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Washington Public Power Supply System

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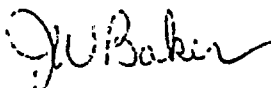
Dear Gentlemen:

Subject: NUCLEAR PLANT NO. 2
SEMI-ANNUAL EFFLUENT REPORT
JULY 1, 1986 TO DECEMBER 31, 1986 (ATTACHED)

In accordance with Title 10 of the Code of Federal Regulations, Part 50.36a (a) (2), the subject report is herewith being submitted.

Should you have any questions, please contact Mr. R. G. Graybeal, Manager, WNP-2 Health Physics/Chemistry.

Very truly yours,



C. M. Powers
WNP-2 Plant Manager

tmh
Attachment

cc: JO Bradfute - NRC
C Eschels - EFSEC
D Jaquish - DOE
JB Martin - NRC RV (2)
D Sherman - Amer. Nuclear Insurers
TR Strong - DSHS
JM Taylor - NRC
NRC Site Inspector

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August 20, 1986
G02-86-810

Docket No. 50-397

Mr. J. B. Martin
Regional Administrator
U.S. Nuclear Regulatory Commission
Region V
1450 Maria Lane, Suite 210
Walnut Creek, CA 94596

Dear Mr. Martin:

Subject: NUCLEAR PLANT NO. 2
SEMI-ANNUAL EFFLUENT REPORT
JANUARY 1, 1986 TO JUNE 30, 1986 (ATTACHED)

In accordance with Title 10 of the Code of Federal Regulations, Part 50.36a (a) (2), the subject report is herewith being submitted.

Should you have any questions, please contact Mr. R. G. Graybeal, Manager, WNP-2 Health Physics/Chemistry.

Very truly yours,

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WNP-2 SEMI-ANNUAL EFFLUENT
REPORT
JULY TO DECEMBER 1986

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
LICENSE NO. NPF-21

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1.0 INTRODUCTION

This report is submitted in compliance with Technical Specification 6.9.1.11. It includes a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from WNP-2 during the previous six months of operation with data summarized on a quarterly basis.

2.0 LIQUID EFFLUENTS

The radwaste liquid effluents were released in a batch mode only during the reporting period. Three batch releases occurred during the third calendar quarter and 5 batch releases during the calendar fourth quarter. The total time period for the batch releases was 12.1 hours, with the maximum time period being 1.76 hours for a release, the minimum time period being 1.35 hours for a release and the average time period was 1.51 hours. The volume of dilution water used, is the total volume of recirculating cooling tower blowdown flow for the period. The average flow rate of the Columbia River during July through December 1986 was 97,620 cubic feet per second.

A liquid release Licensee Event Report, LER, was filed for an unmonitored discharge to the plant discharge line. Report number 86-044 contained the evaluation of the problem and its resolution. A sample of the tank to be discharged was taken in accordance to technical specification 7.4.11.1.1.1. The analytical results yielded the MPC fraction of 0.3, which met the 10CFR20 guidelines, the pre- and post- release analysis agreed. There was no threat to the safety of the plant, the public or the environment as a result. Further information is contained in the filed LER.

Periodic LADTAP II computer runs were performed to verify compliance with Technical Specification limits. The calculated dose to the adult individual due to liquid releases for the third quarter was $8.6\text{E-}04$ mrem whole body and $1.4\text{E-}03$ mrem for the maximum organ. The fourth quarter calculated dose was $1.3\text{E-}03$ mrem whole body and $2.1\text{E-}03$ mrem for 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 tank samples for each quarter was analyzed for strontium and iron. The method for measurement of total radioactivity was by gamma spectroscopy, liquid scintillation and proportional counters.

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

The percent of estimated total errors are listed in Table 2-1. These estimated errors are based on counting statistics, tank volume, and in obtaining a representative sample prior to discharge.

The estimated total errors were calculated by obtaining the square root of the sum of the squares of the errors of the individual contributors and multiplying by 1.96 for a 95% confidence level.



Table 2-1

WNP-2 LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

July - December 1986

Unit	3rd Quarter	4th Quarter	Est. Total Error* %
------	----------------	----------------	---------------------------

A. Fission and activation products

1. Total release (not including tritium, gases, alpha)	Ci	5.9E-04	4.1E-03	2.2 E+01
2. Average diluted concentration during period	uCi/ml	7.8E-10	1.0E-08	
3. Percent of MPC limit	%	1.5E-03	1.6E-02	

B. Tritium

1. Total release	Ci	2.8E-01	4.6E-01	2.2 E+01
2. Average diluted concentration during period	uCi/ml	3.7E-07	1.2E-06	
3. Percent of MPC limit	%	1.2E-02	3.8E-02	

C. Dissolved and entrained gases

1. Total release	Ci	<6.9E-05	<9.3E-05	2.2 E+01
2. Average diluted concentration during period	uCi/ml	<9.1E-11	<2.3E-10	
3. Percent of MPC limit	%	4.6E-05	1.2E-04	

