0.92	0.57	0.23	0.06	0.69	2.29	1.95	1.09	0.52	0.17	0.46	0.92	1.20	1.43	14.11

ATMOSPHERIC STABILITY CLASS G

TOTAL HOURS CONSIDERED ARE 1744

OWIND MEASURED AT 10.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	7.4	5.0	2.7	2.6	1.9	1.9	5.6	13.8	12.6	9.1	5.9	3.8	5.5	8.4	7.6	6.3	100.0

OVERALL WIND SPEED FREQUENCY

MAX WIND SPEED (M/S):	0.268	1.341	3.129	5.364	8.047	10.729	11.176
AVE WIND SPEED (M/S):	0.134	0.805	2.235	4.247	6.706	9.388	10.952
WIND SPEED FREQUENCY:	0.69	9.17	32.68	33.89	15.60	7.34	0.63

THE CONVERSION FACTOR APPLIED TO THE WIND SPEED CLASSES IS 0.447

TABLE 5-7 WNP-2 33 FT FOURTH QUARTER 1993

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS A								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050
1.34	0.100	0.100	0.050	0.000	0.000	0.000	0.000	0.000	0.100	0.151	0.050	0.000	0.000	0.050	0.050	0.000	0.652
3.13	0.151	0.100	0.000	0.000	0.000	0.000	0.000	0.151	0.050	0.100	0.000	0.000	0.000	0.000	0.000	0.201	0.753
5.36	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.30	0.20	0.05	0.00	0.00	0.00	0.00	0.15	0.15	0.25	0.05	0.00	0.00	0.05	0.05	0.25	1.51

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS B								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.151
3.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.100
5.36	0.050	0.000	0.050	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.151
8.05	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.05	0.00	0.10	0.00	0.00	0.00	0.05	0.05	0.05	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.45

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS C								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.100
3.13	0.000	0.100	0.000	0.050	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.251
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.100	0.000	0.151
8.05	0.000	0.050	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.15	0.05	0.10	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.60

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS D								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.050	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.050	0.050	0.000	0.000	0.301
1.34	0.452	0.702	0.201	0.251	0.100	0.201	0.301	0.251	0.452	0.502	0.351	0.301	0.652	0.401	0.602	0.552	6.272
3.13	0.652	0.201	0.452	0.151	0.050	0.000	0.151	1.104	0.953	0.301	0.351	0.201	0.301	1.355	1.957	1.656	9.834
5.36	0.050	0.000	0.151	0.000	0.000	0.000	0.000	0.401	1.004	0.753	0.050	0.050	0.151	0.201	0.953	0.502	4.265
8.05	0.351	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.151	0.251	0.050	0.050	0.050	0.201	0.301	0.201	1.656
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.251	0.100	0.050	0.151	0.050	0.100	0.151	0.201	1.054
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.100
TOTAL	1.56	1.00	0.85	0.40	0.15	0.20	0.45	1.76	2.86	1.91	0.90	0.80	1.25	2.31	3.96	3.11	23.48

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS E								
OMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.050	0.050	0.151	0.000	0.050	0.050	0.000	0.100	0.100	0.000	0.050	0.100	0.050	0.050	0.000	0.000	0.803
1.34	0.803	0.452	0.201	0.301	0.301	0.301	0.401	0.652	0.803	0.702	0.652	0.702	1.004	0.753	1.355	1.104	10.487
3.13	1.355	1.104	0.552	0.201	0.000	0.050	0.552	1.806	2.007	0.702	0.251	0.502	0.702	1.254	2.659	2.107	15.805
5.36	0.301	0.000	0.100	0.000	0.000	0.000	0.401	0.702	0.753	0.452	0.100	0.201	0.301	0.301	0.853	0.452	4.917
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.401	0.100	0.652	0.452	0.201	0.201	0.050	0.351	0.201	0.000	2.609
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.100	0.100	0.301	0.050	0.100	0.050	0.000	0.000	0.000	0.753
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	2.51	1.61	1.00	0.50	0.35	0.40	1.81	3.46	4.42	2.61	1.30	1.81	2.16	2.71	5.07	3.66	35.37

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS F								
OMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.151	0.100	0.100	0.050	0.050	0.000	0.000	0.100	0.000	0.100	0.000	0.100	0.050	0.050	0.050	0.000	0.903
1.34	1.154	1.104	0.552	0.201	0.050	0.201	0.050	0.502	0.953	0.652	0.702	0.502	0.502	1.054	1.254	1.505	10.938
3.13	0.702	0.351	0.452	0.151	0.000	0.000	0.050	0.502	1.154	0.602	0.351	0.301	0.351	0.652	1.355	0.803	7.777
5.36	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.903	0.301	0.151	0.000	0.000	0.151	0.251	0.452	0.000	2.258
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.100	0.151	0.000	0.000	0.000	0.050	0.151	0.000	0.502
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.151	0.000	0.000	0.000	0.000	0.000	0.000	0.151
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	2.01	1.56	1.15	0.40	0.10	0.20	0.10	2.06	2.51	1.81	1.05	0.90	1.05	2.06	3.26	2.31	22.53

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS G								
OMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.100	0.000	0.050	0.000	0.050	0.050	0.050	0.000	0.050	0.050	0.050	0.452
1.34	0.301	0.301	0.201	0.100	0.000	0.000	0.050	0.452	0.100	0.452	0.000	0.301	3.211	0.803	1.254	1.054	8.580
3.13	0.602	0.652	0.251	0.000	0.000	0.000	0.050	0.301	0.552	0.201	0.251	0.000	0.151	0.452	0.903	1.254	5.620
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.401	0.201	0.050	0.050	0.050	0.151	0.050	0.251	0.050	1.254
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.151
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.90	0.95	0.45	0.10	0.00	0.10	0.10	1.25	0.90	0.75	0.35	0.40	3.56	1.35	2.46	2.41	16.06

TOTAL HOURS CONSIDERED ARE 1993

OWIND MEASURED AT 10.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	7.3	5.5	3.7	1.5	0.6	0.9	2.5	8.8	10.9	7.3	3.7	3.9	8.0	8.5	15.1	11.8	100.0

OVERALL WIND SPEED FREQUENCY

MAX WIND SPEED (M/S): 0.268 1.341 3.129 5.364 8.047 10.729 11.176

AVE WIND SPEED (M/S): 0.134 0.805 2.235 4.247 6.706 9.388 10.952

WIND SPEED FREQUENCY: 2.51 37.18 40.14 13.05 5.07 1.96 0.10

THE CONVERSION FACTOR APPLIED TO THE WIND SPEED CLASSES IS 0.447



TABLE 5-8 WNP-2 245 FT FOURTH QUARTER 1993

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS A								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.256	0.051	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.153	0.000	0.000	0.000	0.051	0.051	0.000	0.614
3.13	0.153	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.153	0.051	0.205	0.000	0.000	0.000	0.000	0.102	0.716
5.36	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102	0.153
8.05	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.51	0.10	0.05	0.00	0.00	0.00	0.00	0.15	0.05	0.36	0.00	0.00	0.00	0.05	0.05	0.20	1.53

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS B								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.051
1.34	0.000	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051
3.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.051	0.153
5.36	0.000	0.000	0.000	0.051	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102
8.05	0.051	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.05	0.00	0.00	0.10	0.05	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.05	0.00	0.05	0.05	0.46

