

REFERENCE:  
10CFR50.36a(a)(2)

WNP-2 RADIOACTIVE EFFLUENT RELEASE REPORT

JANUARY THROUGH DECEMBER 1996

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

LICENSE NO. NPF-21

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# Table of Contents

<b>1.0 INTRODUCTION.....</b>	<b>1</b>
<b>2.0 LIQUID EFFLUENTS.....</b>	<b>1</b>
Liquid Effluent Tables .....	2
Table 2-0 WNP-2 Liquid Effluents -- Dose .....	2
Table 2-1 WNP-2 Liquid Effluents -- Summation of all Releases .....	3
Table 2-2 WNP-2 Liquid Effluents -- Source Terms.....	4
Table 2-3 WNP-2 Liquid Effluents -- LLD.....	5
<b>3.0 GASEOUS EFFLUENTS .....</b>	<b>6</b>
Gaseous Effluent Tables.....	9
Table 3-0 Dose .....	9
Table 3-1A Source Terms Mixed Mode Releases -- Main Plant Vent .....	10
Table 3-1B Mixed Mode Releases -- Main Plant Vent.....	11
Table 3-2A Source Terms Ground Level Releases -- Turbine Building.....	12
Table 3-2B Ground Level Releases -- Turbine Building .....	13
Table 3-3A Source Terms Ground Level Releases -- Radwaste Building .....	14
Table 3-3B Ground Level Releases -- Radwaste Building.....	15
Table 3-4 Summation of all Gaseous Releases.....	16
Table 3-5 Gaseous Batch Releases .....	17
<b>4.0 SOLID RADWASTE:.....</b>	<b>19</b>
Required by ODCM.....	19
Class A.....	19
Class B.....	21
Class C.....	22
Required by Reg. Guide 1.21 .....	23
Type of Waste.....	23
Estimate of major nuclide composition (by type of waste): .....	24
Solid Waste Disposition.....	25
<b>5.0 METEOROLOGY .....</b>	<b>26</b>
Joint Frequency Distribution Tables .....	27
Table 5-1 1st Quarter, 33 FT AGL.....	27
Table 5-2 1st Quarter, 245 FT AGL.....	31
Table 5-3 2nd Quarter, 33 FT AGL. ....	34
Table 5-4 2nd Quarter, 245 FT AGL. ....	37
Table 5-5 3rd Quarter, 33 FT AGL.....	40
Table 5-6 3rd Quarter, 245 FT AGL.....	43
Table 5-7 4th Quarter, 33 FT AGL.....	46
Table 5-8 4th Quarter, 245 FT AGL.....	49

Table 5-9 Year 1996, 33 FT AGL.....	52
Table 5-10 Year 1996, 245 FT AGL.....	55

## 6.0 DOSE ASSESSMENT -- IMPACT ON MAN .....58

### Exposure to "A Member of the Public" .....58

#### Dose Tables.....60

Table 6-1A Maximum Individual Doses From Liquid Effluents:.....60

Table 6-1B Maximum Individual Doses From Liquid Effluents: .....61

Table 6-2 Average Individual Doses From Liquid Effluents -- 1996.....62

Table 6-3 50-Mile Population Doses From Liquid Effluents -- 1996.....63

Table 6-4 Annual Ladtap II Results for 1996 .....64

Table 6-5A Summary of Doses from WNP-2 Gaseous Effluents, 1996 .....65

Table 6-5B Summary of Doses from WNP-2 Gaseous Effluents, 1996 .....66

Table 6-6 50-Mile Population Doses From 1996 Gaseous Effluents.....67

## 7.0 REVISIONS TO THE ODCM.....68

## 8.0 REVISIONS TO THE PROCESS CONTROL PROGRAM (PCP) .....68

## 9.0 NEW OR DELETED LOCATIONS FOR DOSE ASSESSMENTS AND/OR ENVIRONMENTAL MONITORING LOCATIONS.....68

## 10.0 MAJOR CHANGES TO RADIOACTIVE LIQUID, GASEOUS AND SOLID WASTE TREATMENT SYSTEMS .....68

## 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. Table 2-0 summarizes the number and duration of batch releases, dilution flow and calculated maximum individual doses. The liquid batch releases were recirculated before sampling. A representative sample was obtained and analyzed for each batch release. A composite of the batch samples for each month was analyzed for tritium, and a composite sample for each quarter was analyzed for strontium 89, strontium 90, and iron 55. 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 average flow rate of the Columbia River during January through December 1996 was  $1.67\text{E}+05$  cubic feet per second.

The percentage 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.

Doses were calculated using the LADTAP II computer code, NUREG/CR-4013.

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 program of processing small batches of containerized liquids collected from plant systems and operational activities has been initiated. This program permits us to segregate high impurity, low activity liquid waste from the plant radwaste systems, and process it separately for discharge. The result of this program is a significant reduction in discharged volume and radioactivity. Eleven of these liquid batch discharges had a duration of less than 30 minutes due to their small volume.

There were no abnormal releases.

## Liquid Effluent Tables

Table 2-0 WNP-2 Liquid Effluents -- Dose

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year
Number of Batch Releases	8	56	17	4	85
Discharge Duration in Hours					
Total	15.0	111.1	4.3	3.3	133.7
Average	1.9	2.0	1.9	0.8	1.7
Minimum	0.3	0.3	0.3	0.1	0.1
Maximum	2.6	4.5	3.5	2.2	4.5
Dilution Flow					
Gallons	1.73E+06	9.37E+06	2.34E+06	2.80E+05	1.37E+07
Maximum Individual Dose (mrem)					
Whole Body (Adult)	2.23E-03	3.44E-04	9.30E-04	4.33E-07	3.50E-03
ODCM Limit	1.5	1.5	1.5	1.5	3.0
% of Limit	0.149%	0.023%	0.062%	0.00003%	0.117%
Organ	3.01E-03	6.73E-04	1.38E-03	1.42E-06	5.05E-03
ODCM Limit	5	5	5	5	10
% of Limit	0.060%	0.013%	0.028%	0.00003%	0.051%
ODCM Limits					
Batch	Less than the concentration specified in 10 CFR 20, Appendix B, Table II, Column 2, and less than 2.0E-04 $\mu$ Ci/cc dissolved or entrained noble gases.				
Calendar Quarter	Less than or equal to 1.5 mrem to the total body, and less than or equal to 5 mrem to any organ.				
Calendar Year	Less than or equal to 3 mrem to the total body, and less than or equal to 10 mrem to any organ.				

**Table 2-1 WNP-2 Liquid Effluents -- Summation of all Releases**

Report Period: January -- December

1996

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)	3.4E-03	6.1E-03	1.2E-03	2.8E-05	1.1E-02	2.2E+01
Average diluted concentration during period (µCi/ml)	4.6E-07	1.5E-07	1.1E-07	2.3E-08	1.8E-07	
Percent of MPC limit (%)	1.60%	0.47%	0.53%	0.06%	0.61%	

**B. Tritium**

Total release (Ci)	3.8E-01	2.8E+00	7.7E-01	9.2E-02	4.1E+00	2.2E+01
Average diluted concentration during period (µCi/ml)	5.2E-05	6.8E-05	7.2E-05	7.5E-05	6.7E-05	
Percent of MPC limit (%)	1.74%	2.27%	2.40%	2.50%	2.23%	

**C. Dissolved and entrained gases**

Total release (Ci)	<LLD	<LLD	2.7E-06	3.7E-06	6.5E-06	2.2E+01
Average diluted concentration during period (µCi/ml)	<LLD	<LLD	2.6E-10	3.1E-09	1.1E-10	
Percent of limit (%)	<LLD	<LLD	0.0001%	0.0015%	0.0001%	

**D. Gross alpha radioactivity**

Total release (Ci)	5.7E-07	2.3E-06	1.0E-06	6.7E-07	4.6E-06	5.0E+01
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**E.**

Volume of waste prior to dilution (liters)	4.1E+05	3.1E+06	8.8E+05	8.3E+04	4.5E+06	1.5E+01
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**F.**

Volume of dilution water used during period (liters)	7.0E+06	3.9E+07	9.7E+06	1.1E+06	5.6E+07	1.5E+01
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\* At 95% confidence level

See Table 2-3 for LLD values.

**Table 2-2 WNP-2 Liquid Effluents -- Source Terms**

Report Period: January -- December

1996

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	2.5E-06	5.5E-06	5.8E-06	<LLD	1.4E-05
strontium-90	1.7E-06	4.1E-06	4.1E-06	<LLD	9.9E-06
cesium-134	2.3E-05	<LLD	2.8E-05	<LLD	5.1E-05
cesium-137	2.4E-04	1.6E-05	2.2E-04	<LLD	4.8E-04
iodine-131	<LLD	<LLD	<LLD	<LLD	<LLD
cobalt-58	6.7E-05	5.8E-05	<LLD	<LLD	1.2E-04
cobalt-60	2.8E-03	5.1E-03	7.6E-04	2.1E-05	8.6E-03
iron-59	<LLD	<LLD	<LLD	<LLD	<LLD
zinc-65	1.1E-04	7.3E-04	6.5E-05	<LLD	9.0E-04
manganese-54	1.0E-04	1.6E-04	<LLD	<LLD	2.6E-04
chromium-51	<LLD	<LLD	<LLD	<LLD	<LLD
zirconium-niobium-95	<LLD	6.8E-06	<LLD	<LLD	6.8E-06
molybdenum-99	<LLD	<LLD	<LLD	<LLD	<LLD
technetium-99m	<LLD	<LLD	<LLD	<LLD	<LLD
barium-lanthanum-140	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-141	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-144	<LLD	<LLD	<LLD	<LLD	<LLD
iron-55	1.8E-05	8.6E-05	9.5E-05	7.3E-06	2.1E-04
<u>Others</u>					
sodium-24	1.4E-05	<LLD	<LLD	<LLD	1.4E-05
Total for period above*	3.4E-03	6.1E-03	1.2E-03	2.8E-05	1.1E-02

**B. Dissolved and entrained gases**

xenon-133	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-135	<LLD	<LLD	2.7E-06	3.7E-06	6.5E-06

**C. Tritium**

tritium	3.8E-01	2.8E+00	7.7E-01	9.2E-02	4.1E+00
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\* Less than (<) values are not included in the totals.  
See Table 2-3 for LLD values.

**Table 2-3 WNP-2 Liquid Effluents -- LLD**

Report Period: January -- December

1996

**Fission and Activation Products**

Nuclide	LLD( $\mu\text{Ci/cc}$ )
strontium-89	2.0E-10
strontium-90	3.6E-09
cesium-134	8.6E-09
cesium-137	9.7E-09
barium-lanthanum-140	7.6E-09
molybdenum-99	1.2E-07
cerium-141	6.1E-09
cerium-144	1.0E-07
cobalt-58	2.5E-09
cobalt-60	5.2E-09
iron-59	8.1E-09
chromium-51	4.7E-08
manganese-54	3.4E-09
zinc-65	6.2E-09
iodine-131	6.0E-09
iodine-133	2.1E-09
Others	LLD( $\mu\text{Ci/cc}$ )
sodium-24	3.7E-09
copper-64	7.4E-07
antimony-124	8.8E-09
antimony-125	4.3E-08

**Dissolved and entrained gasses**

Nuclide	LLD( $\mu\text{Ci/cc}$ )
xenon-133	2.1E-08
xenon-135	5.1E-09



### 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 percentage 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 in a marinelli beaker and analyzing them using gamma spectroscopy. Tritium is analyzed by collecting the sample on a desiccant, distillation, and liquid scintillation counting. Particulates and iodines are sampled using particulate filters and charcoal cartridges. Both are analyzed using gamma spectroscopy.  $E_{\text{bar}}$  was 0.763 MeV per disintegration.

Noble gas activities are commonly below detection limits in the building effluent ducts. Where possible, noble gas concentrations in the effluent have been calculated from plant process data. Reactor building noble gas concentrations were calculated from offgas post treatment data.

Calculations were performed for releases using the NRC GASPAR II computer program and parameters as outlined in the ODCM. Quarterly doses to a member of the public were determined at the locations identified in the Annual Land Use Census and at the site boundary.

Table 3-0 summarizes the results of these calculations.

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 activity 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 identified in the annual land use census, and was based on quarterly limits of ten (10) millirads for beta and five (5) millirads for gamma. These locations were used to determine the most restrictive value to be used in Table 3-4 for each quarter.

The ODCM limits are listed in Table 3-0.

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 near 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 materials present other than that attributable to natural background.