D. Gross alpha radioactivity

1. Total release	Ci	<2.7E-07	2.1E-07	2.3 E+01
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E. Volume of waste (prior to dilution)	liters	1.8E+05	3.2E+05	1.5 E+01
--	--------	---------	---------	----------

F. Volume of dilution water used during period	liters	7.6E+08	4.0E+08	1.5 E+01
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*At 95% confidence level

Table 2-2

WNP-2 LIQUID EFFLUENTS - SOURCE TERMS

July - December 1986

BATCH MODE

Nuclides Released	Unit	3rd Quarter	4th Quarter
Strontium-89	Ci	6.1E-06	2.8E-05
Strontium-90	Ci	1.1E-06	1.1E-07
Cesium-134	Ci	< 1.5 E-05	< 2.9 E-05
Cesium-137	Ci	< 1.5 E-05	< 2.2 E-05
Iodine-131	Ci	< 1.6 E-05	< 2.2 E-05
Iodine-133	Ci	3.0 E-07	1.6 E-05

Cobalt-58	Ci	5.0 E-05	5.2 E-05
Cobalt-60	Ci	5.1 E-05	2.1 E-04
Iron-59	Ci	< 1.7 E-05	< 4.6 E-05
Zinc-65	Ci	2.4 E-04	3.3 E-04
Manganese-54	Ci	2.2 E-05	7.3 E-05
Chromium-51	Ci	1.3 E-04	2.0 E-04

Zirconium-Niobium-95	Ci	< 2.2 E-05	< 3.6 E-05
Molybdenum-99	Ci	< 1.2 E-05	7.5 E-05
Technetium-99m	Ci	< 1.5 E-05	2.7 E-05
Barium-Lanthanum-140	Ci	< 4.4 E-05	< 6.8 E-05
Cerium-141	Ci	< 2.2 E-05	< 3.0 E-05



TABLE 2-2 (Continued)

Others			
Cerium-144	Ci	$< 9.7 \text{ E-05}$	$< 1.3 \text{ E-04}$
Iron-55	Ci	1.7 E-05	7.2 E-05
Sodium-24	Ci	5.7 E-05	4.5 E-04
Copper-64	Ci	$< 1.1 \text{ E-03}$	2.6 E-03
Arsenic-76	Ci	$< 3.1 \text{ E-05}$	$< 4.3 \text{ E-05}$
Silver-110m	Ci	1.7 E-05	$< 2.1 \text{ E-05}$
Total for Period (Above)	Ci	5.9 E-04	4.1 E-03

Xenon-133	Ci	$< 5.6 \text{ E-05}$	$< 7.3 \text{ E-05}$
Xenon-135	Ci	$< 1.3 \text{ E-05}$	$< 2.0 \text{ E-05}$

Tritium	Ci	2.8 E-01	4.6 E-01
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NOTE: Less than (<) values are not included in the Total For Period values.



3.0 GASEOUS EFFLUENTS

The gaseous radwaste effluents from WNP-2 were released in a continuous mode. There are three (3) release points at WNP-2:

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 to 3-3. Table 3-4 provides a summation of the total activity released, the average release rate, the percent of Technical Specification 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 charcoal cartridges and particulate filters and analyzed using gamma spectroscopy.

The "Percent of Technical Specification Limit" calculations were based on exposure at specified locations. Air dose due to noble gases was determined at the site boundary with the quarterly limit of 5 mrad for gamma being the more restrictive for each time period. The gamma air dose from noble gases for the third quarter was $6.6\text{E-}02$ mrad and $1.2\text{E-}01$ mrad for the fourth quarter. Iodines, particulates and tritium calculations were determined at Taylor Flats, located 4.2 miles southeast. A limit of 7.5 mrem per quarter to any organ was used in these calculations. The maximum organ dose to a "Member of the Public" was $2.6\text{E-}02$ mrem for the third quarter and $7.8\text{E-}03$ mrem for the fourth quarter.

To verify compliance with Technical Specification limits, calculations were performed for each month's releases using the GASPAR computer program and parameters as outlined in the ODCM. Doses were determined at two special locations.

1. The Site Boundary at 1.2 miles from the plant and for the sector with the maximum X/Q value.
2. Taylor Flats - at 4.2 miles SE.

There were no abnormal releases of gaseous effluent during the third and fourth quarters of 1986. A gaseous sampling LER was issued due to a missed sampling period of the containment air while it was being purged, exhausting through the reactor building HVAC system. The reactor building elevated release monitor indicated no unusual activity. The sampling is required by Technical Specification 7.4.11.2.8.3. LER number 86-040 contains the details and corrective action taken. There was no threat to the safety of the plant, the public or the environment as a result.