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS C								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.051	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102
3.13	0.000	0.051	0.051	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.000	0.205
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.051	0.000	0.000	0.000	0.000	0.000	0.051	0.000	0.153
8.05	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.000	0.102
10.73	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.05	0.10	0.05	0.10	0.05	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.61

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS D								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.051	0.051	0.102	0.051	0.000	0.000	0.051	0.051	0.000	0.153	0.102	0.051	0.205	0.102	0.972
1.34	0.153	0.358	0.358	0.256	0.051	0.205	0.205	0.256	0.153	0.051	0.512	0.205	0.102	0.512	0.358	0.460	4.194
3.13	0.767	0.205	0.307	0.205	0.102	0.000	0.153	0.818	1.023	0.256	0.256	0.307	0.307	0.358	2.864	1.228	9.156
5.36	0.153	0.102	0.358	0.051	0.000	0.000	0.000	0.307	1.023	0.512	0.051	0.102	0.000	0.460	1.125	0.716	4.962
8.05	0.256	0.000	0.051	0.051	0.000	0.000	0.000	0.153	0.460	0.460	0.153	0.000	0.153	0.102	0.205	0.409	2.455
10.73	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.358	0.051	0.153	0.051	0.256	0.307	0.205	1.535
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.000	0.051	0.000	0.000	0.000	0.051	0.000	0.153
TOTAL	1.43	0.66	1.13	0.61	0.26	0.26	0.36	1.53	2.81	1.69	1.07	0.92	0.72	1.74	5.12	3.12	23.43

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS E								
UWIND (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.153	0.000	0.102	0.102	0.000	0.000	0.051	0.000	0.153	0.000	0.000	0.051	0.051	0.205	0.563	0.256	1.688
1.34	0.563	0.409	0.153	0.256	0.460	0.307	0.512	0.767	1.125	0.512	0.358	0.256	0.409	0.307	0.716	0.409	7.519
3.13	1.637	1.074	0.716	0.512	0.256	0.102	0.358	1.176	1.330	0.870	0.409	0.563	0.102	0.409	1.279	1.125	11.918
5.36	0.153	0.409	0.358	0.051	0.000	0.000	0.153	1.176	1.125	0.460	0.256	0.051	0.307	0.614	1.893	0.460	7.468
8.05	0.460	0.000	0.000	0.000	0.051	0.000	0.205	0.358	0.409	0.409	0.256	0.102	0.205	0.409	0.972	0.000	3.836
10.73	0.051	0.000	0.000	0.000	0.000	0.102	0.153	0.051	0.307	0.818	0.256	0.205	0.051	0.153	0.153	0.000	2.302
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.051	0.051	0.051	0.000	0.205
TOTAL	3.02	1.89	1.33	0.92	0.77	0.51	1.43	3.53	4.50	3.07	1.53	1.23	1.18	2.15	5.63	2.25	34.94

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS F								
UWIND (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.051	0.000	0.000	0.000	0.051	0.000	0.153	0.000	0.153	0.000	0.051	0.051	0.051	0.051	0.153	0.102	0.870
1.34	0.460	0.409	0.409	0.307	0.358	0.460	0.307	0.716	0.614	0.205	0.460	0.307	0.153	0.205	0.358	0.767	6.496
3.13	0.972	0.870	0.716	0.358	0.153	0.051	0.409	0.614	1.023	0.767	0.358	0.205	0.153	0.153	0.460	0.460	7.724
5.36	0.102	0.205	0.460	0.051	0.000	0.000	0.000	1.074	0.563	0.307	0.000	0.205	0.307	0.256	0.256	0.512	4.297
8.05	0.000	0.000	0.000	0.153	0.051	0.000	0.153	0.512	0.563	0.051	0.000	0.051	0.102	0.460	0.256	0.205	2.558
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102	0.051	0.051	0.000	0.000	0.000	0.307	0.051	0.000	0.563
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.153
TOTAL	1.59	1.48	1.59	0.87	0.61	0.51	1.02	3.02	3.02	1.48	0.87	0.82	0.77	1.43	1.53	2.05	22.66

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS G								
UWIND (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102
1.34	0.153	0.051	0.051	0.102	0.051	0.000	0.205	0.205	0.051	0.051	0.153	0.000	0.102	0.205	0.102	0.153	1.637
3.13	0.409	1.125	0.563	0.409	0.051	0.051	0.205	0.614	0.614	0.256	0.153	0.153	0.153	0.102	0.358	0.409	5.627
5.36	0.051	0.102	0.358	0.205	0.000	0.000	0.153	3.427	0.563	0.307	0.102	0.051	0.000	0.256	0.563	0.665	6.803
8.05	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.409	0.102	0.051	0.000	0.102	0.716	0.205	0.153	1.790
10.73	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.153	0.102	0.000	0.000	0.102	0.000	0.000	0.000	0.409
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.66	1.28	0.97	0.87	0.10	0.05	0.56	4.25	1.79	0.82	0.46	0.20	0.46	1.28	1.23	1.38	16.37

TOTAL HOURS CONSIDERED ARE 1955

OWIND MEASURED AT 10.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	7.3	5.5	5.1	3.5	1.8	1.3	3.4	12.6	12.2	7.4	3.9	3.2	3.2	6.6	13.8	9.1	100.0

OVERALL WIND SPEED FREQUENCY

MAX WIND SPEED (M/S): 0.268 1.341 3.129 5.364 8.047 10.729 11.176

Ave WIND SPEED (M/S): 0.134 0.805 2.235 4.247 6.706 9.388 10.952

WIND SPEED FREQUENCY: 3.68 20.61 35.50 23.94 10.90 4.86 0.51

THE CONVERSION FACTOR APPLIED TO THE WIND SPEED CLASSES IS 0.447

TABLE 5-9 WNP-2 33 FT ANNUAL 1993ES

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS A								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050
1.34	0.100	0.100	0.050	0.000	0.000	0.000	0.000	0.000	0.100	0.151	0.050	0.000	0.000	0.050	0.050	0.000	0.653
3.13	0.151	0.100	0.000	0.000	0.000	0.000	0.000	0.151	0.050	0.100	0.000	0.000	0.000	0.000	0.000	0.201	0.753
5.36	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.30	0.20	0.05	0.00	0.00	0.00	0.00	0.15	0.15	0.25	0.05	0.00	0.00	0.05	0.05	0.25	1.51

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS B								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.151
3.13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.100
5.36	0.050	0.000	0.050	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.151
8.05	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.05	0.00	0.10	0.00	0.00	0.00	0.05	0.05	0.05	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.45

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS C								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.100
3.13	0.000	0.100	0.000	0.050	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.251
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.100	0.000	0.151
8.05	0.000	0.050	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.00	0.15	0.05	0.10	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.60

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS D								
U _{MAX} (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.050	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.050	0.050	0.000	0.000	0.301
1.34	0.452	0.703	0.201	0.251	0.100	0.201	0.301	0.251	0.452	0.502	0.351	0.301	0.653	0.402	0.602	0.552	6.275
3.13	0.653	0.201	0.452	0.151	0.050	0.000	0.151	1.104	0.954	0.301	0.351	0.201	0.301	1.355	1.958	1.657	9.839
5.36	0.050	0.000	0.151	0.000	0.000	0.000	0.000	0.402	1.004	0.753	0.050	0.050	0.151	0.201	0.954	0.502	4.267
8.05	0.351	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.151	0.251	0.050	0.050	0.050	0.201	0.301	0.201	1.657
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.251	0.100	0.050	0.151	0.050	0.100	0.151	0.201	1.054
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.100
TOTAL	1.56	1.00	0.85	0.40	0.15	0.20	0.45	1.76	2.86	1.91	0.90	0.80	1.26	2.31	3.97	3.11	23.49