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

The Radwaste Building effluent monitor was out of service for more than thirty days. The monitor was out of service from February 2, 1996, to June 23, 1996, for a total of 142 days. The monitor was rendered inoperable by the failure of the sample pump due to overheating. The outage was extended as a result of an engineering evaluation that determined that flow restriction in the sample flow path caused excessive load on the sample pump. The flow restrictions were downstream of the iodine and particulate samplers, and did not affect the ability of the system to obtain a representative sample. The excessive load shortened the pump's operational life sufficiently to potentially impact on its ability to meet its post accident function according to Regulatory Guide 1.97. The flow restrictions were a result of a design deficiency, rather than an operational failure, and therefore it was necessary to redesign the sample flow path to reduce the amount of restriction. The design and modification process resulted in the extended outage of the monitor. During the monitor outage, all ODCM required compensatory measures were completed. At no time during this monitor outage was any radioactive noble gas detected in this effluent pathway. No radioactive noble gas was measured above minimum detection limits in this effluent pathway during the entire calendar year of 1996. (Reference PER 296-0103-02.)

The Main Plant Vent release monitor, required by ODCM 6.1.2.1-1, instrument 3, was inoperable for more than 30 days between May 26, 1993, and July 15, 1993. This inoperability was due to the installation of a new stack monitoring system, but was not reported in the next Radioactive Effluent Release Report, as required. This failure to report the extended outage was discovered on May 28, 1996, during an internal trend evaluation of effluent monitor outages. (Reference PER 296-0333-01.)

The accident range gaseous effluent monitors, PRM-RE-1B and PRM-RE-1C were incorrectly calibrated during their initial primary calibration in July 1993, resulting in a non-conservative efficiency factor. This was discovered on March 21, 1996, as a part of an internal evaluation of the monitor's compliance with applicable standards. Until this time, the ODCM required alarm function for the normal range monitor was based on the intermediate range detector, PRM-RE-1B. The non-conservative efficiency factor resulted in an alarm setpoint that was higher than is required by the ODCM. A review of effluent records indicates that WNP-2 effluents via this pathway did not at any time exceed a small fraction of the offsite dose limits. Subsequent to this discovery, the alarm function was relocated to the low range monitor, PRM-RE-1A, which was properly calibrated during its primary calibration. This condition was reported at the time of the discovery, and a Notice of Violation was issued. Refer to NRC Inspection Report NO. 50-397/95-15 for additional information. (Reference PER 296-0176-08.)

During an internal evaluation of compliance to effluent monitor surveillance requirements, it was discovered that the quarterly Channel Functional Test (CFT) required by ODCM 6.1.2.1.1-1, instrument 3.d, Reactor Building Effluent Flow Rate Monitor, had not been performed between March 29, 1995, and June 19, 1996. This failure to perform the surveillance was caused by the incorporation of the CFT instructions into the channel calibration procedure, and the subsequent cancellation of the CFT procedure. The surveillance frequency for the channel calibration should have been changed to quarterly then, but was not. The instrument was declared inoperable when the failure was discovered on June 18, 1996. The CFT was completed, and the instrument was returned to service on June 19, 1996. The frequency of the channel calibration procedure has been changed to quarterly. (Reference PER 296-0504-03.)

## Gaseous Effluent Tables

Table 3-0 Dose

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year
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### Noble Gas (mrem)

Gamma Air Dose	4.81E-04	2.05E-05	4.99E-04	1.46E-03	2.46E-03
ODCM Limit	5	5	5	5	10
% of Limit	0.0096%	0.0004%	0.0100%	0.0292%	0.0246%
Beta Air Dose	1.70E-04	7.49E-06	1.81E-04	5.30E-04	8.88E-04
ODCM Limit	10	10	10	10	20
% of Limit	0.0017%	0.0001%	0.0018%	0.0053%	0.0044%

### Iodine-131, Iodine-133, Tritium, and Particulates with half-lives greater than eight days. (mrem)

Organ Dose	3.74E-04	2.27E-04	6.72E-04	2.10E-03	3.37E-03
ODCM Limit	7.5	7.5	7.5	7.5	15
% of Limit	0.0050%	0.0030%	0.0090%	0.0280%	0.0225%

**Table 3-1A Source Terms Mixed Mode Releases -- Main Plant Vent**

Report Period: January -- December

1996

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	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-85m	8.6E-01	9.7E-03	1.2E-01	2.0E-01	1.2E+00
krypton-87	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-88	6.2E-01	<LLD	<LLD	5.0E-02	6.7E-01
xenon-133	8.3E-01	1.4E-02	1.7E-01	2.1E-01	1.2E+00
xenon-133m	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-135	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-135m	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-138	<LLD	<LLD	<LLD	<LLD	<LLD
Others					
argon-41	5.6E+00	4.1E-01	4.0E+00	4.4E+00	1.4E+01
Total for period *	8.0E+00	4.4E-01	4.3E+00	4.9E+00	1.8E+01

**B. Iodines**

iodine-131	5.1E-05	<LLD	<LLD	<LLD	5.1E-05
iodine-132	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-133	2.5E-04	<LLD	<LLD	<LLD	2.5E-04
iodine-134	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-135	<LLD	<LLD	<LLD	<LLD	<LLD
Total for period *	3.0E-04	<LLD	<LLD	<LLD	3.0E-04

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

See Table 3-6 for LLD values.

**Table 3-1B Mixed Mode Releases -- Main Plant Vent**

Report Period: January -- December

1996

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

strontium-89	<LLD	1.2E-06	<LLD	1.8E-06	3.1E-06
strontium-90	<LLD	3.5E-07	<LLD	<LLD	3.5E-07
cesium-134	<LLD	<LLD	<LLD	<LLD	<LLD
cesium-137	<LLD	<LLD	<LLD	<LLD	<LLD
barium-lanthanum-140	<LLD	<LLD	<LLD	<LLD	<LLD
molybdenum-99	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-141	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-144	<LLD	<LLD	<LLD	<LLD	<LLD
cobalt-58	<LLD	<LLD	<LLD	<LLD	<LLD
cobalt-60	3.3E-04	3.2E-04	4.3E-05	5.7E-05	7.5E-04
iron-59	<LLD	<LLD	<LLD	<LLD	<LLD
manganese-54	<LLD	<LLD	<LLD	<LLD	<LLD
zinc-65	1.6E-05	<LLD	<LLD	<LLD	1.6E-05
Others					
chrome-51	1.3E-03	<LLD	9.8E-05	<LLD	1.4E-03
Total for period*	1.6E-03	3.3E-04	1.4E-04	5.9E-05	2.1E-03

Others with T 1/2 < 8 days

	No nuclides with half-lives less than 8 days were identified				
Total with T 1/2 < 8 days*	No nuclides with half-lives less than 8 days were identified				

**D. Tritium**

tritium	7.1E-01	8.7E-01	8.3E-01	1.0E+00	3.4E+00
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\* Less than (<) values are not included in the totals.  
See Table 3-6 for LLD values.

**Table 3-2A Source Terms Ground Level Releases -- Turbine Building**

Report Period: January -- December

1996

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	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-85m	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-87	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-88	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-133	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-133m	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-135	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-135m	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-138	<LLD	<LLD	<LLD	<LLD	<LLD
Others					
ar-41	<LLD	<LLD	<LLD	<LLD	<LLD
Total for period *	<LLD	<LLD	<LLD	<LLD	<LLD

**B. Iodines**

iodine-131	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-132	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-133	4.2E-05	<LLD	<LLD	<LLD	4.2E-05
iodine-134	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-135	<LLD	<LLD	<LLD	<LLD	<LLD
Total for period *	4.2E-05	<LLD	<LLD	<LLD	4.2E-05

\* Less than (<) values are not included in the totals.  
See Table 3-6 for LLD values.

**Table 3-2B Ground Level Releases -- Turbine Building**

Report Period: January -- December

1996

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

strontium-89	3.3E-06	<LLD	1.2E-06	9.1E-06	1.4E-05
strontium-90	<LLD	<LLD	<LLD	<LLD	<LLD
cesium-134	<LLD	<LLD	<LLD	<LLD	<LLD
cesium-137	<LLD	<LLD	<LLD	<LLD	<LLD
barium-lanthanum-140	<LLD	<LLD	<LLD	<LLD	<LLD
molybdenum-99	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-141	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-144	<LLD	<LLD	<LLD	<LLD	<LLD
cobalt-58	<LLD	<LLD	<LLD	<LLD	<LLD
cobalt-60	<LLD	8.0E-06	<LLD	<LLD	8.0E-06
iron-59	<LLD	<LLD	<LLD	<LLD	<LLD
manganese-54	<LLD	<LLD	<LLD	<LLD	<LLD
zinc-65	<LLD	<LLD	<LLD	<LLD	<LLD
Others					
chrome-51	<LLD	<LLD	<LLD	<LLD	<LLD
Total for period*	3.3E-06	8.0E-06	1.2E-06	9.1E-06	2.2E-05

Others with T 1/2 < 8 days

NONE	No nuclides with half-lives less than 8 days were identified				
Total with T 1/2 < 8 days*	No nuclides with half-lives less than 8 days were identified				

**D. Tritium**

tritium	1.8E+00	6.0E-02	8.6E-01	1.0E+00	3.7E+00
---------	---------	---------	---------	---------	---------

\* Less than (<) values are not included in the totals.  
See Table 3-6 for LLD values.



**Table 3-3A Source Terms Ground Level Releases -- Radwaste Building**

Report Period: January -- December

1996

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
-------------------	------------------------	------------------------	------------------------	------------------------	--------------

**A. Fission gases**

krypton-85	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-85m	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-87	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-88	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-133	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-133m	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-135	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-135m	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-138	<LLD	<LLD	<LLD	<LLD	<LLD
Others					
NONE					
Total for period *	<LLD	<LLD	<LLD	<LLD	<LLD

**B. Iodines**

iodine-131	6.8E-06	<LLD	<LLD	4.6E-06	1.1E-05
iodine-132	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-133	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-134	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-135	<LLD	<LLD	<LLD	<LLD	<LLD
Total for period *	6.8E-06	<LLD	<LLD	4.6E-06	1.1E-05

\* Less than (<) values are not included in the totals.  
See Table 3-6 for LLD values.

**Table 3-3B Ground Level Releases -- Radwaste Building**

Report Period: January -- December

1996

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
-------------------	------------------------	------------------------	------------------------	------------------------	--------------

**C. Particulates**

strontium-89	1.8E-06	8.9E-07	<LLD	<LLD	2.6E-06
strontium-90	<LLD	<LLD	<LLD	<LLD	<LLD
cesium-134	<LLD	<LLD	<LLD	<LLD	<LLD
cesium-137	<LLD	<LLD	<LLD	<LLD	<LLD
barium-lanthanum-140	<LLD	<LLD	<LLD	<LLD	<LLD
molybdenum-99	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-141	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-144	<LLD	<LLD	<LLD	<LLD	<LLD
cobalt-58	<LLD	<LLD	<LLD	<LLD	<LLD
cobalt-60	<LLD	<LLD	<LLD	<LLD	<LLD
iron-59	<LLD	<LLD	<LLD	<LLD	<LLD
manganese-54	<LLD	<LLD	<LLD	<LLD	<LLD
zinc-65	<LLD	<LLD	<LLD	<LLD	<LLD
Others					
NONE	No other nuclides were identified				
Total for period*	1.8E-06	8.9E-07	<LLD	<LLD	2.6E-06

Others with T 1/2 < 8 days					
NONE	No other nuclides were identified				
Total with T 1/2 < 8 days*	No nuclides with half-lives less than 8 days were identified				

<b>D. Tritium</b>					
tritium	2.0E-01	1.0E-01	1.2E-01	1.0E-01	5.2E-01

\* Less than (<) values are not included in the totals.  
See Table 3-6 for LLD values.

**Table 3-4 Summation of all Gaseous Releases**

Report Period: January – December

1996

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

Total release (Ci)	8.0E+00	4.4E-01	4.3E+00	4.9E+00	1.8E+01	3.6E+01
Average release rate (μCi/s)	1.0E+00	5.6E-02	5.4E-01	6.1E-01	5.6E-01	
Percent of ODCM limit (%)	**	**	**	**	**	

**B. Iodines**

Total I-131 (Ci)	5.7E-05	<LLD	<LLD	4.6E-06	6.2E-05	3.6E+01
Average release rate (μCi/s)	7.3E-06	<LLD	<LLD	5.8E-07	2.0E-06	
Percent of ODCM limit (%)	**	**	**	**	**	

**C. Particulates**

Particulates with half-lives > 8 days (Ci)	1.6E-03	3.4E-04	1.4E-04	6.8E-05	2.2E-03	3.6E+01
Average release rate (μCi/s)	2.1E-04	4.3E-05	1.8E-05	8.6E-06	6.9E-05	
Percent of ODCM limit (%)	**	**	**	**	**	
Gross alpha radioactivity	9.3E-06	3.6E-06	3.5E-06	2.5E-06	1.9E-05	

**D. Tritium**

Total release (Ci)	2.7E+00	1.0E+00	1.8E+00	2.1E+00	7.7E+00	3.6E+01
Average release rate (μCi/s)	3.4E-01	1.3E-01	2.3E-01	2.7E-01	2.4E-01	
Percent of ODCM limit (%)	**	**	**	**	**	

\* At 95% confidence level

\*\* ODCM limits are based on dose.