Evaluation of Nitrogen-13, a positron emitter with a half life of 9.97 minutes and the result of the $O-16(p,\alpha)N-13$ reaction, was made with respect to its release to the environment. Two pathways of possible release were considered, release through the turbine building exhaust as the result of steam leaks and release through the reactor building elevated release duct. Calculations based upon data collected to date indicate that the total annual release of Nitrogen-13 was less than 44 curies based on the lower limit of detection (LLD) values from the turbine building and less than 2.8 curies from the reactor building. The annual site boundary doses corresponding to these maximum releases would be 0.43 mrem and 0.00093 mrem respectively. Further analytical work is in progress to refine the results.

Total error estimates are based on grab samples, gamma spectrometry, analyzer detectors, and beta scintillation readings. The overriding uncertainty in all cases is the measurement of the effluent and sample volumes. The estimated error was determined to be 36% at the 95% confidence level.

In addition to the reactor site, WNP-2 has a permanent laundry facility located approximately 0.75 miles from the site. Its ventilation system contains HEPA filters on the discharge and is continuously monitored for particulates and radioiodines. Also at this location is a backup chemistry lab within the EOF. The radiochemical hood containing HEPA filters is monitored for radioactive releases when in operation. Gamma spectrometry indicated no isotopes present other than those attributable to natural background.

The average energy for fission and activation product gases in airborne effluents was 0.4485 Mev.



Table 3-1

WNP-2 GASEOUS EFFLUENTS
SOURCE TERMS - MIXED MODE RELEASES
MAIN PLANT VENT

July - December 1986

CONTINUOUS MODE

Nuclides Released	Unit	3rd Quarter	4th Quarter
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1. Fission gases

Krypton-85	Ci	< 3.7 E-06	< 7.4 E-07
Krypton-85m	Ci	1.5 E-01	1.3 E-01
Krypton-87	Ci	5.4 E-01	4.1 E-01
Krypton-88	Ci	1.9 E+00	2.3 E+00
Xenon-133	Ci	3.1 E+00	6.7 E-01
Xenon-135	Ci	8.5 E+00	3.6 E-01
Xenon-135m	Ci	3.9 E+00	1.1 E-03
Xenon-138	Ci	1.7 E+00	1.7 E+00
Xenon-133m	Ci	4.6 E+00	6.7 E-01
Total for period	Ci	2.4 E+01	6.2 E+00

2. Iodines

Iodine-131	Ci	5.9 E-04	1.9 E-04
Iodine-133	Ci	3.5 E-03	1.2 E-03
Iodine-135	Ci	< 5.0 E-03	< 5.0 E-03
Total for period	Ci	4.1 E-03	1.4 E-03

NOTE: Kr-85 value is a fission product ratio from other fission gas isotopes.



Table 3-1 (Continued)

3. Particulates

Strontium-89	Ci	1.8 E-05	1.9 E-06
Strontium-90	Ci	< 8.4 E-06	4.8 E-07
Cesium-134	Ci	< 3.8 E-04	< 1.4 E-04
Cesium-137	Ci	4.3 E-05	< 1.3 E-04
Barium-Lanthanum-140	Ci	< 1.1 E-03	< 4.0 E-04
Molybdenum-99	Ci	1.6 E-02	6.3 E-03
Cerium-141	Ci	< 3.3 E-04	< 8.9 E-05
Cerium-144	Ci	< 1.7 E-03	< 4.8 E-04
Cobalt-58	Ci	7.0 E-04	4.2 E-04
Cobalt-60	Ci	1.3 E-03	4.4 E-04
Iron-59	Ci	< 9.9 E-04	< 2.5 E-04
Manganese-54	Ci	< 3.8 E-04	8.7 E-05
Zinc-65	Ci	4.1 E-03	2.3 E-03
Others			
Chromium-51	Ci	< 2.6 E-03	2.8 E-04
Zirconium-95	Ci	< 5.8 E-04	< 2.1 E-04
Total for period	Ci	2.2 E-02	9.8 E-03

4. Tritium	Ci	2.2 E-01	6.6 E-02
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Total building release	Ci	2.4 E+01	6.3 E+00
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NOTE: Less than (<) values are not included in the Total For Period values.

Table 3-2
WNP-2 GASEOUS EFFLUENTS
SOURCE TERMS GROUND LEVEL RELEASES
TURBINE BUILDING

July - December 1986

CONTINUOUS MODE

Nuclides Released	Unit	3rd Quarter	4th Quarter
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1. Fission gases

Krypton-85	Ci	< 1.4 E-05	< 1.2 E-05
Krypton-85m	Ci	< 7.9 E-01	< 6.1 E-01
Krypton-87	Ci	2.0 E+00	1.7 E+00
Krypton-88	Ci	2.8 E+00	2.6 E+00
Xenon-133	Ci	3.6 E+00	3.2 E+00
Xenon-135	Ci	9.0 E-01	8.0 E-01
Xenon-135m	Ci	< 2.3 E+00	< 1.3 E+00
Xenon-138	Ci	1.1 E+01	7.6 E+00
Xenon-133m	Ci	7.2 E+00	1.7 E+01
Total for period	Ci	2.8 E+01	3.3 E+01

2. Iodines

Iodine-131	Ci	2.2 E-03	6.7 E-05
Iodine-133	Ci	2.4 E-02	3.4 E-04
Iodine-135	Ci	< 3.0 E-03	< 2.1 E-03
Total for period	Ci	2.6 E-02	4.1 E-04

NOTE: Kr-85 value is a fission product ratio from other fission gas isotopes.