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

DIRMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.050	0.050	0.151	0.000	0.050	0.050	0.000	0.100	0.100	0.000	0.050	0.100	0.050	0.050	0.000	0.000	0.803
1.34	0.803	0.452	0.201	0.301	0.301	0.301	0.402	0.653	0.803	0.703	0.653	0.703	1.004	0.753	1.305	1.104	10.442
3.13	1.355	1.104	0.552	0.201	0.000	0.050	0.552	1.807	2.008	0.703	0.251	0.502	0.703	1.255	2.661	2.108	15.813
5.36	0.301	0.000	0.100	0.000	0.000	0.000	0.402	0.703	0.753	0.452	0.100	0.201	0.301	0.301	0.853	0.452	4.920
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.402	0.100	0.653	0.452	0.201	0.201	0.050	0.351	0.201	0.000	2.610
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.100	0.100	0.301	0.050	0.100	0.050	0.000	0.000	0.000	0.753
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	2.51	1.61	1.00	0.50	0.35	0.40	1.81	3.46	4.42	2.61	1.31	1.81	2.16	2.71	5.02	3.66	35.34

ATMOSPHERIC STABILITY CLASS E

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

DIRMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.151	0.100	0.100	0.050	0.050	0.000	0.000	0.100	0.000	0.100	0.000	0.100	0.050	0.050	0.050	0.000	0.904
1.34	1.155	1.104	0.552	0.201	0.050	0.201	0.050	0.502	0.954	0.653	0.703	0.502	0.502	1.054	1.255	1.506	10.944
3.13	0.703	0.351	0.452	0.151	0.000	0.000	0.050	0.502	1.155	0.602	0.351	0.301	0.351	0.653	1.355	0.803	7.781
5.36	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.904	0.301	0.151	0.000	0.000	0.151	0.251	0.452	0.000	2.259
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.100	0.151	0.000	0.000	0.000	0.050	0.151	0.000	0.502
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.151	0.000	0.000	0.000	0.000	0.000	0.000	0.151
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	2.01	1.56	1.15	0.40	0.10	0.20	0.10	2.06	2.51	1.81	1.05	0.90	1.05	2.06	3.26	2.31	22.54

ATMOSPHERIC STABILITY CLASS F

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

DIRMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.100	0.000	0.050	0.000	0.050	0.050	0.050	0.000	0.050	0.050	0.050	0.452
1.34	0.301	0.301	0.201	0.100	0.000	0.000	0.050	0.452	0.100	0.452	0.000	0.301	3.213	0.803	1.255	1.054	8.584
3.13	0.602	0.653	0.251	0.000	0.000	0.000	0.050	0.301	0.552	0.201	0.251	0.000	0.151	0.452	0.904	1.255	5.622
5.36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.402	0.201	0.050	0.050	0.050	0.151	0.050	0.251	0.050	1.255
8.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.050	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.151
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.90	0.95	0.45	0.10	0.00	0.10	0.10	1.26	0.90	0.75	0.35	0.40	3.56	1.36	2.46	2.41	16.06

ATMOSPHERIC STABILITY CLASS G

TOTAL HOURS CONSIDERED ARE 1992

OWIND MEASURED AT 10.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	7.3	5.5	3.7	1.5	0.6	0.9	2.5	8.8	10.9	7.3	3.7	3.9	8.0	8.5	15.0	11.8	100.0

OVERALL WIND SPEED FREQUENCY

MAX WIND SPEED (M/S):	0.268	1.341	3.129	5.364	8.047	10.729	11.176
AVE WIND SPEED (M/S):	0.134	0.805	2.235	4.247	6.706	9.388	10.952
WIND SPEED FREQUENCY:	2.51	37.15	40.16	13.05	5.07	1.96	0.10
THE CONVERSION FACTOR APPLIED TO THE WIND SPEED CLASSES IS	0.447						

TABLE 5-10 WNP-2 245 FT ANNUAL 1993

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS A								
UOMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.065	0.013	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.000	0.000	0.000	0.013	0.026	0.000	0.182
3.13	0.039	0.013	0.000	0.000	0.000	0.000	0.000	0.363	0.013	0.052	0.000	0.000	0.000	0.000	0.013	0.039	0.532
5.36	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026	0.052
8.05	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.13	0.03	0.03	0.00	0.00	0.00	0.00	0.38	0.01	0.09	0.00	0.00	0.00	0.01	0.04	0.06	0.78

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS B								
UOMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.013
1.34	0.013	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026
3.13	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.013	0.065
5.36	0.000	0.000	0.000	0.013	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026
8.05	0.013	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026
10.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.03	0.00	0.00	0.03	0.03	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.16

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS C								
UOMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.34	0.013	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026
3.13	0.013	0.013	0.013	0.013	0.000	0.000	0.013	0.039	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.117
5.36	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.013	0.013	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.052
8.05	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.026
10.73	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.052	0.000	0.065
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.03	0.03	0.01	0.03	0.01	0.01	0.01	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.29

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION									ATMOSPHERIC STABILITY CLASS D								
UOMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.000	0.013	0.013	0.026	0.013	0.000	0.013	0.013	0.013	0.000	0.039	0.026	0.026	0.052	0.026	0.272
1.34	0.052	0.091	0.091	0.065	0.013	0.078	0.052	0.091	0.052	0.039	0.143	0.052	0.039	0.143	0.091	0.130	1.220
3.13	0.195	0.091	0.078	0.065	0.026	0.013	0.039	0.298	0.285	0.065	0.091	0.078	0.091	0.117	0.804	0.324	2.660
5.36	0.285	0.078	0.091	0.013	0.013	0.000	0.000	0.104	0.272	0.130	0.026	0.026	0.026	0.208	0.480	0.311	2.063
8.05	0.091	0.000	0.013	0.013	0.000	0.000	0.000	0.039	0.130	0.130	0.117	0.039	0.078	0.065	0.195	0.221	1.129
10.73	0.052	0.104	0.026	0.000	0.000	0.000	0.000	0.000	0.026	0.246	0.182	0.065	0.052	0.091	0.130	0.078	1.051
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.065	0.013	0.013	0.000	0.013	0.013	0.000	0.130
TOTAL	0.67	0.36	0.31	0.17	0.08	0.10	0.09	0.54	0.79	0.69	0.57	0.31	0.31	0.66	1.76	1.09	8.52