See Table 3-0 for percent of ODCM limits.

**Table 3-5      Gaseous Batch Releases**

Report Period: January -- December

1996

Type	Number	Total Time (hr.)	Maximum Time (hr.)	Minimum Time (hr.)	Mean Time (hr.)
Purge	3	17.98	14.4	3.58	9.0
Vent	23	27.0	2.0	1.0	1.2

Table 3-6 Gaseous Lower Limit of Detection

Reporting Period: January -- December  
Fission Gases

1996

Nuclide	LLD ( $\mu\text{Ci/cc}$ )
krypton-85	2.6E-07
krypton-85m	3.7E-07
krypton-87	3.0E-09
krypton-88	1.3E-08
xenon-133	1.1E-08
xenon-135	1.3E-09
xenon-135m	4.0E-09
xenon-138	1.2E-08
argon-41	2.6E-09
xenon-137	6.7E-08

Iodines

Nuclide	LLD ( $\mu\text{Ci/cc}$ )
iodine-131	2.4E-13
iodine-132	3.9E-13
iodine-133	3.5E-13
iodine-134	5.6E-13
iodine-135	1.6E-12

Particulates

Nuclide	LLD ( $\mu\text{Ci/cc}$ )
strontium-89	5.5E-15
strontium-90	4.2E-15
cesium-134	5.3E-13
cesium-137	3.2E-13
barium-lanthanum-140	1.1E-12
molybdenum-99	3.2E-12
cerium-141	2.3E-13
cerium-144	1.6E-12
cobalt-58	3.2E-13
cobalt-60	6.0E-13
iron-59	1.1E-12
manganese-54	3.7E-13
zinc-65	1.1E-12
Gross Alpha	4.3E-16

## 4.0 Solid Radwaste:

### *Required by ODCM*

#### Class A

##### 1. Container Volumes

*	B-25 Box	92.5 ft <sup>3</sup>
*	B-25 Box overpack	126.8 ft <sup>3</sup>
*	55 gal Drum	7.5 ft <sup>3</sup>
*	55 gal Drum with overpack	11.6 ft <sup>3</sup>
*	EA-50 Enviroalloy HIC	49.9 ft <sup>3</sup>
*	EL-142 Poly HIC	132.4 ft <sup>3</sup>
*	ES-190 Steel Liner	170.2 ft <sup>3</sup>

##### 2. Total Curies

\* 2.60E+02 Ci

##### 3. Principal Radionuclides

<u>Nuclide</u>	<u>Percent</u>	<u>Curies</u>
Co-60	4.63E+01	1.20E+02
Cr-51	1.72E+01	4.46E+01
Fe-55	1.08E+01	2.81E+01
Zn-65	1.04E+01	2.71E+01
Ba/La-140	3.90E+00	1.01E+01
Cs-137	2.45E+00	6.37E+00
Mn-54	2.06E+00	5.35E+00
Co-58	1.78E+00	4.62E+00
Sb-125	1.74E+00	4.53E+00
Ni-63	1.34E+00	3.49E+00
C-14	8.74E-01	2.27E+00
H-3	4.77E-01	1.24E+00
Cs-134	3.19E-01	8.28E-01
Sr-89	1.95E-01	5.06E-01

4. Source

*	Resins	2.03E+02 Ci
*	DAW	5.73E+01 Ci
*	Irradiated Components	None
*	Other	None

5. Type of Container

\* All containers shipped as LSA in STC, IP-2 and Type A or Type B cask where appropriate.

6. Solidification Agent

\* None

**Class B**

1. Container Volumes

\* EL-142 132.4 ft<sup>3</sup>

2. Total Curies

\* 3.16E+02 Ci

3. Principal Radionuclides

<u>Nuclide</u>	<u>Percent</u>	<u>Curies</u>
Co-60	5.46E+01	1.72E+02
Fe-55	1.28E+01	4.04E+01
Zn-65	1.11E+01	3.51E+01
Cr-51	6.70E+00	2.12E+01
Cs-137	3.70E+00	1.17E+01
Co-58	3.63E+00	1.15E+01
Mn-54	3.29E+00	1.04E+01
Sb-125	2.07E+00	6.52E+00
Cs-134	8.87E-01	2.80E+00
Nb-95	3.50E-01	1.10E+00
Ni-63	3.15E-01	9.96E-01
BaLa-140	2.84E-01	8.97E-01
Zr-95	1.48E-01	4.68E-01
C-14	3.60E-02	1.13E-01

4. Source

\* Resins

5. Type of Container

\* All containers shipped as LSA in EL-142 HIC's and Type A or Type B Cask as appropriate.



6. Solidification Agent

\* None

Class C

\* None

**Required by Reg. Guide 1.21**

Table 4-1, WNP-2 Solid Waste Shipments, January -- December, 1996.  
Solid waste shipped offsite for burial or disposal.

**Type of Waste**

<u>Waste Stream</u>	<u>Unit</u>	<u>Annual Cumulative</u>	<u>Est. Total Error %</u>
Spent resins, filter sludges, evaporator bottoms, etc.	m <sup>3</sup>	1.34E+02	
	Ci	5.18E+02	2.5E+01%
Dry Active Waste	m <sup>3</sup>	8.94E+01	
	Ci	5.73E+01	2.5E+01%

Irradiated Components -- None

Other Waste -- None

**Estimate of major nuclide composition (by type of waste):**

**a. Dewatered Spent Resins -- All Classes**

<u>Nuclide</u>	<u>%</u>	<u>Curies</u>
Co-60	5.33E+01	2.76E+02
Fe-55	1.25E+01	6.47E+01
Zn-65	9.91E+00	5.14E+01
Cr-51	9.56E+00	4.95E+01
Cs-137	3.27E+00	1.69E+01
Mn-54	2.84E+00	1.47E+01
Co-58	2.83E+00	1.46E+01
Sb-125	2.01E+00	1.04E+01
BaLa-140	1.37E+00	7.09E+00
Ni-63	7.83E-01	4.06E+00
Cs-134	6.54E-01	3.39E+00
C-14	4.55E-01	2.36E+00
Nb-95	2.28E-01	1.18E+00
Sr-89	1.08E-01	5.58E-01

b. Dry Active Waste (DAW) -- All Classes

<u>Nuclide</u>	<u>%</u>	<u>Curies</u>
Co-60	2.85E+01	1.63E+01
Cr-51	2.83E+01	1.62E+01
Zn-65	1.90E+01	1.09E+01
BaLa-140	6.88E+00	3.94E+00
Fe-55	6.71E+00	3.85E+00
Co-58	2.51E+00	1.44E+00
H-3	2.07E+00	1.19E+00
Cs-137	1.98E+00	1.13E+00
Mn-54	1.77E+00	1.01E+00
Sb-125	1.07E+00	6.14E-01
Ni-63	7.38E-01	4.23E-01
Cs-134	4.14E-01	2.38E-01

c. Irradiated Components -- None

d. Other Waste -- None

**Solid Waste Disposition**

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
48	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 the 33 ft and 245 ft above ground level (AGL) elevations. The meteorological data is a composite file from both the manual and automated data recovery systems for the calendar year 1996. Data archives were moved this year from a PRIME Computer System to the Supply System's Local Area Network.

Calendar year 1996 was the second wettest year on record. Total precipitation measured at the Hanford Meteorology Station was 12.19 inches, 195% of the normal 6.26 inches. Snowfall for 1996 was above normal. The period of January through March received snowfall 371% above normal and the two month period of November and December had snowfall 460% above normal. Temperatures for 1996 were, on the average, slightly lower than normal. The average temperature for 1996 was 52.3° F, which is 1.0° F below normal. The occurrence of fog, haze and blowing dust in 1996 was nearly the same as in 1995. In summary, the dispersive environment for WNP-2 for 1996 was near normal.

Joint data recovery for 1996 was 97.3%. Lightning strikes and thunderstorms were of minor concern and had no significant effect on meteorological tower operations

Tables 5-1 through 5-8 list the joint frequency distributions at the 33 ft and 245 ft AGL for 1996, by quarter. Table 5-9 and 5-10 list the annual joint frequency distribution for those levels for 1996. The NRC stability classes A through 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 1996 as the releases were random in time.

Calibrations performed in 1996 produced no values exceeding WNP-2 FSAR meteorological equipment tolerances. Data below 0.07 MPH has been determined to result from system malfunction and is not included in the results.

## Joint Frequency Distribution Tables

**Table 5-1 1st Quarter, 33 FT AGL.**

For the time period from Hour 00 on 01/01/96 to Hour 23 on 03/31/96

The total hours are 2184, 2080 hours read and 104 missing.

### NRC CATEGORY A

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	5	2	0	0	0	0
11.25	0	7	1	0	0	2	0
33.75	1	0	3	1	0	0	0
56.25	0	0	0	0	0	0	0
78.75	0	0	0	0	0	0	0
101.25	0	1	0	0	0	0	0
123.75	0	1	0	0	0	0	0
146.25	0	0	1	0	0	0	0
168.75	0	2	1	0	0	0	0
191.25	0	0	1	2	0	0	0
213.75	0	0	1	2	1	0	0
236.25	0	0	0	0	0	1	0
258.75	0	1	1	0	0	0	0
281.25	0	1	1	0	0	0	0
303.75	0	1	0	0	0	0	0
326.25	0	4	8	0	0	0	0

### NRC CATEGORY B

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	1	5	1	1	0	0
11.25	0	0	0	2	0	2	0
33.75	0	0	0	0	0	0	0
56.25	0	0	0	0	0	0	0
78.75	0	2	0	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	0	1	1	0	0	0	0
146.25	0	0	1	1	0	0	0
168.75	0	1	0	0	0	0	0
191.25	0	0	1	2	3	0	1
213.75	0	0	0	1	0	1	0
236.25	0	0	0	0	0	0	0
258.75	0	0	1	0	0	0	0
281.25	0	2	0	0	0	0	0
303.75	0	0	1	0	0	0	0
326.25	1	3	2	1	4	0	0

### NRC CATEGORY C

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	1	3	2	1	0	0
11.25	0	0	1	2	0	2	0
33.75	0	1	1	2	0	0	0
56.25	0	0	0	0	0	0	0
78.75	0	1	0	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	0	0	2	0	0	0	0
146.25	0	2	6	2	0	0	0
168.75	0	0	1	1	1	0	0
191.25	0	0	0	1	4	2	1
213.75	0	0	1	0	2	2	0
236.25	0	0	1	0	1	0	0
258.75	0	0	0	0	1	1	0
281.25	0	1	0	0	1	1	0
303.75	0	2	1	0	0	0	0

326.25

0

2

6

2

4

0

0

## NRC CATEGORY D

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	1	12	25	17	5	0	0
11.25	0	6	12	8	3	4	0
33.75	0	4	4	9	2	1	1
56.25	0	2	0	0	0	0	0
78.75	0	2	0	0	0	0	0
101.25	0	4	2	0	0	0	0
123.75	1	3	17	10	2	0	0
146.25	1	6	24	15	7	0	0
168.75	0	6	12	12	11	1	1
191.25	0	7	14	9	2	7	7
213.75	2	9	4	5	1	3	0
236.25	0	6	6	2	6	2	0
258.75	0	12	3	5	3	2	0
281.25	0	16	13	16	26	5	1
303.75	0	12	42	43	14	0	1
326.25	0	13	31	35	11	0	0

## NRC CATEGORY E

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	9	15	5	4	1	0
11.25	0	7	6	4	6	6	0
33.75	0	4	4	9	0	0	0
56.25	1	1	1	1	1	0	0
78.75	0	0	2	0	1	0	0
101.25	0	2	8	0	0	0	0
123.75	0	5	18	14	0	0	0
146.25	0	6	18	11	7	1	0
168.75	1	6	14	15	6	1	0
191.25	0	6	10	8	24	10	2
213.75	0	7	9	2	0	1	0
236.25	1	5	6	6	0	0	0
258.75	1	13	11	11	2	1	0
281.25	0	16	24	17	12	3	2
303.75	0	17	56	23	4	1	0
326.25	1	15	33	18	8	3	0

## NRC CATEGORY F

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	1	13	12	1	0	0	0
11.25	0	5	10	1	0	0	0
33.75	0	3	4	1	0	0	0
56.25	0	3	0	0	0	0	0
78.75	0	5	1	0	0	0	0
101.25	0	3	3	0	0	0	0
123.75	0	5	5	8	1	0	0
146.25	0	4	14	16	5	0	0
168.75	0	4	10	10	5	0	1
191.25	0	7	9	6	3	4	0
213.75	1	8	5	2	1	0	0
236.25	1	9	5	0	0	0	0
258.75	2	11	10	5	2	0	0
281.25	0	19	16	11	2	0	0
303.75	1	18	35	15	0	0	0
326.25	2	20	26	3	0	0	0



NRC CATEGORY G

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	8	10	0	0	0	0
11.25	1	7	4	1	0	0	0
33.75	0	1	3	0	0	0	0
56.25	1	2	0	0	0	0	0
78.75	0	0	0	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	1	4	3	0	0	0	0
146.25	0	4	23	6	3	0	0
168.75	1	2	8	2	0	0	0
191.25	0	2	3	1	0	0	0
213.75	0	5	4	1	0	0	0
236.25	0	4	3	0	0	0	0
258.75	0	6	5	0	0	0	0
281.25	0	14	12	3	0	0	0
303.75	0	13	32	9	0	0	0
326.25	0	17	14	0	0	0	0

**Table 5-2 1st Quarter, 245 FT AGL.**

For the time period from Hour 00 on 01/01/96 to Hour 23 on 03/31/96  
The total hours are 2184, 2080 hours read and 104 missing.