Table 3-2 (Continued)

3. Particulates

Strontium-89	Ci	3.1 E-06	1.7 E-05
Strontium-90	Ci	1.7 E-05	1.8 E-06
Cesium-134	Ci	< 4.1 E-04	< 1.2 E-04
Cesium-137	Ci	< 4.9 E-04	< 1.4 E-04
Barium-Lanthanum-140	Ci	< 1.2 E-03	< 5.2 E-04
Molybdenum-99	Ci	2.4 E-04	< 3.8 E-04
Cerium-141	Ci	< 4.9 E-04	< 1.2 E-04
Cerium-144	Ci	< 2.0 E-03	< 4.7 E-04
Cobalt-58	Ci	3.5 E-04	< 1.3 E-04
Cobalt-60	Ci	5.2 E-04	< 1.8 E-04
Iron-59	Ci	< 9.8 E-04	< 3.0 E-04
Manganese-54	Ci	< 6.9 E-04	< 1.2 E-04
Zinc-65	Ci	1.3 E-03	5.0 E-04
Others			
Chromium-51	Ci	2.6 E-03	3.1 E-04
Zirconium-95	Ci	< 6.0 E-04	< 1.9 E-04
Total for period	Ci	5.0 E-03	8.3 E-04

4. Tritium	Ci	2.2 E+00	1.0 E+00
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Total building release	Ci	3.0 E+01	3.4 E+01
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NOTE: Less than (<) values are not included in the Total For Period values.



Table 3-3

WNP-2 GASEOUS EFFLUENTS
SOURCE TERMS GROUND LEVEL RELEASES
RADWASTE BUILDING

July - December 1986

CONTINUOUS MODE

Nuclides Released	Unit	3rd Quarter	4th Quarter
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1. Fission gases

Krypton-85	Ci	< 4.2 E-06	< 8.3 E-06
Krypton-85m	Ci	< 1.8 E-01	< 1.6 E-01
Krypton-87	Ci	6.1 E-01	1.2 E+00
Krypton-88	Ci	8.3 E-01	1.8 E+00
Xenon-133	Ci	9.4 E-01	1.3 E+00
Xenon-135	Ci	7.8 E-01	4.7 E-01
Xenon-135m	Ci	6.0 E-01	1.5 E+00
Xenon-138	Ci	2.2 E+00	2.2 E+01
Xenon-133m	Ci	1.6 E+00	2.7 E+00
Total for period	Ci	7.6 E+00	9.0 E+00

2. Iodines

Iodine-131	Ci	7.8 E-05	9.2 E-05
Iodine-133	Ci	2.4 E-04	5.6 E-04
Iodine-135	Ci	< 5.9 E-04	< 9.1 E-04
Total for period	Ci	3.2 E-04	6.5 E-04

NOTE: Kr-85 value is a fission product ratio from other fission gas isotopes.

Table 3-3 (Continued)

3. Particulates

Strontium-89	Ci	2.7 E-05	3.2 E-06
Strontium-90	Ci	1.1 E-05	7.5 E-06
Cesium-134	Ci	< 3.4 E-05	< 4.7 E-05
Cesium-137	Ci	< 3.0 E-05	< 3.6 E-05
Barium-Lanthanum-140	Ci	< 1.0 E-04	< 1.6 E-04
Molybdenum-99	Ci	< 1.1 E-04	< 4.1 E-04
Cerium-141	Ci	< 3.6 E-05	< 4.7 E-05
Cerium-144	Ci	< 1.4 E-04	< 1.9 E-04
Cobalt-58	Ci	< 2.9 E-05	< 4.8 E-05
Cobalt-60	Ci	< 4.9 E-05	< 7.6 E-05
Iron-59	Ci	< 1.0 E-04	< 9.6 E-05
Manganese-54	Ci	< 3.4 E-05	< 5.2 E-05
Zinc-65	Ci	< 8.0 E-05	< 1.3 E-04
Others			
Chromium-51	Ci	< 2.3 E-04	< 3.2 E-04
Zirconium-95	Ci	< 5.2 E-05	< 4.1 E-04
Total for period	Ci	3.8 E-05	1.1 E-05

4. Tritium	Ci	1.0 E-01	6.1 E-02
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Total building release	Ci	7.7 E+00	9.1 E+00
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NOTE: Less than (<) values are not included in the Total For Period values.