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

OMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.091	0.039	0.052	0.065	0.000	0.026	0.013	0.013	0.065	0.013	0.039	0.013	0.013	0.052	0.156	0.065	0.714
1.34	0.558	0.415	0.195	0.272	0.246	0.221	0.337	0.363	0.571	0.350	0.272	0.169	0.234	0.350	0.493	0.428	5.475
3.13	1.453	1.323	0.623	0.298	0.182	0.117	0.636	1.375	1.194	1.051	0.558	0.701	0.415	0.688	1.596	1.713	13.921
5.36	0.960	0.817	0.389	0.156	0.065	0.091	0.610	1.661	2.180	1.570	0.804	0.350	0.532	0.947	1.985	1.635	14.751
8.05	0.441	0.208	0.091	0.026	0.013	0.000	0.246	0.623	1.531	1.245	0.519	0.376	0.467	0.999	1.388	0.519	8.692
10.73	0.156	0.208	0.013	0.000	0.000	0.026	0.052	0.039	0.350	0.817	0.376	0.350	0.350	0.960	0.441	0.104	4.242
11.18	0.000	0.013	0.013	0.000	0.000	0.000	0.000	0.000	0.039	0.052	0.078	0.013	0.052	0.195	0.039	0.013	0.506
TOTAL	3.66	3.02	1.38	0.82	0.51	0.48	1.89	4.07	5.93	5.10	2.65	1.97	2.06	4.19	6.10	4.48	48.30

ATMOSPHERIC STABILITY CLASS E

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

OMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.026	0.026	0.013	0.013	0.039	0.013	0.104	0.026	0.065	0.013	0.039	0.026	0.065	0.026	0.065	0.065	0.623
1.34	0.454	0.376	0.272	0.337	0.363	0.376	0.441	0.584	0.519	0.298	0.324	0.221	0.324	0.182	0.454	0.558	6.085
3.13	1.142	0.908	0.739	0.363	0.272	0.208	0.649	1.596	1.297	0.778	0.350	0.376	0.234	0.350	0.532	0.856	10.651
5.36	0.415	0.402	0.311	0.234	0.117	0.337	0.532	0.921	0.778	0.363	0.169	0.272	0.454	0.519	0.662	0.584	7.071
8.05	0.052	0.091	0.052	0.039	0.013	0.013	0.143	0.441	0.623	0.415	0.285	0.143	0.350	0.739	0.337	0.169	3.905
10.73	0.013	0.039	0.013	0.000	0.000	0.000	0.000	0.052	0.156	0.246	0.065	0.091	0.143	0.623	0.091	0.000	1.531
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.026	0.000	0.000	0.000	0.013	0.000	0.000	0.052
TOTAL	2.10	1.84	1.40	0.99	0.80	0.95	1.87	3.62	3.45	2.14	1.23	1.13	1.57	2.45	2.14	2.23	29.92

ATMOSPHERIC STABILITY CLASS F

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION

OMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.27	0.000	0.013	0.000	0.026	0.000	0.013	0.013	0.000	0.013	0.013	0.000	0.013	0.000	0.000	0.039	0.026	0.169
1.34	0.169	0.104	0.065	0.091	0.026	0.052	0.104	0.117	0.117	0.143	0.130	0.039	0.065	0.182	0.078	0.143	1.622
3.13	0.389	0.519	0.285	0.208	0.091	0.039	0.169	0.714	0.376	0.337	0.182	0.117	0.117	0.117	0.195	0.311	4.165
5.36	0.182	0.195	0.195	0.208	0.013	0.000	0.065	1.116	0.350	0.221	0.143	0.052	0.065	0.272	0.441	0.519	4.035
8.05	0.039	0.052	0.013	0.039	0.000	0.000	0.013	0.156	0.246	0.052	0.026	0.000	0.052	0.389	0.428	0.324	1.829
10.73	0.000	0.000	0.065	0.013	0.000	0.000	0.000	0.000	0.039	0.026	0.000	0.000	0.039	0.039	0.000	0.000	0.221
11.18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.78	0.88	0.62	0.58	0.13	0.10	0.36	2.10	1.14	0.79	0.48	0.22	0.34	1.00	1.18	1.32	12.04

ATMOSPHERIC STABILITY CLASS G

TOTAL HOURS CONSIDERED ARE 7708

OWIND MEASURED AT 10.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	7.4	6.2	3.7	2.6	1.6	1.6	4.2	10.8	11.3	8.8	4.9	3.6	4.3	8.3	11.3	9.2	100.0

OVERALL WIND SPEED FREQUENCY

MAX WIND SPEED (M/S):	0.268	1.341	3.129	5.364	8.047	10.729	11.176
AVE WIND SPEED (M/S):	0.134	0.805	2.235	4.247	6.706	9.388	10.952
WIND SPEED FREQUENCY:	1.79	14.63	32.11	28.05	15.62	7.11	0.69
THE CONVERSION FACTOR APPLIED TO THE WIND SPEED CLASSES IS	0.447						

6.0 DOSE ASSESSMENT IMPACT ON MAN

Liquid Effluents - The doses to the maximum individual from WNP-2 liquid effluents were calculated using the NRC LADTAP II computer code and the site specific input parameters.

Table 6-1 lists the doses to the maximum individual by calendar quarter along with the cumulative total body and maximum organ values. Doses by calendar quarters to the average exposed individual are listed in Table 6-2. The 50-mile population doses by calendar quarters are listed in Table 6-3. Table 6-4 provides annual dosages to the average individual and 50-mile population doses from liquid effluents. All doses were calculated using the NRC LADTAP II computer code.

An evaluation of the nearest orchard (approximately 3 miles downstream) using Columbia River water for its irrigation showed an adult total body dose value of $3.3\text{E-}04$ mrem/yr, thyroid dose of $5.4\text{E-}05$ mrem/yr and an organ dose value of $4.8\text{E-}04$ mrem/yr. The population doses at this location showed a total body value of $8.5\text{E-}04$ person-rem, thyroid dose of $8.7\text{E-}05$ person-rem and an organ value of $1.5\text{E-}03$ person-rem.

Gaseous Effluents - The NRC GASPAR II computer code was used to calculate doses at and beyond the site boundary. Table 6-5 furnishes a summary of quarterly air and organ doses. It also provides the annual total body and skin doses at and beyond the site boundary. Table 6-6 lists the annual 50-mile dose using values obtained from the ALARA annual integrated population dose summary (person-rem). Table 6-6 also provides the annual individual doses associated with each pathway. These values were obtained by dividing the ALARA integrated dose (person-rem) by the 50-mile population (252,356 for year 1987) and converting to mrem. The GASPAR II runs utilized quarterly and annual meteorological data and site specific input parameters.

6.1 Exposure to "A Member of the Public"

The WNP-2 Visitor Center was evaluated for assessment of radiation doses to "Members of the Public" due to their activities within the site boundary. The ODCM assumes an eight (8) hour per year occupancy by "A Member of the Public" at the Visitor Center. The dose assessment resulted in an annual calculated total body dose of $1.1\text{E-}03$ mrem. The annual thyroid dose was $3.1\text{E-}03$ mrem and the maximum dose to any other organ was $1.6\text{E-}03$ mrem. The air dose contribution was as follows; Beta air dose was $1.2\text{E-}03$ mrad and the Gamma air dose was $1.9\text{E-}03$ mrad. The direct radiation contribution from TLD results calculated to an average of $1.6\text{E-}01$ mrem per eight hour period.

The annual assessment of radiation doses to the most likely exposed "Member of the Public" to show conformance with 40CFR Part 190 is assumed to be located in the Taylor Flats vicinity (4.2 miles in a East Southeasterly direction). The NRC GASPAR II computer code with annual source terms and XOQDOQ meteorological data was used to obtain the dose assessment from gaseous effluents. It is assumed there is no dose contribution from liquid effluents at this location. The assessment of the maximum age group resulted in annual calculated total body dose of $2.2\text{E-}02$ mrem. The annual thyroid dose was $6.3\text{E-}02$ mrem and the maximum dose to any other organ was $2.3\text{E-}02$ mrem. Exposure pathways were ground, vegetable and inhalation. The air dose contribution was as follows; Beta air dose was $2.9\text{E-}03$ mrad/yr and the Gamma air dose was $3.2\text{E-}03$ mrad/yr.