**NRC CATEGORY A**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	3	2	0	0	0	0
11.25	0	7	1	0	1	0	2
33.75	0	0	1	0	0	0	0
56.25	0	0	0	0	0	0	0
78.75	0	3	0	0	0	0	0
101.25	0	1	0	0	0	0	0
123.75	0	2	1	0	0	0	0
146.25	1	0	0	0	0	0	0
168.75	0	0	3	0	0	0	0
191.25	0	1	0	2	1	0	0
213.75	0	0	1	0	1	1	1
236.25	0	0	1	0	0	0	0
258.75	0	3	0	0	0	0	0
281.25	0	0	0	0	0	0	0
303.75	0	3	3	0	0	0	0
326.25	0	0	6	1	0	0	0

**NRC CATEGORY B**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	0	2	1	1	0	0
11.25	0	1	0	2	0	0	1
33.75	0	0	0	0	0	0	1
56.25	0	0	0	0	0	0	0
78.75	0	1	1	0	0	0	0
101.25	0	1	0	0	0	0	0
123.75	0	1	1	0	0	0	0
146.25	0	0	2	1	0	0	0
168.75	0	0	0	0	1	0	0
191.25	0	1	1	3	0	2	1
213.75	0	0	0	0	0	0	1
236.25	0	0	0	0	0	0	0
258.75	0	0	1	0	0	0	0
281.25	0	2	0	0	0	0	0
303.75	0	2	1	1	1	1	0
326.25	0	0	3	2	2	0	0

**NRC CATEGORY C**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	2	1	3	0	0	0
11.25	0	1	0	4	0	0	2
33.75	0	2	1	0	0	0	0
56.25	0	0	0	0	0	0	0
78.75	0	0	0	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	0	0	2	0	0	0	0
146.25	0	1	3	1	0	2	0
168.75	0	0	2	3	2	0	1
191.25	0	1	0	0	4	2	1
213.75	0	3	1	0	2	2	0
236.25	0	0	1	0	0	1	0
258.75	0	1	1	0	0	0	0
281.25	0	0	1	0	1	0	1
303.75	0	0	0	0	2	1	0
326.25	0	1	4	4	1	0	0

# NRC CATEGORY D

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	9	18	11	6	0	0
11.25	0	6	8	10	5	2	4
33.75	0	3	5	4	2	0	2
56.25	0	2	2	2	0	0	0
78.75	0	0	2	0	0	0	0
101.25	0	3	7	2	0	0	1
123.75	0	10	19	6	8	0	1
146.25	0	2	14	15	4	5	2
168.75	1	10	13	9	9	6	3
191.25	0	10	9	8	4	4	15
213.75	0	7	12	10	4	1	0
236.25	0	9	6	4	4	2	1
258.75	0	7	3	1	4	11	1
281.25	1	5	14	21	26	16	6
303.75	1	12	22	31	20	14	0
326.25	0	11	22	27	8	1	0

# NRC CATEGORY E

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	10	14	9	5	1	3
11.25	0	6	4	11	3	4	2
33.75	0	9	7	7	3	3	5
56.25	0	5	2	0	1	0	3
78.75	1	1	1	2	2	0	4
101.25	0	3	5	3	4	0	0
123.75	0	1	10	6	5	0	0
146.25	0	5	11	12	2	4	1
168.75	0	6	13	18	16	5	3
191.25	0	2	4	5	9	11	19
213.75	0	6	2	3	3	2	0
236.25	0	5	4	0	4	1	0
258.75	1	1	8	5	7	11	3
281.25	0	4	22	24	23	6	8
303.75	0	3	34	35	13	4	3
326.25	0	6	13	18	8	7	3

# NRC CATEGORY F

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	9	13	8	1	0	0
11.25	0	2	15	7	0	0	0
33.75	0	5	7	5	1	0	0
56.25	0	3	6	1	0	0	0
78.75	1	3	4	1	1	0	1
101.25	0	8	2	2	0	0	0
123.75	1	3	11	7	1	0	0
146.25	0	8	9	9	10	4	0
168.75	0	3	8	9	16	7	2
191.25	0	5	4	11	7	4	8
213.75	0	2	4	4	0	1	0
236.25	0	1	5	3	2	0	0
258.75	0	5	8	2	3	3	2
281.25	0	2	6	8	13	3	3
303.75	0	3	13	11	7	2	0
326.25	0	5	25	10	3	1	0

# NRC CATEGORY G

deg	MPH						
	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	1	10	1	0	0	0
11.25	0	3	16	3	0	1	0
33.75	0	1	12	5	2	0	0
56.25	0	2	5	0	0	0	0
78.75	0	1	2	1	0	0	0
101.25	1	1	2	0	0	0	0
123.75	0	2	3	7	2	0	0
146.25	0	2	11	8	4	2	0
168.75	0	8	16	7	4	2	0
191.25	0	4	6	4	1	0	0
213.75	0	4	2	1	1	0	0
236.25	0	1	5	0	2	0	0
258.75	0	1	2	1	1	0	0
281.25	0	1	3	1	5	0	0
303.75	1	1	10	13	7	3	0
326.25	0	1	5	6	2	0	0

**Table 5-3 2nd Quarter, 33 FT AGL.**

For the time period from Hour 00 on 04/01/96 to Hour 23 on 06/30/96

The total hours are 2184, 2122 read and 62 missing.

**NRC CATEGORY A**

deg	0.07	0.60	MPH		7.00	12.00	18.00	24.00
			3.00					
0.00	0	5	10		2	0	0	0
11.25	0	0	7		5	2	0	0
33.75	2	2	3		0	0	0	0
56.25	0	3	0		0	0	0	0
78.75	1	1	4		0	0	0	0
101.25	0	3	4		1	0	0	0
123.75	0	6	4		2	0	0	0
146.25	1	4	9		3	0	0	0
168.75	0	8	18		20	4	0	0
191.25	0	5	10		17	4	1	0
213.75	0	2	10		3	2	1	0
236.25	1	11	7		3	1	0	0
258.75	0	0	1		2	1	0	0
281.25	0	3	10		1	0	0	0
303.75	0	4	7		2	0	1	0
326.25	0	4	4		0	0	0	0

**NRC CATEGORY B**

deg	0.07	0.60	MPH		7.00	12.00	18.00	24.00
			3.00					
0.00	0	2	3		1	0	0	0
11.25	0	0	3		3	0	0	0
33.75	0	2	0		2	0	0	0
56.25	0	1	1		0	0	0	0
78.75	0	0	3		0	0	0	0
101.25	1	1	1		0	0	0	0
123.75	0	0	4		1	0	0	0
146.25	0	0	3		1	0	0	0
168.75	0	1	6		7	2	0	0
191.25	0	1	1		7	8	2	0
213.75	0	0	5		4	3	2	0
236.25	0	1	4		1	0	0	0
258.75	0	2	3		4	3	0	0
281.25	0	0	4		3	1	0	0
303.75	0	0	1		6	2	0	0
326.25	0	2	2		0	0	0	0

**NRC CATEGORY C**

deg	0.07	0.60	MPH		7.00	12.00	18.00	24.00
			3.00					
0.00	0	1	4		1	0	0	0
11.25	1	2	2		0	0	0	0
33.75	0	0	1		1	1	0	0
56.25	0	1	0		0	0	0	0
78.75	0	0	0		0	0	0	0
101.25	0	0	1		0	0	0	0
123.75	0	0	0		0	0	0	0
146.25	0	0	0		2	0	0	0
168.75	0	0	4		6	3	0	1
191.25	0	1	4		5	7	2	0
213.75	0	0	2		3	5	0	1
236.25	1	1	4		2	3	4	0
258.75	0	1	1		4	3	0	0
281.25	0	0	0		1	0	0	0
303.75	0	0	0		1	1	0	0
326.25	0	0	1		1	0	0	0

## NRC CATEGORY D

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	1	7	0	0	0	0
11.25	0	5	5	2	0	0	0
33.75	0	1	6	7	0	0	0
56.25	1	1	2	1	0	0	0
78.75	0	0	1	1	0	0	0
101.25	0	1	11	1	0	0	0
123.75	0	3	1	3	1	0	0
146.25	0	2	12	16	4	0	0
168.75	0	1	13	17	6	2	1
191.25	0	3	8	25	41	6	1
213.75	0	3	7	10	16	6	1
236.25	0	1	7	10	18	12	0
258.75	1	1	5	15	3	3	0
281.25	0	0	6	11	14	0	0
303.75	0	2	5	11	14	7	4
326.25	0	2	10	6	1	0	0

## NRC CATEGORY E

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	1	8	1	0	0	0
11.25	0	3	3	0	0	0	0
33.75	1	3	10	6	0	0	0
56.25	0	2	8	1	0	0	0
78.75	0	1	10	2	0	0	0
101.25	0	5	7	1	0	0	0
123.75	0	0	14	16	6	1	0
146.25	0	3	19	18	3	1	1
168.75	1	7	20	22	12	1	0
191.25	0	6	14	13	17	10	0
213.75	0	4	4	15	11	7	0
236.25	0	4	14	8	6	3	0
258.75	0	5	5	8	4	0	0
281.25	0	6	11	26	30	10	1
303.75	0	8	18	29	23	6	3
326.25	0	4	16	6	1	1	0

## NRC CATEGORY F

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	4	9	0	0	0	0
11.25	0	6	6	0	0	0	0
33.75	0	4	2	0	0	0	0
56.25	0	3	2	0	0	0	0
78.75	0	1	1	0	0	0	0
101.25	0	4	1	0	0	0	0
123.75	1	2	8	4	0	0	0
146.25	0	6	27	13	1	0	0
168.75	1	10	33	17	7	0	0
191.25	1	6	18	16	4	2	0
213.75	1	7	8	2	0	0	0
236.25	0	7	9	2	2	0	0
258.75	0	10	11	4	2	0	0
281.25	0	2	14	24	6	4	0
303.75	0	4	19	16	4	0	0
326.25	0	11	16	3	0	0	0

NRC CATEGORY G

deg	0.07	0.60	MPH 3.00	7.00	12.00	18.00	24.00
0.00	0	13	15	0	0	0	0
11.25	0	7	9	0	0	0	0
33.75	0	6	4	1	0	0	0
56.25	0	3	3	1	0	0	0
78.75	0	1	0	0	0	0	0
101.25	1	0	2	0	0	0	0
123.75	0	1	7	0	0	0	0
146.25	1	8	29	6	0	0	0
168.75	0	9	15	4	0	0	0
191.25	0	5	8	1	0	0	0
213.75	1	7	5	1	0	0	0
236.25	1	3	4	1	0	0	0
258.75	0	2	1	2	0	0	0
281.25	0	6	5	0	0	0	0
303.75	0	9	10	2	0	0	0
326.25	0	11	12	0	0	0	0

**Table 5-4 2nd Quarter, 245 FT AGL.**

For the time period from Hour 00 on 04/01/96 to Hour 23 on 06/30/96

The total hours are 2184, 2121 read and 63 missing.