Table 3-4

WNP-2 GASEOUS EFFLUENTS
SUMMATION OF ALL RELEASES

July - December 1986

Unit	3rd Quarter	4th Quarter	Est. Total Error %*
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A. Fission & activation gases

1. Total release	Ci	6.0 E+01	4.9 E+01	3.6 E+01
2. Average release rate for period	uCi/sec	7.5 E+00	6.2 E+00	
3. Percent of Tech. Spec. limit	%	1.3 E+00	2.4 E+00	

B. Iodines

1. Total iodine (131, 133)	Ci	3.0 E-03	2.5 E-03	3.6 E+01
2. Average release rate for period	uCi/sec	3.8 E-04	3.1 E-04	
3. Percent of Tech. Spec. limit	%	3.5 E-01	1.0 E-01	

C. Particulates

1. Particulates with half-lives > 8 days	Ci	2.7 E-02	1.1 E-02	3.6 E+01
2. Average release rate for period	uCi/sec	3.4 E-03	1.4 E-03	
3. Percent of Tech. Spec. limit	%	3.5 E-01	1.0 E-01	
4. Gross alpha radioactivity	Ci	8.1 E-04	1.5 E-03	

D. Tritium

1. Total releases	Ci	2.3 E+00	1.1 E+00	3.6 E+01
2. Average release rate for period	uCi/sec	2.9 E-01	1.4 E-01	
3. Percent of Tech. Spec. limit	%	3.5 E-01	1.1 E-01	

* At 95% confidence level



Table 3-5

WNP-2 GASEOUS EFFLUENTS
BATCH RELEASES

July - December 1986

Type	Number	Total Time (hrs)	Maximum Time (hrs)	Minimum Time (hrs)	Mean Time (hrs)
Purge	2	82.6	54.6	28	41.3
Vent	82	144.3	4.0	0.75	1.76



4.0 SOLID WASTE

A total volume of 5615 ft³ (159.0 m³) of solid waste was transported in 22 shipments during the July 1 through December 31, 1986 reporting period. The total activity of the waste shipped was 408.51 Ci; 408.24 Ci contained in dewatered spent resins, 0.1892 Ci in Dry Active Waste (DAW) and 7.85E-2 Ci in absorbed liquid.

A. Dewatered Spent Resin

Dewatered resins accounted for 4175 ft³ (118.2 m³) of the radioactive wastes shipped during the reporting period. The burial containers were LSA-190 liners provided by NUPAC, Inc. The total activity of the resins shipped during the reporting period was 408.24 Ci. The principle nuclides and their percent contribution to the total activity are listed in Table 4-2. The solid wastes were shipped to the U.S. Ecology, Hanford burial site using flat bed trailers, or NUPAC 14-210H casks as appropriate.

The counting error associated with the total activity has been found to be less than 1.0% at one standard deviation in previous effluent reports and to decrease with increasing activity. The statistical counting error is assumed to be 1% for the purpose of this error evaluation.

Other parameters considered in estimating the total error of the activity shipped included the error in measuring the absolute volume, the weight of the waste in the liners, the representativeness of the sample taken, the homogeneity of the nuclide distribution within a batch or liner and the geometry error in the gamma spectroscopy analysis. The gamma spectroscopy calibration error was approximately 5%. The best estimate of the total error in the activity of spent resin shipped was assumed to be less than or equal to 20%.

B. Dry Active Waste (DAW)

A total of 1260 ft³ (35.68 m³) of DAW was shipped in 30 Container Products Corporation, B-25 steel boxes. The total activity of the DAW shipped was 0.1892 Ci. The values for the activities shipped were determined by using dose rate-to-curie conversion factors. The conversion factors were based on a nuclide distribution taken from reactor coolant sample analyses which are representative for the time period in which the waste was generated. Short lived nuclides were eliminated based on decay of the DAW prior to shipment. A meaningful counting error cannot be generated for the DAW, however, the total error may be assumed to be less than or equal to 20% since DAW would be subjected to similar error contributions as the spent resins.



C. Absorbed Liquids

A total of 176.4 ft³ (4.995 m³) of absorbed aqueous liquid containing a total of 7.85E-2 Ci was shipped during the reporting period. The drums were of either a 17C, 17H or 17E/H designation to meet burial ground requirements but were shipped only as strong tight containers (STCs) per DOT LSA requirements.

The values for the activities shipped were based on using dose rate-to-curie conversion factors and sample analysis. As with the DAW, the total error is assumed to be less than or equal to 20% due to the likelihood of similar contributing errors to those associated with the resins.

4.1 Scaling Factor Methodology

H-3

In accordance with the procedure outlined in the AIF report "Methodologies for Classification of Low Level Radioactive Waste from Nuclear Power Plants" and the final EPRI report, "Radionuclide Correlations in Low-Level Radwaste", EPRI NP-4037 June 1985, the amount of H-3 in solid radwaste shipments was determined by estimating or measuring the amount of water present and multiplying by the average H-3 concentration in the coolant for the time period associated with the waste generation. In accordance with the final EPRI report a water percentage of 55% was used for powdered resin, 50% for bead resin and 25% (very conservative) was used for DAW.