An annual assessment of radiation doses to a "Member of the Public" was also made at a location in the vicinity of 4.5 miles East Southeast. This location receives irrigation water from the Columbia River as mentioned in paragraph 6.0 above. The annual GASPAR II computer run resulted in a child total body dose of $2.0\text{E-}02$ mrem. The annual child age group thyroid dose was $5.6\text{E-}02$ mrem and the maximum dose to any other organ for the child age group was $2.0\text{E-}02$ mrem. The annual Beta air dose was $2.4\text{E-}03$ mrad and the Gamma air dose was $2.5\text{E-}03$ mrad. The annual dose contribution due to liquid releases using vegetation from the irrigated food pathway and the child age group in the NRC LADTAP II computer run showed a total body dose of $5.0\text{E-}04$ mrem. The annual thyroid dose was $1.3\text{E-}04$ mrem and the maximum dose to any other organ was $1.3\text{E-}03$ mrem.

The direct radiation contribution showed no significant amount above normal background. The 1993 average TLD summary was 91 mrem per year.

MAXIMUM INDIVIDUAL DOSES FROM
WNP-2 LIQUID EFFLUENTS*
1993

Table 6-1A

1st Quarter				
Pathway	Total Body (mrem/qtr)	1993 Cumulative Total Body (mrem/yr)	Max. Organ (mrem/qtr)	1993 Cumulative Max. Organ (mrem/yr)
Fishing	9.1E-04	9.1E-04	1.8E-03	1.8E-03
Drinking	6.7E-06	6.7E-06	7.8E-06	7.8E-06
Shoreline	3.3E-06	3.3E-06	3.8E-06	3.8E-06
Swimming	6.5E-09	6.5E-09	6.5E-09	6.5E-09
Boating	7.2E-07	7.2E-07	7.2E-07	7.2E-07
Vegetables	6.0E-06	6.0E-06	9.0E-06	9.0E-06
Leafy Veg.	1.1E-06	1.1E-06	2.4E-06	2.4E-06
Milk	2.6E-06	2.6E-06	3.9E-06	3.9E-06
Meat	7.6E-07	7.6E-07	1.3E-06	1.3E-06
Total	9.3E-04	9.3E-04	1.8E-03	1.8E-03

2nd Quarter				
Pathway	Total Body (mrem/qtr)	1993 Cumulative Total Body (mrem/yr)	Max. Organ (mrem/qtr)	1993 Cumulative Max. Organ (mrem/yr)
Fishing	3.7E-02	3.8E-02	5.9E-02	6.1E-02
Drinking	1.1E-05	1.8E-05	1.5E-05	2.3E-05
Shoreline	4.5E-05	4.8E-05	5.3E-05	5.7E-05
Swimming	8.5E-08	9.2E-08	8.5E-08	9.2E-08
Boating	9.5E-06	1.0E-05	9.5E-06	1.0E-05
Vegetables	4.0E-05	4.6E-05	5.9E-05	6.8E-05
Leafy Veg.	1.5E-05	1.6E-05	2.3E-05	2.5E-05
Milk	2.9E-05	3.2E-05	5.2E-05	5.6E-05
Meat	4.6E-06	5.4E-06	9.9E-06	1.1E-05
Total	3.7E-02	3.8E-02	5.9E-02	6.1E-02

MAXIMUM INDIVIDUAL DOSES FROM
WNP-2 LIQUID EFFLUENTS*
1993

Table 6-1B

3rd Quarter				
Pathway	Total Body (mrem/qtr)	1993 Cumulative Total Body (mrem/yr)	Max. Organ (mrem/qtr)	1993 Cumulative Max. Organ (mrem/yr)
Fishing	7.5E-02	1.1E-01	1.2E-01	1.8E-01
Drinking	1.8E-05	3.6E-05	2.5E-05	4.8E-05
Shoreline	6.3E-05	1.1E-04	7.4E-05	1.3E-04
Swimming	1.2E-07	2.1E-07	1.2E-07	2.1E-07
Boating	1.4E-05	2.4E-05	1.4E-05	2.4E-05
Vegetables	7.5E-05	1.2E-04	1.1E-04	1.8E-04
Leafy Veg.	2.9E-05	4.5E-05	4.3E-05	6.8E-05
Milk	5.4E-05	8.6E-05	9.3E-05	1.5E-04
Meat	7.6E-06	1.3E-05	1.4E-05	2.5E-05
Total	7.5E-02	1.1E-01	1.2E-01	1.8E-01

4th Quarter				
Pathway	Total Body (mrem/qtr)	1993 Cumulative Total Body (mrem/yr)	Max. Organ (mrem/qtr)	1993 Cumulative Max. Organ (mrem/yr)
Fishing	6.7E-03	1.2E-01	9.7E-03	1.9E-01
Drinking	4.5E-06	4.0E-05	7.4E-06	5.5E-05
Shoreline	2.1E-05	1.3E-04	2.5E-05	1.6E-04
Swimming	3.3E-08	2.4E-07	3.3E-08	2.4E-07
Boating	3.7E-06	2.8E-05	3.7E-06	2.8E-05
Vegetables	1.0E-05	1.3E-04	2.3E-05	2.0E-04
Leafy Veg.	3.6E-06	4.9E-05	9.3E-06	7.8E-05
Milk	4.5E-06	9.0E-05	6.6E-06	1.6E-04
Meat	9.5E-07	1.4E-05	3.5E-06	2.9E-05
Total	6.7E-03	1.2E-01	9.8E-03	1.9E-01

* Age Group - Adult: Maximum individual resides at Richland and fishes near the WNP-2 outfall area

AVERAGE INDIVIDUAL DOSES FROM
WNP-2 LIQUID EFFLUENTS
1993

Table 6-2

Pathway	1st Quarter		2nd Quarter	
	Total Body (mrem)	Max. Organ (mrem)	Total Body (mrem)	Max. Organ (mrem)
Fishing	3.0E-06	5.8E-06	1.2E-04	1.9E-04
Drinking	3.4E-06	4.0E-06	5.7E-06	7.7E-06
Shoreline	2.5E-07	2.9E-07	3.4E-06	4.0E-06
Swimming	1.4E-09	1.4E-09	1.9E-08	1.9E-08
Boating	3.6E-10	3.6E-10	4.7E-09	4.7E-09
Vegetables*	4.9E-08	6.5E-08	3.0E-07	5.3E-07
Leafy Veg.*	5.2E-07	1.0E-06	6.8E-06	1.1E-05
Milk*	1.9E-07	2.8E-07	2.0E-06	3.9E-06
Meat*	1.3E-07	1.9E-07	7.6E-07	1.4E-06
Total	7.5E-06	1.2E-05	1.4E-04	2.2E-04