**NRC CATEGORY A**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	3	6	1	0	0	0
11.25	0	4	6	5	4	0	0
33.75	0	0	7	1	0	0	0
56.25	1	4	4	0	0	0	0
78.75	0	4	8	1	0	0	0
101.25	1	9	6	3	0	0	0
123.75	0	2	10	1	0	0	0
146.25	0	4	12	3	0	0	0
168.75	0	4	12	17	9	0	0
191.25	0	1	10	14	9	3	0
213.75	0	4	6	5	1	2	0
236.25	0	2	5	4	1	0	0
258.75	0	2	2	2	2	0	0
281.25	2	0	5	4	0	0	0
303.75	0	1	5	1	0	0	1
326.25	0	0	6	0	0	0	0

**NRC CATEGORY B**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	2	3	0	0	0	0
11.25	0	0	2	3	1	0	0
33.75	0	2	2	2	0	0	0
56.25	0	0	2	0	0	0	0
78.75	0	1	0	1	0	0	0
101.25	0	1	2	1	0	0	0
123.75	0	0	4	1	0	0	0
146.25	1	1	5	1	0	0	0
168.75	0	0	2	6	4	0	0
191.25	1	1	3	8	5	4	0
213.75	0	1	2	2	4	3	2
236.25	0	1	2	3	1	0	0
258.75	1	1	2	1	4	1	0
281.25	0	0	1	3	2	0	0
303.75	0	0	0	7	1	1	0
326.25	0	1	2	0	0	0	0

**NRC CATEGORY C**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	0	3	1	0	0	0
11.25	0	0	2	0	0	0	0
33.75	1	1	1	1	1	0	0
56.25	0	0	2	0	0	0	0
78.75	0	1	2	0	0	0	0
101.25	0	1	0	0	0	0	0
123.75	0	0	0	0	0	0	0
146.25	0	0	2	1	0	0	0
168.75	0	0	5	3	4	1	0
191.25	0	1	3	6	7	2	0
213.75	0	0	2	1	4	3	3
236.25	3	1	2	3	2	4	2
258.75	0	0	0	0	3	0	0
281.25	0	0	0	2	1	0	0
303.75	0	0	0	1	0	0	0
326.25	0	0	0	1	0	0	0



# NRC CATEGORY D

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	2	6	1	0	0	0
11.25	0	0	4	2	0	0	0
33.75	1	0	1	7	1	0	0
56.25	0	2	2	5	0	0	0
78.75	0	3	1	3	0	0	0
101.25	0	2	7	5	0	0	0
123.75	3	2	3	4	1	0	0
146.25	2	2	8	11	5	1	0
168.75	0	7	9	16	15	4	0
191.25	1	2	9	19	29	9	3
213.75	0	1	7	17	14	10	4
236.25	4	0	2	13	7	11	10
258.75	1	2	4	8	6	3	0
281.25	0	1	4	9	13	5	0
303.75	1	2	0	9	14	6	9
326.25	0	0	10	3	2	0	0

# NRC CATEGORY E

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	3	4	2	0	0	0
11.25	1	3	3	2	0	0	0
33.75	0	2	4	10	0	0	0
56.25	0	0	5	3	0	0	0
78.75	0	1	5	9	0	0	0
101.25	0	3	7	3	1	2	0
123.75	2	2	7	14	8	3	0
146.25	1	3	19	17	9	0	0
168.75	1	5	6	18	20	5	1
191.25	2	1	10	8	7	7	9
213.75	0	6	7	9	11	7	15
236.25	1	2	4	8	8	6	3
258.75	2	0	7	6	4	4	1
281.25	2	4	7	17	20	23	29
303.75	0	6	6	16	22	18	11
326.25	1	3	13	5	3	0	0

# NRC CATEGORY F

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	3	4	7	1	0	0	0
11.25	4	4	2	0	0	0	0
33.75	1	5	4	5	0	0	0
56.25	0	3	1	4	0	0	0
78.75	0	1	1	2	0	0	0
101.25	0	1	3	2	1	0	0
123.75	2	4	7	1	1	2	0
146.25	1	3	9	12	2	4	1
168.75	5	8	13	16	6	2	2
191.25	0	5	9	5	4	5	1
213.75	7	6	6	5	7	0	0
236.25	0	2	15	6	1	0	0
258.75	0	3	7	12	9	0	0
281.25	3	1	8	16	26	22	0
303.75	1	4	11	11	7	9	0
326.25	1	2	6	5	0	0	0

NRC CATEGORY G

deg	MPH						
	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	1	2	8	4	0	0	0
11.25	0	2	6	3	0	0	0
33.75	0	3	8	4	0	0	0
56.25	0	3	7	3	1	0	0
78.75	0	1	5	1	1	0	0
101.25	0	1	0	1	1	0	0
123.75	2	2	5	0	0	0	0
146.25	3	5	13	12	0	0	0
168.75	1	3	21	13	2	0	0
191.25	3	1	4	3	2	1	0
213.75	2	4	7	3	0	0	0
236.25	2	6	2	0	0	0	0
258.75	0	0	1	2	4	1	0
281.25	0	0	1	1	2	1	0
303.75	0	4	4	8	7	2	0
326.25	1	4	4	8	0	0	0



**Table 5-5 3rd Quarter, 33 FT AGL.**

For the time period from Hour 00 on 07/01/96 to Hour 23 on 09/30/96

The total hours are 2208, 2147 read and 61 missing.

**NRC CATEGORY A**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	1	0	0	0	0	0
11.25	0	0	0	0	0	0	0
33.75	0	0	0	1	0	0	0
56.25	0	0	0	0	0	0	0
78.75	0	0	0	0	0	0	0
101.25	0	1	0	0	0	0	0
123.75	0	0	1	2	0	0	0
146.25	0	1	8	5	0	0	0
168.75	0	0	5	6	1	0	0
191.25	0	1	2	3	3	0	0
213.75	0	1	0	2	0	0	0
236.25	0	0	0	0	0	0	0
258.75	0	0	0	0	0	0	0
281.25	0	0	0	0	0	0	0
303.75	0	0	0	0	0	0	0
326.25	0	0	1	0	0	0	0

**NRC CATEGORY B**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	0	0	0	0	0	0
11.25	0	0	0	1	0	0	0
33.75	0	1	0	1	0	0	0
56.25	0	0	0	0	0	0	0
78.75	0	0	1	0	0	0	0
101.25	1	0	0	0	0	0	0
123.75	0	0	0	1	0	0	0
146.25	0	0	0	0	0	0	0
168.75	0	0	0	1	0	0	0
191.25	0	0	0	0	0	0	0
213.75	0	0	0	0	1	1	1
236.25	0	0	0	0	0	0	3
258.75	0	0	0	0	0	0	0
281.25	0	0	0	0	0	0	0
303.75	0	0	0	0	0	1	0
326.25	0	0	0	0	0	0	0

**NRC CATEGORY C**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	0	2	1	0	0	0
11.25	0	0	0	0	1	0	0
33.75	0	0	0	1	0	0	0
56.25	0	0	0	0	0	0	0
78.75	0	0	0	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	0	1	2	0	0	1	0
146.25	0	0	0	4	0	0	0
168.75	0	0	1	2	1	0	0
191.25	0	0	1	3	4	4	1
213.75	0	0	0	1	0	2	2
236.25	0	1	1	0	2	3	2
258.75	0	3	0	0	1	1	0
281.25	1	0	0	0	0	0	0
303.75	0	0	0	0	0	0	0
326.25	0	0	1	0	0	0	0

## NRC CATEGORY D

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	1	4	4	1	0	0
11.25	0	1	4	5	7	0	0
33.75	0	2	3	3	0	0	0
56.25	0	0	3	3	0	0	0
78.75	0	1	0	1	0	0	0
101.25	0	0	1	1	1	0	0
123.75	0	1	1	1	1	3	0
146.25	0	0	3	7	2	2	0
168.75	0	2	10	23	12	0	0
191.25	0	3	11	24	32	8	1
213.75	0	2	8	10	8	5	3
236.25	0	1	0	9	15	4	4
258.75	0	0	3	6	5	1	8
281.25	0	2	2	7	8	3	5
303.75	0	0	3	2	4	7	9
326.25	0	0	3	1	5	0	0

## NRC CATEGORY E

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	5	22	15	4	0	0
11.25	1	6	32	43	2	0	0
33.75	0	6	36	16	1	0	0
56.25	0	2	18	12	2	0	0
78.75	1	4	13	9	2	0	0
101.25	0	7	9	20	6	1	0
123.75	0	5	21	24	8	1	0
146.25	0	5	20	18	6	1	0
168.75	0	6	28	27	9	5	0
191.25	0	4	18	20	7	7	0
213.75	0	2	6	5	5	1	1
236.25	0	2	9	7	3	3	3
258.75	0	2	9	6	11	6	1
281.25	0	5	8	10	14	32	28
303.75	0	4	8	9	17	26	18
326.25	0	5	14	8	6	0	0

## NRC CATEGORY F

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	1	9	13	4	0	0	0
11.25	0	9	12	14	0	0	0
33.75	0	5	9	7	0	0	0
56.25	0	4	7	5	0	0	0
78.75	0	5	3	1	0	0	0
101.25	0	4	3	0	0	0	0
123.75	0	7	4	7	10	0	0
146.25	0	5	4	7	2	2	0
168.75	1	6	12	15	12	0	0
191.25	1	4	9	10	12	0	0
213.75	0	4	9	7	0	1	0
236.25	0	6	7	4	1	0	0
258.75	0	7	10	6	3	0	0
281.25	0	2	8	10	20	10	1
303.75	0	5	6	17	20	4	0
326.25	1	7	10	8	1	0	0

NRC CATEGORY G

deg	MPH						
	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	4	24	8	1	0	0
11.25	0	3	24	7	0	0	0
33.75	0	0	27	19	4	0	0
56.25	0	2	20	9	0	0	0
78.75	0	2	6	0	0	0	0
101.25	0	2	4	0	0	0	0
123.75	0	4	6	2	2	0	0
146.25	0	2	16	15	5	0	0
168.75	1	5	21	10	5	0	0
191.25	0	6	15	6	6	0	0
213.75	0	7	8	5	3	1	0
236.25	0	2	10	5	0	0	0
258.75	0	3	5	3	0	0	0
281.25	0	4	6	0	2	1	0
303.75	0	1	7	7	7	1	0
326.25	0	4	16	16	5	0	0

Table 5-6 3rd Quarter, 245 FT AGL.

For the time period from Hour 00 on 07/01/96 to Hour 23 on 09/30/96

The total hours are 2208, 2148 read and 60 missing.

NRC CATEGORY A

deg	0.07	0.60	MPH		7.00	12.00	18.00	24.00
			3.00					
0.00	0	1	0	0	0	0	0	0
11.25	0	0	0	0	0	0	0	0
33.75	0	0	0	0	0	0	0	0
56.25	0	0	0	0	0	0	0	0
78.75	0	0	0	0	0	0	0	0
101.25	0	0	0	0	0	0	0	0
123.75	0	1	0	1	0	0	0	0
146.25	0	0	10	5	0	0	0	0
168.75	0	1	9	3	0	0	0	0
191.25	0	2	2	0	3	0	0	0
213.75	0	2	1	1	0	0	0	0
236.25	0	0	0	0	0	0	0	0
258.75	0	0	0	0	0	0	0	0
281.25	0	0	0	0	0	0	0	0
303.75	0	1	0	0	0	0	0	0
326.25	0	2	0	0	0	0	0	0

NRC CATEGORY B

deg	0.07	0.60	MPH		7.00	12.00	18.00	24.00
			3.00					
0.00	1	0	1	0	0	0	0	0
11.25	0	0	1	0	0	0	0	0
33.75	0	0	1	0	0	0	0	0
56.25	0	0	0	0	0	0	0	0
78.75	0	0	0	0	0	0	0	0
101.25	0	0	1	0	0	0	0	0
123.75	0	0	1	0	0	0	0	0
146.25	0	0	0	0	0	0	0	0
168.75	0	0	0	1	0	0	0	0
191.25	0	0	0	0	1	0	0	0
213.75	0	0	0	1	0	1	1	1
236.25	0	0	0	0	0	2	0	0
258.75	0	0	0	0	0	0	0	0
281.25	0	0	0	0	0	0	0	0
303.75	0	0	0	0	1	0	0	0
326.25	0	0	0	0	0	0	0	0

NRC CATEGORY C

deg	0.07	0.60	MPH		7.00	12.00	18.00	24.00
			3.00					
0.00	0	1	1	1	0	0	0	0
11.25	0	1	0	0	1	0	0	0
33.75	0	1	0	1	0	0	0	0
56.25	0	0	0	0	0	0	0	0
78.75	0	0	0	0	0	0	0	0
101.25	0	0	0	0	0	0	0	0
123.75	0	0	2	3	1	0	0	0
146.25	0	0	1	2	1	0	0	0
168.75	0	3	0	5	2	0	0	0
191.25	0	0	0	1	4	1	0	0
213.75	0	1	0	1	4	2	0	0
236.25	0	0	0	0	2	3	0	0
258.75	0	0	1	1	1	0	0	0
281.25	0	0	0	0	0	0	0	0
303.75	0	0	0	0	0	0	0	0
326.25	0	1	1	0	0	0	0	0