C-14

The generic scaling factor (C-14 to Co-60, 1.0 E-4) from the EPRI report was used unless the result was less than 5.0E-8 uCi/g (typical MDA), in which case the MDA was used.

I-129

The I-129 concentration was determined by scaling to Cs-137. The Cs-137 MDA was used since Cs-137 was not detected, and the resulting value, if less than a typical I-129 MDA of 3.0E-8 uCi/cc was reported as less than the MDA value. The scaling factor taken from the EPRI report is 2.0E-5.

Tc-99

The Tc-99 concentration was determined by scaling to Cs-137. The Cs-137 MDA was used since Cs-137 was not detected, and the resulting value, if less than a typical Tc-99 MDA of 2.0E-8 uCi/cc was reported as less than the MDA value. The scaling factor taken from the final EPRI report is 3.0E-5.

TRU, Sr-90, Ni-63

TRU nuclides would be scaled to Ce-144. As recommended in the AIF report, these nuclides are not considered to be present if the scaled values are less than: 1 nCi/g for TRU, 35 nCi/g for Pu-241 or 200 nCi/g for Cm-242. TRU nuclides will be reported if the scaling nuclide (Ce-144) is reliably detected and Cs-137 is also present.

Sr-90 is scaled to Cs-137 and Ni-63 is scaled to Co-60. The following table contains the scaling factors, required LLD's and reporting thresholds.

TABLE 4-1

Scaling Factors for TRU, Sr-90 and Ni-63

<u>Scaled Nuclide</u>	<u>Scaling Nuclide</u>	<u>Scaling Factor</u>	<u>Required LLD (uCi/cc)</u>	<u>Reporting Threshold (uCi/g)</u>
Pu-238	Ce-144	8.0 E-3	1.0 E-5	Ce-144 detected
Pu-239	Ce-144	5.0 E-3	1.0 E-5	Ce-144 detected
Pu-241	Ce-144	5.5 E-1	3.5 E-4	Ce-144 detected
Am-241	Ce-144	3.0 E-3	1.0 E-5	Ce-144 detected
Cm-242	Ce-144	1.5 E-2	2.0 E-3	Ce-144 detected
Cm-244	Ce-144	3.5 E-3	1.0 E-5	Ce-144 detected
Ni-63	Co-60	2.0 E-2	3.5 E-2	Co-60 detected
Sr-90	Cs-137	6.3 E-3	4.0 E-4	Cs-137 detected

4.2 Process Control Program

The Process Control Program (PCP) used to control solidification at WNP-2 will be provided by the vendor waste processor, Pacific Nuclear Inc. in accordance with Contract C-20452, and will be subjected to POC review prior to any solidification of radwaste. Two Pacific Nuclear generic solidification PCP's, TP-04, "Portable Solidification System and TP-05, "Radwaste Solidification System" are currently under NRC review. As an alternative, approved High Integrity Containers (HIC's) could be used for the transport of wastes requiring stabilization. Other portions of the radwaste program are controlled by the WNP-2 procedures PPM 1.12.1, "Radwaste Management Program", PPM 1.12.2, "Radwaste Process Control Program", and 1.12.3, "Contract (Vendor) Waste Processing". No significant changes have occurred in these procedures during this reporting period.



Table 4-2
WNP-2 SOLID WASTE SHIPMENTS

July - December 1986

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL

1. Type of Waste

Waste Stream	Unit	6-month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m ³ Ci	118.2 408.24	20
b. Dry active waste, contaminated equip., etc.	m ³ Ci	35.68 0.1892	20
c. Irradiated components, control rods, etc.	m ³ Ci	No Ship- ment	
d. Other, (absorbed aqueous liquid)	m ³ Ci	4.995 0.0785	20

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

a. Dewatered Spent Resins

Nuclide	%	Ci
1 Zn-65	63.55	259.45
2 Co-60	12.50	51.05
3 Co-58	7.14	29.14
4 Cr-51	4.27	17.42
5 Nb-95	4.08	16.65
6 Zr-95	3.52	14.35
7 Mn-54	2.13	8.70
8 Fe-59	0.664	2.71
9 Ag-110m	0.483	1.97
10 Cd-109	0.404	1.65
11 Sb-124	0.385	1.57
12 Sn-113	0.247	1.01
13 Ni-63*	0.240	0.980
14 Hf-181	0.136	0.553

*Indicates scaled nuclide

b. Dry Active Wastes (DAW)

Nuclide	%	Ci
1 Cr-51	36.04	0.0682
2 Zn-65	27.37	0.0518
3 Zr-95	13.63	0.0258
4 Co-58	12.97	0.0245
5 Co-60	5.06	9.57E-3
6 Zr-95	3.10	8.56E-3
7 H-3*	1.74	3.30E-3
8 Ni-63*	0.101	7.72E-6

c. Irradiated Components - None

d. Other - Absorbed Liquids (oil)