Pathway	3rd Quarter		4th Quarter	
	Total Body (mrem)	Max. Organ (mrem)	Total Body (mrem)	Max. Organ (mrem)
Fishing	2.5E-04	3.8E-04	2.2E-05	3.2E-05
Drinking	9.3E-06	1.3E-05	2.3E-06	3.8E-06
Shoreline	4.8E-06	5.6E-06	1.6E-06	1.9E-06
Swimming	2.7E-08	2.7E-08	7.3E-09	7.3E-09
Boating	6.7E-09	6.7E-09	1.8E-09	1.8E-09
Vegetables*	5.3E-07	1.0E-06	7.7E-08	1.6E-07
Leafy Veg.*	1.3E-05	2.1E-05	1.6E-06	3.8E-06
Milk*	3.5E-06	7.1E-06	2.6E-07	5.0E-07
Meat*	1.2E-06	2.2E-06	1.5E-07	5.0E-07
Total	2.8E-04	4.3E-04	2.8E-05	4.2E-05

* Total population ALARA doses divided by the total population served from irrigated production; converted to mrem

50-MILE POPULATION DOSES FROM
WNP-2 LIQUID EFFLUENTS
1993

Table 6-3

Pathway	1st Quarter		2nd Quarter	
	Total Body (person-rem)	Max. Organ (person-rem)	Total Body (person-rem)	Max. Organ (person-rem)
Fishing	6.7E-06	1.3E-05	2.5E-04	4.5E-04
Drinking	2.6E-04	3.1E-04	4.2E-04	6.2E-04
Shoreline	4.3E-05	5.1E-05	6.0E-04	7.1E-04
Swimming	2.5E-07	2.5E-07	3.3E-06	3.3E-06
Boating	6.3E-08	6.3E-08	8.3E-07	8.3E-07
Vegetables	4.9E-07	6.5E-07	3.0E-06	5.3E-06
Leafy Veg.	5.2E-06	1.0E-05	6.8E-05	1.1E-04
Milk	1.8E-06	2.7E-06	1.9E-05	3.7E-05
Meat	1.3E-06	1.9E-06	7.7E-06	1.4E-05
Total	3.2E-04	3.9E-04	1.4E-03	2.0E-03

Pathway	3rd Quarter		4th Quarter	
	Total Body (person-rem)	Max. Organ (person-rem)	Total Body (person-rem)	Max. Organ (person-rem)
Fishing	4.9E-04	9.0E-04	4.3E-05	7.5E-05
Drinking	6.6E-04	1.1E-03	1.7E-04	2.6E-04
Shoreline	8.4E-04	9.9E-04	2.8E-04	3.3E-04
Swimming	4.7E-06	4.7E-06	1.3E-06	1.3E-06
Boating	1.2E-06	1.2E-06	3.2E-07	3.2E-07
Vegetables	5.3E-06	1.0E-05	7.7E-07	1.6E-06
Leafy Veg.	1.3E-04	2.1E-04	1.6E-05	3.8E-05
Milk	3.3E-05	6.8E-05	2.5E-06	4.8E-06
Meat	1.2E-05	2.2E-05	1.6E-06	5.0E-06
Total	2.2E-03	3.3E-03	5.2E-04	7.2E-04

ANNUAL LADTAP II RESULTS
1993

Table 6-4

A. 50-mile population doses from WNP-2 liquid effluents

Pathway	Total Body (person-rem)	Max. Organ (person-rem)
Fishing	7.9E-04	1.5E-03
Drinking	1.5E-03	2.2E-03
Shoreline	1.8E-03	2.1E-03
Swimming	9.6E-06	9.6E-06
Boating	2.4E-06	2.4E-06
Vegetables	9.6E-06	1.7E-05
Leafy Veg.	2.2E-04	3.6E-04
Milk	5.6E-05	1.1E-04
Meat	2.3E-05	4.0E-05
Total	4.4E-03	6.3E-03

B. Average individual doses from WNP-2 liquid effluents

Pathway	Total Body (mrem)	Max. Organ (mrem)
Fishing	4.0E-04	6.2E-04
Drinking	2.1E-05	2.6E-05
Shoreline	1.0E-05	1.2E-05
Swimming	5.5E-08	5.5E-08
Boating	1.4E-08	1.4E-08
Vegetables*	9.6E-07	1.7E-06
Leafy Veg.*	2.2E-05	3.6E-05
Milk*	5.9E-06	1.2E-05
Meat*	2.3E-06	4.0E-06
Total	4.6E-04	7.1E-04

* Total population ALARA doses divided by the total population served from irrigated production; converted to mrem



SUMMARY OF DOSES FROM
WNP-2 GASEOUS EFFLUENTS
1993

Table 6-5A

(1)

Location: Site Boundary; 1.2 miles
Reporting Period: Calendar Quarters Plus Annual Cumulative

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Cumulative
Beta air dose (mrad)*	5.2E-02	2.2E-03	1.0E-02	3.4E-03	6.8E-02
Gamma air dose (mrad)*	8.8E-02	1.2E-03	1.0E-02	2.9E-03	1.0E-01

(2)

Location: Beyond Site Boundary; 3.0 miles ESE
Reporting Period: Calendar Quarters Plus Annual Cumulative

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Cumulative
Beta air dose (mrad)*	1.8E-03	8.3E-04	2.2E-03	8.4E-04	5.7E-03
Gamma air dose (mrad)*	1.5E-03	1.4E-03	3.7E-03	1.3E-03	7.9E-03

(3)

Location: 6.4 miles SE
Reporting Period: Calendar Quarters Plus Annual Cumulative

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Cumulative
Beta air dose (mrad)*	1.2E-03	9.7E-05	4.8E-03	2.5E-04	6.3E-03
Gamma air dose (mrad)*	1.5E-03	5.7E-05	5.4E-03	3.1E-04	7.3E-03

(4)

Location: Site Boundary
Reporting Period: Annual

Annual Total Body Dose (mrem)	5.3E-02
Annual Skin Dose (mrem)	5.2E-02

(5)

Location: Beyond Site Boundary
Reporting Period: Annual

Annual Total Body Dose (mrem)	2.2E-02
Annual Skin Dose (mrem)	2.1E-02

SUMMARY OF DOSES FROM
WNP-2 GASEOUS EFFLUENTS
1993

Table 6-5B

(6)

Location: Site Boundary location having the highest annual cumulative organ dose (ground and inhalation)
1.2 miles

Reporting Period: Calendar Quarters Plus Annual Cumulative

	1st	2nd	3rd	4th	Annual
Maximum organ dose (mrem) **	Quarter	Quarter	Quarter	Quarter	Cumulative
	9.6E-02	2.9E-02	2.6E-02	2.7E-02	1.8E-01

(7)

Location: Beyond site boundary location having the highest annual cumulative organ dose (ground and inhalation)
3.3-3.9 miles ESE

Reporting Period: Calendar Quarters Plus Annual Cumulative

	1st	2nd	3rd	4th	Annual
Maximum organ dose (mrem) **	Quarter	Quarter	Quarter	Quarter	Cumulative
	1.8E-02	4.1E-03	2.5E-03	2.1E-03	2.7E-02

(8)

Location: Land Use Census location having the highest annual cumulative organ dose
(ground, inhalation, and vegetable pathways)
4.2 miles ESE

Reporting Period: Calendar Quarters Plus Annual Cumulative

	1st	2nd	3rd	4th	Annual
Maximum organ dose (mrem) **	Quarter	Quarter	Quarter	Quarter	Cumulative
	3.6E-02	1.2E-02	8.8E-03	6.0E-03	6.3E-02

* ODCM Requirement For Operability 6.2.2.2

** ODCM Requirement For Operability 6.2.2.3

ANNUAL DOSES FROM WNP-2 GASEOUS EFFLUENTS
1993

Table 6-6

A. 50-mile population

Exposure Pathway	Total Body (person-rem)	Max. Organ (person-rem)
Plume	1.2E-02	3.7E-02
Ground	5.5E-04	6.5E-04
Inhalation	1.3E-01	4.0E-01
Vegetables	1.1E-01	1.1E-01
Milk	3.9E-02	8.7E-02
Meat	2.5E-02	2.7E-02
Total	3.2E-01	6.6E-01

Population => 2.5E+05

B. Average individual*

Exposure Pathway	Total Body (mrem)	Max. Organ (mrem)
Plume	4.9E-05	1.5E-04
Ground	2.2E-06	2.6E-06
Inhalation	5.1E-04	1.6E-03
Vegetables	4.5E-04	4.5E-04
Milk	1.6E-04	3.5E-04
Meat	9.8E-05	1.1E-04
Total	1.3E-03	2.6E-03

- * The 50-mile population doses are divided by the population within 50 miles of the Plant by direction and radii interval, and converted to mrem.