## NRC CATEGORY D

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	3	5	8	1	0	0
11.25	0	2	3	1	4	0	0
33.75	0	0	4	3	0	0	0
56.25	0	2	2	1	0	0	0
78.75	0	0	2	0	0	0	0
101.25	0	0	1	1	1	0	0
123.75	0	0	1	6	5	0	0
146.25	0	3	11	24	1	0	0
168.75	1	0	9	27	14	0	0
191.25	0	5	15	18	19	2	0
213.75	0	0	5	12	6	2	2
236.25	0	0	8	12	3	4	0
258.75	0	1	2	8	1	8	3
281.25	2	1	6	9	5	3	0
303.75	0	0	2	3	7	9	3
326.25	0	3	4	5	2	0	0

## NRC CATEGORY E

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	9	32	25	2	0	0
11.25	0	8	47	23	0	0	0
33.75	0	10	34	9	0	0	0
56.25	1	5	12	9	0	0	0
78.75	0	6	7	3	0	0	0
101.25	0	3	10	16	5	0	0
123.75	0	5	26	24	3	0	0
146.25	0	9	43	26	5	0	0
168.75	0	5	41	23	5	0	0
191.25	0	7	20	7	2	1	0
213.75	0	4	13	2	0	0	0
236.25	0	7	3	8	5	1	0
258.75	2	7	13	13	5	1	0
281.25	1	13	10	31	32	14	1
303.75	0	5	11	22	20	9	3
326.25	0	9	27	9	0	0	0

## NRC CATEGORY F

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	15	21	0	0	0	0
11.25	0	12	24	2	0	0	0
33.75	1	7	12	3	0	0	0
56.25	0	1	1	2	0	0	0
78.75	0	1	0	0	0	0	0
101.25	0	2	2	1	0	0	0
123.75	2	3	9	13	0	0	0
146.25	0	4	19	21	0	0	0
168.75	1	6	36	16	0	0	0
191.25	1	9	17	3	0	0	0
213.75	2	5	6	2	0	1	0
236.25	0	13	7	1	0	0	0
258.75	0	7	5	5	0	0	0
281.25	1	13	9	14	3	0	0
303.75	0	16	16	8	0	0	0
326.25	0	17	22	1	0	0	0



NRC CATEGORY G

deg	0.07	0.60	MPH 3.00	7.00	12.00	18.00	24.00
0.00	2	29	41	0	0	0	0
11.25	1	19	59	0	0	0	0
33.75	2	9	18	4	0	0	0
56.25	0	2	3	0	0	0	0
78.75	1	0	0	0	0	0	0
101.25	0	1	0	0	0	0	0
123.75	0	2	3	2	0	0	0
146.25	1	10	21	18	0	0	0
168.75	1	11	23	11	0	0	0
191.25	0	10	13	2	0	0	0
213.75	1	10	2	0	1	0	0
236.25	0	8	1	0	0	0	0
258.75	0	9	2	0	0	0	0
281.25	1	3	3	1	0	0	0
303.75	1	13	6	2	0	0	0
326.25	0	21	17	1	0	0	0

**Table 5-7 4th Quarter, 33 FT AGL.**

For the time period from Hour 00 on 10/01/96 to Hour 23 on 12/31/96

The total hours are 2208, 2195 read and 13 missing.

**NRC CATEGORY A**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	1	3	2	2	2	0
11.25	0	2	2	4	0	0	0
33.75	0	2	0	0	0	0	0
56.25	0	0	0	0	0	0	0
78.75	0	0	2	0	0	0	0
101.25	1	2	0	0	0	0	0
123.75	0	2	1	1	1	0	0
146.25	0	0	0	5	0	0	0
168.75	0	1	3	5	0	0	0
191.25	0	5	3	0	2	0	0
213.75	0	1	1	0	0	0	0
236.25	0	2	0	0	0	0	0
258.75	0	1	0	0	0	0	0
281.25	0	1	0	0	0	0	0
303.75	1	1	2	0	0	0	0
326.25	0	3	3	1	1	0	0

**NRC CATEGORY B**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	2	1	0	0	0	0
11.25	0	1	1	1	0	0	0
33.75	0	0	1	0	0	0	0
56.25	0	0	1	0	0	0	0
78.75	0	0	0	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	0	0	1	0	0	0	0
146.25	0	0	0	1	0	0	0
168.75	0	0	0	1	1	0	0
191.25	0	0	0	0	0	0	0
213.75	0	0	0	0	0	0	0
236.25	0	0	0	0	0	0	0
258.75	0	0	0	0	0	0	0
281.25	0	0	0	0	0	0	0
303.75	0	0	2	0	0	0	0
326.25	0	3	0	0	0	0	0

**NRC CATEGORY C**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	1	0	2	2	0	0	0
11.25	0	0	2	3	0	0	0
33.75	0	0	1	0	0	0	0
56.25	0	0	0	0	0	0	0
78.75	0	0	0	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	0	0	0	0	0	0	0
146.25	0	0	1	0	0	0	0
168.75	0	0	2	4	1	0	0
191.25	0	0	0	0	3	0	0
213.75	0	0	1	0	1	1	0
236.25	0	0	0	0	0	0	0
258.75	0	0	0	0	0	0	0
281.25	0	0	0	0	0	0	0
303.75	0	0	0	0	0	0	0
326.25	1	0	0	3	1	0	0

## NRC CATEGORY D

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	8	14	15	10	5	0
11.25	0	5	7	6	3	0	0
33.75	0	0	9	2	3	0	0
56.25	0	2	10	4	0	0	0
78.75	0	3	1	0	0	0	0
101.25	0	3	1	0	0	0	0
123.75	1	3	2	0	0	0	0
146.25	0	5	14	3	1	0	0
168.75	0	6	17	25	5	3	0
191.25	0	5	8	15	18	5	1
213.75	0	8	10	10	8	2	6
236.25	0	2	3	3	4	3	3
258.75	1	4	3	4	1	1	0
281.25	0	3	6	2	4	2	0
303.75	0	1	10	21	12	3	1
326.25	0	7	37	43	15	3	0

## NRC CATEGORY E

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	4	26	17	10	0	0
11.25	0	6	16	6	0	0	0
33.75	0	3	5	4	1	0	0
56.25	0	2	5	3	1	0	0
78.75	2	4	0	0	0	0	0
101.25	0	2	2	0	0	0	0
123.75	1	2	3	2	0	0	0
146.25	0	5	13	10	10	1	0
168.75	2	8	17	27	9	10	0
191.25	0	7	11	24	28	24	4
213.75	1	5	8	12	14	26	24
236.25	1	6	9	6	8	8	7
258.75	1	6	4	4	4	3	2
281.25	0	4	16	8	9	7	0
303.75	5	6	31	33	30	10	5
326.25	3	5	34	42	23	17	0

## NRC CATEGORY F

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	2	0	15	18	1	0	0
11.25	0	4	14	5	0	0	0
33.75	0	4	5	5	0	0	0
56.25	0	2	5	1	0	0	0
78.75	1	3	3	0	0	0	0
101.25	0	2	4	0	0	0	0
123.75	0	3	1	2	2	0	0
146.25	1	4	3	12	4	3	0
168.75	0	5	22	14	12	1	0
191.25	0	4	7	15	18	8	1
213.75	1	5	15	8	12	15	5
236.25	1	4	11	7	5	4	1
258.75	1	4	10	9	8	1	3
281.25	0	0	9	9	5	5	0
303.75	1	4	6	13	8	4	0
326.25	0	1	12	14	23	0	0

NRC CATEGORY G

deg	0.07	0.60	MPH 3.00	7.00	12.00	18.00	24.00
0.00	1	3	6	7	0	0	0
11.25	0	5	15	4	0	0	0
33.75	0	3	17	8	0	0	0
56.25	0	5	9	7	0	0	0
78.75	0	5	4	1	0	0	0
101.25	0	1	0	0	0	0	0
123.75	0	1	1	0	0	0	0
146.25	0	4	11	6	3	0	0
168.75	0	4	14	7	4	0	0
191.25	1	7	8	5	2	0	0
213.75	0	1	15	8	4	2	0
236.25	0	2	3	4	1	0	0
258.75	0	9	10	2	1	0	0
281.25	0	2	6	2	2	2	0
303.75	0	2	5	6	18	1	0
326.25	0	3	6	13	8	1	0

Table 5-8 4th Quarter, 245 FT AGL.

For the time period from Hour 00 on 10/01/96 to Hour 23 on 12/31/96  
The total hours are 2208, 2195 read and 13 missing.

NRC CATEGORY A

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	2	3	1	3	0	0
11.25	0	0	3	2	0	0	0
33.75	0	0	0	0	0	0	0
56.25	0	1	1	0	0	0	0
78.75	0	1	0	0	0	0	0
101.25	0	4	1	1	0	0	0
123.75	0	0	1	6	0	0	0
146.25	0	0	4	6	0	0	0
168.75	0	4	3	0	0	0	0
191.25	0	3	0	0	0	0	0
213.75	0	2	0	0	0	0	0
236.25	0	0	0	0	0	0	0
258.75	1	0	0	0	0	0	0
281.25	0	1	0	0	0	0	0
303.75	0	4	2	0	0	0	0
326.25	1	3	7	1	0	0	0

NRC CATEGORY B

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	0	1	1	0	0	0
11.25	0	1	2	0	0	0	0
33.75	0	1	1	0	0	0	0
56.25	0	1	0	0	0	0	0
78.75	0	0	0	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	0	0	1	1	0	0	0
146.25	0	0	1	0	0	0	0
168.75	0	0	0	0	0	0	0
191.25	0	0	1	0	0	0	0
213.75	0	0	0	0	0	0	0
236.25	0	0	0	0	0	0	0
258.75	0	0	0	0	0	0	0
281.25	0	0	0	0	0	0	0
303.75	0	3	2	0	0	0	0
326.25	0	0	0	0	0	0	0

NRC CATEGORY C

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	0	2	3	0	0	0
11.25	0	1	1	1	0	0	0
33.75	0	0	1	0	0	0	0
56.25	0	0	0	0	0	0	0
78.75	0	0	0	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	0	0	2	1	0	0	0
146.25	0	0	2	3	1	0	0
168.75	0	0	0	0	2	0	0
191.25	0	0	1	0	2	0	0
213.75	0	0	0	0	0	0	0
236.25	0	0	0	0	0	0	0
258.75	0	0	0	0	0	0	0
281.25	0	0	0	0	0	0	0
303.75	0	0	1	1	0	0	0
326.25	0	2	2	1	0	0	0

# **NRC CATEGORY D**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	6	13	10	3	0	0
11.25	0	10	8	4	0	0	0
33.75	0	4	8	6	1	0	0
56.25	0	3	1	0	0	0	0
78.75	0	2	0	0	0	0	0
101.25	0	3	0	0	0	0	0
123.75	0	8	9	3	1	0	0
146.25	0	10	26	20	3	0	0
168.75	1	7	11	20	12	1	1
191.25	0	6	6	12	4	3	3
213.75	0	2	9	6	4	3	0
236.25	1	2	4	2	1	0	0
258.75	0	3	5	1	3	0	0
281.25	0	4	10	6	5	1	0
303.75	1	6	43	40	9	0	0
326.25	0	8	35	18	13	0	0

# **NRC CATEGORY E**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	7	7	4	0	0	0
11.25	0	5	14	3	0	0	0
33.75	1	0	5	4	0	0	0
56.25	0	3	0	0	0	0	0
78.75	0	7	1	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	0	6	12	14	0	0	0
146.25	0	9	22	33	15	0	0
168.75	0	15	21	37	21	1	0
191.25	1	12	18	10	24	12	4
213.75	1	10	16	8	9	7	1
236.25	1	8	16	5	7	0	0
258.75	0	9	8	7	2	1	0
281.25	0	23	29	17	5	4	0
303.75	0	23	85	40	16	0	0
326.25	0	15	30	25	8	0	0

# **NRC CATEGORY F**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	12	12	1	0	0	0
11.25	0	6	6	0	0	0	0
33.75	1	5	4	1	0	0	0
56.25	0	2	0	0	0	0	0
78.75	2	3	0	0	0	0	0
101.25	0	1	1	1	0	0	0
123.75	0	3	3	4	0	0	0
146.25	0	2	19	31	0	1	0
168.75	3	14	22	25	9	0	0
191.25	0	8	19	18	10	0	0
213.75	0	5	10	5	6	1	0
236.25	0	12	14	8	4	0	0
258.75	0	9	12	5	0	0	0
281.25	0	18	20	14	1	0	0
303.75	1	9	26	13	0	0	0
326.25	0	14	22	2	0	0	0

NRC CATEGORY G

deg	MPH						
	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	1	16	15	0	0	0	0
11.25	0	6	21	0	0	0	0
33.75	0	5	6	1	0	0	0
56.25	0	2	2	0	0	0	0
78.75	0	3	0	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	1	4	0	1	0	0	0
146.25	0	3	8	6	0	0	0
168.75	0	11	15	5	1	0	0
191.25	0	9	12	4	0	0	0
213.75	1	6	5	0	0	0	0
236.25	0	5	5	1	0	0	0
258.75	0	14	3	2	0	0	0
281.25	1	7	11	1	0	0	0
303.75	1	18	28	7	0	0	0
326.25	2	12	29	1	0	0	0

**Table 5-9 Year 1996, 33 FT AGL.**

For the time period from Hour 00 on 01/01/96 to Hour 23 on 12/31/96

The total hours are 8784, 8544 read and 240 missing.