Nuclide	%	Ci
1 Zn-65	58.20	0.0457
2 Co-60	24.96	0.0196
3 Nb-95	4.00	3.14E-3
4 Mn-54	3.80	2.98E-3
5 Co-58	2.65	2.08E-3
6 H-3*	2.52	1.98E-3
7 Zr-95	2.18	1.71E-3
8 Cr-51	0.799	6.27E-4
9 Ni-63*	0.453	3.56E-4
10 Fe-59	0.254	2.02E-4

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
22	Flat bed trailer (4) 14-210H Cask (18)	US Ecology Richland, WA

B. IRRADIATED FUEL SHIPMENTS (Disposition)

None

*Indicates scaled nuclide



5.0 METEOROLOGY

The meteorological data contained in Tables 5-1 through 5-8 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 manual and automated data recovery systems.

The second half of 1986 started cooler and became cold and much drier than normal with a greater percentage of neutral and stable conditions affecting dispersion in the vicinity of WNP-2. The automated data recovery system continued to function at greater than 90% joint data recovery for the joint frequency parameters except during the fourth quarter of 1986. The data recovery for the fourth quarter was 74%. Overall data recovery for all four quarters of 1986 remained above 90%.

Tables 5-1 through 5-8 list the joint frequency distribution at the 33 ft. and 245 ft. levels for 1986 by quarters. Additionally, this report includes Tables 5-9 through 5-10 which list the joint frequency distribution for all of 1986. The tabulated stability classes, A-G, are denoted by numerals 1-7 respectively. Numerals 1-7 were used for the wind sub-fields as is noted at the top of each sensor level reported. The 16 compass sectors in Tables 5-1 through 5-8 pertain to the direction the wind is coming from.

Calibrations performed in 1986 produced no values exceeding WNP-2 FSAR meteorological equipment tolerances. Therefore, no correction has been made to the raw data. The NRC Delta Temperature Stability Classification scheme was utilized in the production of all joint frequency tables.



TABLE 5-1 1ST QUARTER 1964

JOINT FREQUENCY DISTRIBUTION FOR THE 33 FT LEVEL
CALCULATED FROM HOURLY AVERAGES FROM TAPE

MAXIMUM WIND SPEEDS FOR EACH CATEGORY IN MPH ARE:

1 - 0.6 2 - 3.0 3 - 7.0 4 - 12.0 5 - 18.0 6 - 24.0

NUMBERS GIVEN ARE HOURS

STAB CLASS	WIND CAT	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	2	0.	1.	0.	0.	0.	0.	1.	0.	2.	2.	0.	2.	1.	2.	1.	1.
1	3	0.	0.	3.	0.	0.	0.	1.	1.	9.	0.	1.	5.	5.	9.	4.	2.
1	4	0.	2.	1.	0.	0.	0.	1.	3.	13.	5.	2.	6.	0.	5.	0.	2.
1	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	6.	1.	0.	0.	2.	0.	0.
1	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	6.	0.	0.	0.
1	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	2	0.	1.	0.	1.	0.	1.	1.	1.	0.	1.	0.	0.	3.	4.	1.	0.
2	3	0.	0.	0.	1.	0.	0.	1.	0.	1.	1.	0.	0.	3.	3.	5.	1.
2	4	1.	0.	0.	0.	0.	0.	0.	2.	4.	0.	0.	0.	1.	1.	0.	0.
2	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
2	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	2	0.	1.	0.	0.	0.	2.	1.	0.	0.	0.	0.	1.	0.	1.	0.	0.
3	3	0.	0.	0.	0.	0.	0.	1.	3.	0.	0.	2.	1.	1.	3.	0.	1.
3	4	0.	0.	0.	0.	0.	0.	1.	1.	3.	1.	2.	0.	1.	0.	0.	0.
3	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
3	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	2	7.	0.	0.	1.	2.	1.	6.	9.	4.	0.	3.	8.	14.	15.	12.	6.
4	3	4.	2.	1.	1.	0.	3.	4.	5.	4.	4.	3.	14.	17.	23.	18.	8.
4	4	1.	0.	0.	0.	0.	1.	0.	4.	7.	7.	1.	0.	14.	7.	5.	3.
4	5	0.	0.	0.	0.	0.	0.	0.	2.	1.	1.	0.	0.	3.	0.	1.	0.
4	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	1	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	2.	1.	0.
5	2	20.	5.	3.	4.	13.	15.	22.	25.	23.	20.	18.	21.	36.	49.	36.	25.
5	3	6.	5.	2.	0.	3.	30.	36.	16.	16.	15.	7.	18.	62.	93.	49.	27.
5	4	1.	1.	0.	0.	0.	3.	11.	12.	14.	11.	3.	4.	18.	21.	16.	3.
5	5	0.	0.	0.	0.	0.	0.	3.	13.	11.	4.	0.	0.	0.	0.	1.	0.
5	6	0.	0.	0.	0.	0.	0.	0.	0.	3.	0.	0.	0.	0.	0.	0.	0.
5	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	1	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	2.	0.	0.	0.
6	2	7.	2.	5.	2.	2.	9.	6.	7.	16.	12.	10.	14.	23.	22.	27.	23.
6	3	2.	6.	1.	0.	6.	23.	35.	22.	21.	13.	6.	14.	11.	40.	34.	10.
6	4	0.	0.	0.	0.	0.	1.	8.	9.	5.	4.	1.	0.	0.	0.	0.	0.
6	5	0.	0.	0.	0.	0.	0.	2.	5.	8.	3.	0.	0.	0.	0.	0.	0.
6	6	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
6	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
7	2	3.	1.	0.	2.	0.	2.	2.	6.	2.	4.	4.	8.	14.	22.	17.	16.
7	3	2.	2.	0.	0.	0.	13.	16.	13.	5.	1.	4.	3.	11.	25.	11.	9.
7	4	0.	0.	0.	0.	0.	3.	6.	7.	3.	0.	0.	0.	0.	0.	0.	0.
7	5	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.
7	6	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
7	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NUMBER OF HOURS