7.0 REVISIONS TO THE ODCM

During this reporting period Amendment numbers 13,14,15 and 16 to the Offsite Dose Calculation Manual (ODCM) were reviewed and approved by the Plant Operations Committee (POC).

- 7.1 The rationale in this section is intended to provide sufficient information to support the changes made to the WNP-2 Offsite Dose Calculation Manual (ODCM) for Amendments 13 through 16.

SCN NUMBER 93-060: Amendment 13:

<u>Description of Change</u>	<u>Basis for Change</u>
Page 36, Section 3.2.1; Revise main plant release point effluent monitor system description;	Stack effluent monitoring system replacement in accordance with project 90-0305. ODCM applicability pertains to low range only.
Page 122: Include the low range activity under Main Plant Vent Release Monitor in Table 6.1.2.1-1.	To reflect the Table as current.
Page 125: To update Main Plant Release Monitor system in Table 6.1.2.1.1-1.	To reflect the Table as current.

SCN NUMBER: 93-059: Amendment 14:

<u>Description of Change</u>	<u>Basis for Change</u>
Page 24: Editorial change to ensure that storm drain pond is adequately addressed as to usage and present conditions.	Commitment to NRC, Inspection Report.92-35 and to prevent the possible release of identified radionuclides greater than LLD for those listed in Table 6.3.1.1.1-1.

SCN NUMBER: 93-093: Amendment 15:

Description of Change	Basis for Change
Page 1, Section 2.1, Paragraph 1. Delete the sentence "This design objective...."	Editorial - this sentence adds no substantial value to the paragraph.
Page 1 - 2, Section 2.1, Paragraph 2; The last sentence was moved to page 6, Section 2.4.	This information is more useful in Section 2.4 than it is in 2.1.
Page 2, Section 2.1, Paragraph 3; Combined both sentences into one for clarity.	Editorial. Elimination of the reference to LADTAP II is editorial because the use of the program is specifically addressed elsewhere in the ODCM.
Page 2, Section 2.2, Paragraph 2; Delete the statement "(average, based on operating data is 808 gpm)"	The average value varies, and the given value is no longer accurate. Actual values are used in calculation.
Page 2, Section 2.2, Paragraph 3; Editorial revision of description of the liquid discharge monitor.	Editorial
Page 3, Section 2.3.1, Formula 1; Change Con_{ci} to $Conc_i$.	Editorial
Page 3, Section 2.3.1, Paragraph 1; Revise first two sentences to eliminate references to specific plant procedures.	Specific plant procedures are not normally addressed in the LBD. The ODCM establishes the calculation methods. Specific plant procedures implement these methods.
Page 3, Section 2.3.1, Formula 1; Revise the description of f_i to match descriptions found elsewhere in the ODCM.	This does not change the value of f_i , it only makes the description consistent.
Page 4, Section 2.3.1, Formula 2; Change Con_{ci} to $Conc_i$.	Editorial
Page 4, Section 2.3.2, Formula 3; Change Con_{cik} to $Conc_{ik}$.	Editorial
Page 4, Section 2.3.2, Formula 4; Change Con_{cik} to $Conc_{ik}$.	Editorial

Description of Change	Basis for Change
Page 6, Section 2.4, Insert after Formula 4; Insert last sentence moved from page 1-2 Section 2.1, Paragraph 2.	This information is more useful in Section 2.4 than it is in 2.1.
Page 7, Section 2.4, Before Formula 6; Add "This is" to the last sentence in the paragraph before formula 6.	Editorial.
Page 7, Section 2.4, Insert before Formula 6; Add a paragraph which restricts the maximum flow value to be used for dose calculations to a value of less than or equal to 2.0 cfs.	This limitation is based on the NUREG 0133 limitation of 1000 cfs, and our applicable factor of 500.
Page 9, Section 2.5.1, Paragraph 2; Change the description of how the trip/alarm setpoints are calculated to be more explicit, and to clearly identify the alarm (HI) and alarm/trip (HI-HI) as separate values.	This change clarifies the type of alarms and fact that two values will be calculated. One at the alarm value and another at the trip value.
Page 10, Section 2.5.3, Title; Change "Setpoint" to "Setpoints".	Editorial
Page 11, Section 2.5.3, Formula 9 variable definition Fs; Add "The safety factor is 1.5."	This value is the safety factor used, but the definition of Fs did not clearly state this.
Page 12, Section 2.5.3, Paragraph before Formula 11; Change "alarm/trip setpoint is" to "alarm (HI) and alarm/trip (HI-HI) setpoints are".	This change clarifies the type of alarms and the fact that two values will be calculated. One at the alarm value, and another at the trip value.
Page 12, Section 2.5.3, Formula 11; Add dilution term f_d to setpoint calculation.	Previous formula did not include the required dilution term.
Page 12, Section 2.5.3, New Formula 12; Alarm /trip Set Point (HI-Hi) = SP; Formula 11; Alarm Set point (HI) = $0.80 * SP$.	The alarm setpoint is intended to alert the operator prior to the discharge reaching the trip value, therefore the alarm setpoint is set to 80 percent of the trip value.



Description of Change	Basis for Change
Page 12, Section 2.5.3, Formula 12, description of terms; Add "alarm/trip" to description of SP, add f_d description.	These changes support the previously described changes in formulas 11, and 12.
Page 15, Section 2.7.1, Formula 17 definition of terms; Add "variable from 0 to 2.0 cfs, for dose calculation purposes".	This change supports the change to Formula 6, which was changed for compliance with NUREG 0133.
Page 17, Section 2.7.2, Paragraph 1; Change discharge flow rate maximum value from 7500 gpm to 7690 gpm.	The actual maximum discharge flow rate is 7690 gpm.
Page 18, Section 2.7.2, last paragraph; Change "RHI 2.3" to "HPI 2.3".	Editorial change to match the change in the name of the manual.
Page 28, Table 2-2, header; Added micro symbol to table units.	Editorial change due to typographical omission.
Page 35, Section 3.1, last paragraph; Change "3-10 to 3-12 to "3-10 and 3-11".	Editorial, Table 3-12 was removed from the ODCM in a previous revision.
Page 47, Section 3.4.2, last paragraph; Add indicated subscripts.	Editorial changes due to typographical omissions.
Page 56, Section 3.6.1, Paragraph 1; Change the sense of the paragraph from a preoperational condition to an operational condition.	Editorial
Page 63, Table 3-2; Revise location two to eliminate reference to "cow milk".	A milk sample is no longer available at the location.
Page 63, Table 3-2; Revise location three distance and location.	Changed distance and direction as per Radiological Environmental Monitoring Program (REMP).
Page 63, Table 3-2; Add new location six.	This location added to compensate for loss of milk sample at old location two.
Page 64, Table 3-3; Change table values for location three.	Meteorological data changed due to direction and distance changes for location three. Calculations were performed per computer code XOQDOQ.