**NRC CATEGORY A**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	12	15	4	2	2	0
11.25	0	9	10	9	2	2	0
33.75	3	4	6	2	0	0	0
56.25	0	3	0	0	0	0	0
78.75	1	1	6	0	0	0	0
101.25	1	7	4	1	0	0	0
123.75	0	9	6	5	1	0	0
146.25	1	5	18	13	0	0	0
168.75	0	11	27	31	5	0	0
191.25	0	11	16	22	9	1	0
213.75	0	4	12	7	3	1	0
236.25	1	13	7	3	1	1	0
258.75	0	2	2	2	1	0	0
281.25	0	5	11	1	0	0	0
303.75	1	6	9	2	0	1	0
326.25	0	11	16	1	1	0	0

**NRC CATEGORY B**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	5	9	2	1	0	0
11.25	0	1	4	7	0	2	0
33.75	0	3	1	3	0	0	0
56.25	0	1	2	0	0	0	0
78.75	0	2	4	0	0	0	0
101.25	2	1	1	0	0	0	0
123.75	0	1	6	2	0	0	0
146.25	0	0	4	3	0	0	0
168.75	0	2	6	9	3	0	0
191.25	0	1	2	9	11	2	1
213.75	0	0	5	5	4	4	1
236.25	0	1	4	1	0	0	3
258.75	0	2	4	4	3	0	0
281.25	0	2	4	3	1	0	0
303.75	0	0	4	6	2	1	0
326.25	1	8	4	1	4	0	0

**NRC CATEGORY C**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	1	2	11	6	1	0	0
11.25	1	2	5	5	1	2	0
33.75	0	1	3	4	1	0	0
56.25	0	1	0	0	0	0	0
78.75	0	1	0	0	0	0	0
101.25	0	0	1	0	0	0	0
123.75	0	1	4	0	0	1	0
146.25	0	2	7	8	0	0	0
168.75	0	0	8	13	6	0	1
191.25	0	1	5	9	18	8	2
213.75	0	0	4	4	8	5	3
236.25	1	2	6	2	6	7	2
258.75	0	4	1	4	5	2	0
281.25	1	1	0	1	1	1	0
303.75	0	2	1	1	1	0	0
326.25	1	2	8	6	5	0	0



## NRC CATEGORY D

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	1	22	50	36	16	5	0
11.25	0	17	28	21	13	4	0
33.75	0	7	22	21	5	1	1
56.25	1	5	15	8	0	0	0
78.75	0	6	2	2	0	0	0
101.25	0	8	15	2	1	0	0
123.75	2	10	21	14	4	3	0
146.25	1	13	53	41	14	2	0
168.75	0	15	52	77	34	6	2
191.25	0	18	41	73	93	26	10
213.75	2	22	29	35	33	16	10
236.25	0	10	16	24	43	21	7
258.75	2	17	14	30	12	7	8
281.25	0	21	27	36	52	10	6
303.75	0	15	60	77	44	17	15
326.25	0	22	81	85	32	3	0

## NRC CATEGORY E

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	19	71	38	18	1	0
11.25	1	22	57	53	8	6	0
33.75	1	16	55	35	2	0	0
56.25	1	7	32	17	4	0	0
78.75	3	9	25	11	3	0	0
101.25	0	16	26	21	6	1	0
123.75	1	12	56	56	14	2	0
146.25	0	19	70	57	26	4	1
168.75	4	27	79	91	36	17	0
191.25	0	23	53	65	76	51	6
213.75	1	18	27	34	30	35	25
236.25	2	17	38	27	17	14	10
258.75	2	26	29	29	21	10	3
281.25	0	31	59	61	65	52	31
303.75	5	35	113	94	74	43	26
326.25	4	29	97	74	38	21	0

## NRC CATEGORY F

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	4	26	49	23	1	0	0
11.25	0	24	42	20	0	0	0
33.75	0	16	20	13	0	0	0
56.25	0	12	14	6	0	0	0
78.75	1	14	8	1	0	0	0
101.25	0	13	11	0	0	0	0
123.75	1	17	18	21	13	0	0
146.25	1	19	48	48	12	5	0
168.75	2	25	77	56	36	1	1
191.25	2	21	43	47	37	14	1
213.75	3	24	37	19	13	16	5
236.25	2	26	32	13	8	4	1
258.75	3	32	41	24	15	1	3
281.25	0	23	47	54	33	19	1
303.75	2	31	66	61	32	8	0
326.25	3	39	64	28	24	0	0

## NRC CATEGORY G

deg	MPH						
	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	1	28	55	15	1	0	0
11.25	1	22	52	12	0	0	0
33.75	0	10	51	28	4	0	0
56.25	1	12	32	17	0	0	0
78.75	0	8	10	1	0	0	0
101.25	1	3	6	0	0	0	0
123.75	1	10	17	2	2	0	0
146.25	1	18	79	33	11	0	0
168.75	2	20	58	23	9	0	0
191.25	1	20	34	13	8	0	0
213.75	1	20	32	15	7	3	0
236.25	1	11	20	10	1	0	0
258.75	0	20	21	7	1	0	0
281.25	0	26	29	5	4	3	0
303.75	0	25	54	24	25	2	0
326.25	0	35	48	29	13	1	0

**Table 5-10 Year 1996, 245 FT AGL.**

For the time period from Hour 00 on 01/01/96 to Hour 23 on 12/31/96

The total hours are 8784, 8544 read and 240 missing.

**NRC CATEGORY A**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	9	11	2	3	0	0
11.25	0	11	10	7	5	0	2
33.75	0	0	8	1	0	0	0
56.25	1	5	5	0	0	0	0
78.75	0	8	8	1	0	0	0
101.25	1	14	7	4	0	0	0
123.75	0	5	12	8	0	0	0
146.25	1	4	26	14	0	0	0
168.75	0	9	27	20	9	0	0
191.25	0	7	12	16	13	3	0
213.75	0	8	8	6	2	3	1
236.25	0	2	6	4	1	0	0
258.75	1	5	2	2	2	0	0
281.25	2	1	5	4	0	0	0
303.75	0	9	10	1	0	0	1
326.25	1	5	19	2	0	0	0

**NRC CATEGORY B**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	1	2	7	2	1	0	0
11.25	0	2	5	5	1	0	1
33.75	0	3	4	2	0	0	1
56.25	0	1	2	0	0	0	0
78.75	0	2	1	1	0	0	0
101.25	0	2	3	1	0	0	0
123.75	0	1	7	2	0	0	0
146.25	1	1	8	2	0	0	0
168.75	0	0	2	7	5	0	0
191.25	1	2	5	11	6	6	1
213.75	0	1	2	3	4	4	4
236.25	0	1	2	3	1	2	0
258.75	1	1	3	1	4	1	0
281.25	0	2	1	3	2	0	0
303.75	0	5	3	8	3	2	0
326.25	0	1	5	2	2	0	0

**NRC CATEGORY C**

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	3	7	8	0	0	0
11.25	0	3	3	5	1	0	2
33.75	1	4	3	2	1	0	0
56.25	0	0	2	0	0	0	0
78.75	0	1	2	0	0	0	0
101.25	0	1	0	0	0	0	0
123.75	0	0	6	4	1	0	0
146.25	0	1	8	7	2	2	0
168.75	0	3	7	11	10	1	1
191.25	0	2	4	7	17	5	1
213.75	0	4	3	2	10	7	3
236.25	3	1	3	3	4	8	2
258.75	0	1	2	1	4	0	0
281.25	0	0	1	2	2	0	1
303.75	0	0	1	2	2	1	0
326.25	0	4	7	6	1	0	0

# NRC CATEGORY D

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	20	42	30	10	0	0
11.25	0	18	23	17	9	2	4
33.75	1	7	18	20	4	0	2
56.25	0	9	7	8	0	0	0
78.75	0	5	5	3	0	0	0
101.25	0	8	15	8	1	0	1
123.75	3	20	32	19	15	0	1
146.25	2	17	59	70	13	6	2
168.75	3	24	42	72	50	11	4
191.25	1	23	39	57	56	18	21
213.75	0	10	33	45	28	16	6
236.25	5	11	20	31	15	17	11
258.75	1	13	14	18	14	22	4
281.25	3	11	34	45	49	25	6
303.75	3	20	67	83	50	29	12
326.25	0	22	71	53	25	1	0

# NRC CATEGORY E

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	0	29	57	40	7	1	3
11.25	1	22	68	39	3	4	2
33.75	1	21	50	30	3	3	5
56.25	1	13	19	12	1	0	3
78.75	1	15	14	14	2	0	4
101.25	0	9	22	22	10	2	0
123.75	2	14	55	58	16	3	0
146.25	1	26	95	88	31	4	1
168.75	1	31	81	96	62	11	4
191.25	3	22	52	30	42	31	32
213.75	1	26	38	22	23	16	16
236.25	2	22	27	21	24	8	3
258.75	5	17	36	31	18	17	4
281.25	3	44	68	89	80	47	38
303.75	0	37	136	113	71	31	17
326.25	1	33	83	57	19	7	3

# NRC CATEGORY F

deg	0.07	0.60	MPH				
			3.00	7.00	12.00	18.00	24.00
0.00	3	40	53	10	1	0	0
11.25	4	24	47	9	0	0	0
33.75	3	22	27	14	1	0	0
56.25	0	9	8	7	0	0	0
78.75	3	8	5	3	1	0	1
101.25	0	12	8	6	1	0	0
123.75	5	13	30	25	2	2	0
146.25	1	17	56	73	12	9	1
168.75	9	31	79	66	31	9	4
191.25	1	27	49	37	21	9	9
213.75	9	18	26	16	13	3	0
236.25	0	28	41	18	7	0	0
258.75	0	24	32	24	12	3	2
281.25	4	34	43	52	43	25	3
303.75	2	32	66	43	14	11	0
326.25	1	38	75	18	3	1	0

# NRC CATEGORY G

	MPH						
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	4	48	74	5	0	0	0
11.25	1	30	102	6	0	1	0
33.75	2	18	44	14	2	0	0
56.25	0	9	17	3	1	0	0
78.75	1	5	7	2	1	0	0
101.25	1	3	2	1	1	0	0
123.75	3	10	11	10	2	0	0
146.25	4	20	53	44	4	2	0
168.75	2	33	75	36	7	2	0
191.25	3	24	35	13	3	1	0
213.75	4	24	16	4	2	0	0
236.25	2	20	13	1	2	0	0
258.75	0	24	8	5	5	1	0
281.25	2	11	18	4	7	1	0
303.75	3	36	48	30	14	5	0
326.25	3	38	55	16	2	0	0

## 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 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 quarter are listed in Table 6-3. Table 6-4 provides annual doses to the average individual and 50-mile population doses from liquid effluents. All doses were calculated using the NRC LADTAP II computer code.

**Gaseous Effluents** - The NRC GASPAR II computer code was used to calculate doses at and beyond the site boundary. Table 6-5 lists the annual 50-mile dose using values obtained from the ALARA annual integrated population dose summary (person-rem). Table 6-5 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 use quarterly and annual meteorological data and site specific input parameters.

### ***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  $3.70\text{E-}05$  mrem. The annual thyroid dose was  $3.79\text{E-}05$  mrem and the maximum dose to any other organ was  $4.55\text{E-}05$  mrem. The air dose contribution was as follows; Beta air dose was  $4.60\text{E-}03$  mrad and the Gamma air dose was  $1.72\text{E-}02$  mrad. The direct radiation contribution from TLD results calculated to an average of  $9.30\text{E-}02$  mrem per eight hour period.

The 1996 TLD summary showed no significant change from pre-operational values. Based on one sigma error, the maximum direct radiation exposure to the public for calendar year 1996 was less than 10 mrem.

The report issued for calendar year 1995 did not include the values for total body and skin dose. These values were calculated and verified to be within limits at the time the report for 1995 was issued. This omission was identified by WNP-2 Quality Assurance in an audit of the Radioactive Effluents program in November 1996. Corrective actions have been initiated to prevent recurrence. (Reference PER 296-0724-02.) The values omitted from the 1995 report are listed below.

The highest annual skin dose at the site boundary for calendar year 1995 was 2.02E-03 mrem.

The highest annual total body dose at the site boundary for calendar year 1995 was 1.57E-03 mrem.