Description of Change	Basis for Change
Page 64, Table 3-3; Add values for new location six.	Values added to support new sample location six.
Page 75, Table 3-9; Change to eliminate references to Table 3-12.	Editorial, Table 3-12 was deleted in a previous revision to the ODCM.
Page 85, Table 3-14, Reference 9; Change "Radiological Programs" to "Health Physics".	Editorial to match organization title changes.
Page 85, Table 3-14, Reference 9; Change Calculation Log NO. "88-3" to "93-2".	Calculation was updated.
Page 101, Table 5-1, Station 40; Delete sample location code 40 as a milk sampling location.	Sample location 40 is no longer producing milk. Other adequate milk sample locations are in use.
Page 101, Table 5-1, Item 4.a; Delete sample location code 59.	Sample location 59 is no longer producing milk.
Page 106, Table 5-2, Station 40; Delete table notation for milk sample at this location.	Sample location 40 is no longer producing milk.
Page 106, Table 5-2, Station 55; Change radial distance from 7.0 to 5.5.	Station 55 was near the DOE 300 area. Construction of the new facility required that the TLD be moved.
Page 106, Table 5-2, Station 59; Delete.	Sample location 59 is no longer producing milk.
Page 109, Figure 5-1; Change map to indicate new location for Station 55 and to eliminate Station 61.	Station 55 change to support relocation. Station 61 deletion was performed in a previous revision to the ODCM.
Page 111, Table 5-3; Add gamma symbol (γ) in appropriate locations.	Editorial for typographical omissions.
Page 158, Table 6.3.1.1.1-1, Title; Change "OR" to "FOR" in title.	Editorial correction for typographical omission.

Additional Basis To Allow POC To Confirm SCN NO. 93-093

1. The limitation of credit for discharge flow to 2.0 cfs for dose calculation is made to bring the ODCM into compliance with NUREG 0133 and commitments in the LBD, and to ensure that the doses calculated will agree with the values generated by the LADTAP II program. This change is conservative, and while increasing the value of the dose calculated by the ODCM methodology, will not result in any increase in the actual value of the dose to the public. This change does not alter the limits or design basis for radioactive releases.
2. The clarification of the method for calculating the Radiation Monitor setpoint does not change the actual method the setpoint is calculated. The changes correct a previous omission of one factor used in the calculation, and clarify the use and calculation method of the Alarm setpoint and the Alarm/Trip setpoint.
3. The relocation of one environmental sample point and the addition of a new sample point will not alter any plant effluent or setpoint calculation. The changes merely reflect the changes in the physical environment surrounding WNP-2.
4. Various editorial changes.

Item #1 above will change the values calculated for effluent dose calculation, but will not adversely impact the accuracy or reliability of effluent dose or setpoint calculations.

Item #2 above changes the setpoint calculation formula given in the ODCM, but does not change the actual value calculated.

Items #3 and #4 have no affect on the effluent dose or setpoint calculation.



SCN NUMBER 93-035: AMENDMENT 16

<u>Description of Change</u>	<u>Basis for Change</u>
Page 35; Add the Auxiliary Boiler as a source of radioactivity to the atmosphere.	To identify this system as an effluent source to the atmosphere from WNP-2.
Page 91a; New page providing a simplified diagram of the Auxiliary Boiler.	Identify the release point to the atmosphere.
<u>SCN NUMBER 93-045:</u>	
Pages 95,96,121,150,155,161 and 166; Change to read "Radioactive Effluent Release Report".	To provide the frequency for radioactive effluent release reporting to the NRC.

- 7.2 A determination has been made that these changes will maintain the level of radioactive effluent control required by 10 CFR 20.106, 40 CFR Part 190, 10 CFR 50.36a, and Appendix I to 10 CFR Part 50 and not adversely impact the accuracy or reliability of effluent, dose or setpoint calculations.
- 7.3 Amendment 13 to the ODCM consisted of one SCN which was reviewed and approved at POC meeting 93-028, dated July 14, 1993. Amendment 14 consisted of one SCN which was reviewed and approved at POC meeting 93-034, on August 25, 1993. Amendment 15 consisted of one SCN which was reviewed and approved at POC meeting 93-040, on October 6, 1993. Amendment 16 consisted of two SCNs which were reviewed and approved at POC meeting 93-049, dated December 7, 1993.

SCN Number For Amendment 13:

93-060

SCN Number For Amendment 14:

93-059

SCN Number For Amendment 15:

93-093

SCN Number For Amendment 16:

93-035

93-045

- 7.4 This section addresses compliance with Technical Specification 6.14.c. A complete, legible copy of the entire ODCM is included as an enclosure to the letter transmitting this Radioactive Effluent Release Report. ODCMs are sent only to the Nuclear Regulatory Commission (NRC).

8.0 REVISIONS TO THE PROCESS CONTROL PROGRAM (PCP)

The Process Control Program (PCP) was revised during this reporting period. The changes were for the most part minor clarifications or rewordings, however, descriptions of the more significant changes follow.

- A. The number of waste streams listed in the PCP procedure was changed from a total of eight, to six primary streams with examples of additional streams that may be generated from time-to-time.
- B. The description of reactor coolant trending was expanded to add I-134 as an indicator of fuel failure or other changes which could affect scaling factors..
- C. The basis for the tritium concentration of radwaste, which was previously scaled to Cs-137 if tritium was detected in offsite 10CFR61 sample analysis and if Cs-137 was detected in in-house waste stream sample analysis, was changed to scale directly to the reactor coolant tritium concentration.
- D. A description of second order scaling was added.

The WNP-2 Process Control Program is proceduralized in PPM 1.12.2 of the Plant Procedures Manual.

9.0 NEW OR DELETED LOCATIONS FOR DOSE ASSESSMENTS AND/OR ENVIRONMENTAL MONITORING LOCATIONS

- 9.1 There was one new location identified during this reporting period which required dose calculations. It is located 7.2 miles ESE and provides for a cow milk dose pathway.
- 9.2 One additional environmental monitoring location was added for cow milk at 7.2 miles ESE during this reporting period for dose calculations. Amendment 15 to the ODCM furnishes revised Figures and Tables to provide consistency with the current Radiological Environmental Monitoring Program (REMP). A complete copy of the ODCM has been included as per Section 7.4 of this report.
- 9.3 There was one environmental monitoring sample type deleted during this reporting period which consisted of cow milk obtained from ~6.4 miles SE (Station 40). The owner sold their cow. A monitoring site (Station 59) at 9.6 miles SE was discontinued as a cow milk location due to owner quitting the dairy business.

10.0 MAJOR CHANGES TO RADIOACTIVE LIQUID, GASEOUS AND SOLID WASTE
TREATMENT SYSTEMS

No major changes were made to the radioactive waste systems (liquid, gaseous, or solid) during this reporting period.