The highest annual skin dose beyond the site boundary for calendar year 1995 was 1.54E-03 mrem.

The highest annual total body dose beyond the site boundary for calendar year 1995 was 1.09E-03 mrem.





## Dose Tables

**Table 6-1A Maximum Individual Doses From Liquid Effluents:**  
First and Second Quarters -- 1996

1st Quarter				
Pathway	Total Body (mrem/qtr)	1996 Cumulative Total Body (mrem/yr)	Max. Organ (mrem/qtr)	1996 Cumulative Max. Organ (mrem/yr)
Fishing	2.2E-03	2.2E-03	3.0E-03	3.0E-03
Drinking	6.8E-07	6.8E-07	7.6E-07	7.6E-07
Shoreline	4.6E-06	4.6E-06	5.4E-06	5.4E-06
Swimming	7.2E-09	7.2E-09	7.2E-09	7.2E-09
Boating	8.0E-07	8.0E-07	8.0E-07	8.0E-07
Vegetables	2.4E-06	2.4E-06	1.1E-05	1.1E-05
Leafy Veg.	9.9E-07	9.9E-07	1.9E-06	1.9E-06
Milk	1.2E-06	1.2E-06	1.6E-06	1.6E-06
Meat	1.9E-07	1.9E-07	7.0E-07	7.0E-07
Total	2.2E-03	2.2E-03	3.0E-03	3.0E-03

2nd Quarter				
Pathway	Total Body (mrem/qtr)	1996 Cumulative Total Body (mrem/yr)	Max. Organ (mrem/qtr)	1996 Cumulative Max. Organ (mrem/yr)
Fishing	3.3E-04	2.5E-03	6.3E-04	3.6E-03
Drinking	1.6E-06	2.3E-06	1.6E-06	2.4E-06
Shoreline	7.8E-06	1.2E-05	9.2E-06	1.5E-05
Swimming	1.2E-08	2.0E-08	1.2E-08	2.0E-08
Boating	1.4E-06	2.2E-06	1.4E-06	2.2E-06
Vegetables	5.6E-06	4.8E-06	2.3E-05	2.3E-05
Leafy Veg.	6.3E-07	2.0E-06	3.6E-06	3.8E-06
Milk	7.8E-07	2.0E-06	1.3E-06	2.9E-06
Meat	3.2E-07	5.1E-07	1.4E-06	2.1E-06
Total	3.4E-04	2.6E-03	6.7E-04	3.7E-03

**Table 6-1B Maximum Individual Doses From Liquid Effluents:**  
Third and Fourth Quarters -- 1996

3rd Quarter				
Pathway	Total Body (mrem/qtr)	1996 Cumulative Total Body (mrem/yr)	Max. Organ (mrem/qtr)	1996 Cumulative Max. Organ (mrem/yr)
Fishing	9.2E-04	3.5E-03	1.4E-03	5.0E-03
Drinking	5.7E-07	2.9E-06	6.5E-07	3.0E-06
Shoreline	1.4E-06	1.4E-05	1.6E-06	1.6E-05
Swimming	2.0E-09	2.2E-08	2.0E-09	2.2E-08
Boating	2.2E-07	2.4E-06	2.2E-07	2.4E-06
Vegetables	3.1E-06	8.0E-06	6.5E-06	2.9E-05
Leafy Veg.	4.3E-07	2.4E-06	9.8E-07	4.8E-06
Milk	5.7E-07	2.5E-06	8.3E-07	3.7E-06
Meat	9.3E-08	6.0E-07	2.2E-07	2.3E-06
Total	9.3E-04	3.5E-03	1.4E-03	5.1E-03

4th Quarter				
Pathway	Total Body (mrem/qtr)	1996 Cumulative Total Body (mrem/yr)	Max. Organ (mrem/qtr)	1996 Cumulative Max. Organ (mrem/yr)
Fishing	2.4E-07	3.5E-03	1.1E-06	5.0E-03
Drinking	4.6E-08	2.9E-06	5.2E-08	3.1E-06
Shoreline	3.2E-08	1.4E-05	3.8E-08	1.6E-05
Swimming	4.9E-11	2.2E-08	4.9E-11	2.2E-08
Boating	5.4E-09	2.4E-06	5.4E-09	2.4E-06
Vegetables	9.0E-08	8.0E-06	1.6E-07	2.9E-05
Leafy Veg.	5.6E-09	2.4E-06	1.8E-08	4.8E-06
Milk	9.8E-09	2.5E-06	1.1E-08	3.7E-06
Meat	4.0E-09	6.1E-07	8.5E-09	2.4E-06
Total	4.3E-07	3.5E-03	1.4E-06	5.1E-03

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

**Table 6-2 Average Individual Doses From Liquid Effluents -- 1996**

Pathway	1st Quarter		2nd Quarter	
	Total Body (mrem)	Max. Organ (mrem)	Total Body (mrem)	Max. Organ (mrem)
Fishing	2.2E-03	3.0E-03	3.3E-04	6.3E-04
Drinking	6.8E-07	7.6E-07	1.6E-06	1.6E-06
Shoreline	4.6E-06	5.4E-06	7.8E-06	9.2E-06
Swimming	7.2E-09	7.2E-09	1.2E-08	1.2E-08
Boating	8.0E-07	8.0E-07	1.4E-06	1.4E-06
Vegetables*	9.6E-07	1.8E-06	8.8E-07	3.6E-06
Leafy Veg.*	3.3E-07	6.3E-07	2.1E-07	1.2E-06
Milk*	4.3E-08	5.8E-08	2.8E-08	4.6E-08
Meat*	2.2E-08	8.2E-08	3.8E-08	1.7E-07
Total	2.2E-03	3.0E-03	3.4E-04	6.5E-04

Pathway	3rd Quarter		4th Quarter	
	Total Body (mrem)	Max. Organ (mrem)	Total Body (mrem)	Max. Organ (mrem)
Fishing	9.2E-04	3.5E-03	2.4E-07	1.1E-06
Drinking	5.7E-07	2.9E-06	4.6E-08	5.2E-08
Shoreline	1.4E-06	1.4E-05	3.2E-08	3.8E-08
Swimming	2.0E-09	2.2E-08	4.9E-11	4.9E-11
Boating	2.2E-07	2.4E-06	5.4E-09	5.4E-09
Vegetables*	5.0E-07	6.2E-07	1.4E-08	2.6E-08
Leafy Veg.*	1.4E-07	3.3E-07	1.9E-09	5.9E-09
Milk*	2.1E-08	3.0E-08	3.6E-10	4.1E-10
Meat*	1.1E-08	2.6E-08	4.7E-10	9.9E-10
Total	9.3E-04	3.5E-03	3.4E-07	1.3E-06

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

**Table 6-3 50-Mile Population Doses From Liquid Effluents -- 1996**

Pathway	1st Quarter		2nd Quarter	
	Total Body (person-rem)	Max. Organ (person-rem)	Total Body (person-rem)	Max. Organ (person-rem)
Fishing	1.2E-05	1.6E-05	6.6E-05	1.2E-04
Drinking	1.7E-05	2.9E-05	1.4E-04	2.3E-04
Shoreline	6.1E-05	7.2E-05	2.9E-04	3.5E-04
Swimming	2.8E-07	2.8E-07	1.4E-06	1.4E-06
Boating	7.0E-08	7.0E-08	3.5E-07	3.5E-07
Vegetables	9.6E-06	1.8E-05	8.8E-06	3.6E-05
Leafy Veg.	3.3E-06	6.3E-06	2.1E-06	1.2E-05
Milk	4.1E-07	5.6E-07	2.7E-07	4.4E-07
Meat	2.2E-07	8.3E-07	3.8E-07	1.7E-06
Total	1.0E-04	1.4E-04	5.2E-04	7.5E-04

Pathway	3rd Quarter		4th Quarter	
	Total Body (person-rem)	Max. Organ (person-rem)	Total Body (person-rem)	Max. Organ (person-rem)
Fishing	4.9E-06	7.3E-06	1.3E-09	6.0E-09
Drinking	1.5E-05	1.7E-05	1.2E-06	1.3E-06
Shoreline	1.8E-05	2.1E-05	4.3E-07	5.0E-07
Swimming	7.6E-08	7.6E-08	1.9E-09	1.9E-09
Boating	1.9E-08	1.9E-08	4.8E-10	4.8E-10
Vegetables	5.0E-06	6.2E-06	1.4E-07	2.6E-07
Leafy Veg.	1.4E-06	3.3E-06	1.9E-08	5.9E-08
Milk	2.0E-07	2.9E-07	3.4E-09	3.9E-09
Meat	1.1E-07	2.6E-07	4.8E-09	1.0E-08
Total	4.4E-05	5.5E-05	1.8E-06	2.2E-06

Table 6-4 Annual Ladtap II Results for 1996

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

Pathway	Total Body (person-rem)	Max. Organ (person-rem)
Fishing	1.2E-05	1.9E-05
Drinking	7.0E-05	1.3E-04
Shoreline	1.8E-04	2.1E-04
Swimming	8.2E-07	8.2E-07
Boating	2.1E-07	2.1E-07
Vegetables	2.0E-05	6.0E-05
Leafy Veg.	5.5E-06	5.8E-06
Milk	6.9E-07	1.0E-06
Meat	6.6E-07	2.8E-06
Total	2.9E-04	4.3E-04

B. Average individual doses from WNP-2 liquid effluents

Pathway	Total Body (mrem)	Max. Organ (mrem)
Fishing	2.3E-03	3.5E-03
Drinking	2.7E-06	5.0E-06
Shoreline	1.4E-05	1.6E-05
Swimming	2.1E-08	2.1E-08
Boating	2.3E-06	2.3E-06
Vegetables*	2.0E-06	6.0E-06
Leafy Veg.*	5.5E-07	5.8E-07
Milk*	7.2E-08	1.1E-07
Meat*	6.6E-08	2.7E-07
Total	2.3E-03	3.5E-03

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

**Table 6-5A Summary of Doses from WNP-2 Gaseous Effluents, 1996**

**1 Location: Site Boundary**

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Cumulative
Beta air dose (mrad)	4.30E-04	1.99E-05	4.68E-05	2.41E-04	7.38E-04
Gamma air dose	1.23E-03	5.59E-05	1.30E-04	6.66E-04	2.08E-03

**2 Location: Beyond Site Boundary**

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Cumulative
Beta air dose (mrad)	1.70E-04	7.49E-06	1.81E-04	5.30E-04	8.88E-04
Gamma air dose	4.81E-04	2.05E-05	4.99E-04	1.46E-03	2.46E-03

**3 Location: Site Boundary**

	Annual Dose
Annual Total Body Dose (mrem)	4.15E-03
Annual Skin Dose (mrem)	5.15E-03

**4 Location: Beyond Site Boundary**

	Annual Dose
Annual total Body Dose (mrem)	3.72E-03
Annual Skin Dose (mrem)	4.79E-03

**Table 6-5B Summary of Doses from WNP-2 Gaseous Effluents, 1996**

**5 Location: Site Boundary**

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Cumulative
Maximum Organ dose (mrem)	6.76E-03	1.55E-03	6.41E-04	1.34E-03	1.03E-02

**6 Location: Beyond Site Boundary**

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Cumulative
Maximum Organ dose (mrem)	3.74E-04	2.27E-04	6.72E-04	2.10E-03	3.37E-03

**7 Location: Land Use Census; 4.1 Miles ESE**

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Cumulative
Maximum Organ dose (mrem)	3.74E-04	2.27E-04	6.72E-04	2.10E-03	3.37E-03

**Table 6-6 50-Mile Population Doses From 1996 Gaseous Effluents**

**A. 50-mile population**

Exposure Pathway	Total Body (person-rem)	Max. Organ (person-rem)
Plume	6.2E-04	6.4E-04
Ground	2.4E-03	2.4E-03
Inhalation	5.1E-03	9.6E-03
Vegetables	4.7E-03	4.7E-03
Milk	1.7E-03	1.6E-03
Meat	1.0E-03	1.0E-03
Total	1.6E-02	2.0E-02

Population => 2.5E+05

**B. Average individual\***

Exposure Pathway	Total Body (mrem)	Max. Organ (mrem)
Plume	2.5E-06	2.6E-06
Ground	9.5E-06	9.5E-06
Inhalation	2.0E-05	3.8E-05
Vegetables	1.9E-05	1.9E-05
Milk	6.6E-06	6.6E-06
Meat	4.2E-06	4.1E-06
Total	6.2E-05	8.0E-05

\* 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**

This section completes the requirement of 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. ODCM's are sent only to the Nuclear Regulatory Commission (NRC).

## **8.0 REVISIONS TO THE PROCESS CONTROL PROGRAM (PCP)**

There have been no significant changes to the Process Control Program during the reporting period.

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**

There were no new or deleted locations for dose assessments or environmental monitoring.

## **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.