USED = 2261

MISSING =

26

CALM =

1

VARIABLE =

32



TABLE 5-2 1ST QUARTER 1986

JOINT FREQUENCY DISTRIBUTION FOR THE 245 FT LEVEL
CALCULATED FROM HOURLY AVERAGES FROM TAPE

MAXIMUM WIND SPEEDS FOR EACH CATEGORY IN KPH ARE:

1 - 0.5 2 - 3.0 3 - 7.0 4 - 12.0 5 - 18.0 6 - 24.0

NUMBERS GIVEN ARE HOURS

STAB CLASS	WIND CAT	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	2	2.	0.	0.	0.	0.	0.	1.	1.	0.	1.	3.	0.	0.	0.	0.	3.
1	3	0.	2.	2.	0.	0.	0.	0.	1.	2.	2.	3.	1.	1.	6.	6.	5.
1	4	0.	2.	2.	1.	0.	1.	0.	0.	3.	4.	6.	4.	6.	1.	6.	4.
1	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	6.	2.	0.	0.	2.	1.
1	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.	0.	0.	0.	0.	0.
1	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	2	3.	0.	0.	0.	2.	0.	1.	2.	0.	0.	0.	0.	0.	0.	2.	1.
2	3	1.	1.	0.	1.	0.	0.	0.	0.	1.	1.	1.	0.	1.	0.	4.	5.
2	4	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	3.	0.
2	5	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	1.	1.	0.	0.	1.	0.
2	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
2	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	2	0.	0.	0.	0.	0.	0.	0.	2.	1.	0.	0.	0.	0.	0.	0.	1.
3	3	0.	0.	1.	0.	0.	0.	0.	2.	0.	1.	0.	0.	1.	0.	2.	1.
3	4	0.	0.	0.	0.	0.	0.	0.	1.	2.	3.	2.	1.	0.	0.	1.	1.
3	5	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.	1.
3	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.
3	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	2	10.	5.	2.	0.	1.	1.	2.	2.	9.	6.	1.	1.	1.	3.	13.	9.
4	3	11.	8.	6.	3.	1.	1.	0.	3.	8.	4.	2.	7.	2.	2.	12.	30.
4	4	5.	4.	0.	2.	0.	0.	0.	0.	2.	5.	6.	4.	2.	4.	20.	5.
4	5	1.	0.	0.	0.	0.	0.	0.	0.	1.	2.	8.	3.	0.	2.	7.	1.
4	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.
5	1	1.	0.	0.	1.	0.	1.	2.	0.	2.	0.	1.	2.	1.	0.	1.	0.
5	2	15.	11.	9.	3.	7.	5.	13.	14.	23.	22.	14.	9.	16.	11.	17.	23.
5	3	38.	19.	12.	7.	2.	4.	2.	19.	36.	21.	7.	10.	12.	12.	44.	98.
5	4	37.	9.	1.	0.	0.	1.	0.	16.	12.	13.	15.	8.	4.	9.	48.	38.
5	5	3.	1.	0.	0.	0.	0.	0.	4.	6.	12.	16.	12.	3.	3.	16.	2.
5	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	13.	1.	0.	0.	0.	0.
5	7	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	4.	0.	0.	2.	0.	0.
6	1	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.
6	2	10.	12.	3.	2.	7.	6.	6.	6.	5.	7.	7.	5.	3.	2.	1.	5.
6	3	27.	12.	4.	5.	11.	2.	3.	21.	22.	15.	13.	10.	13.	8.	13.	26.
6	4	5.	1.	0.	1.	2.	1.	1.	10.	20.	18.	13.	6.	8.	7.	16.	41.
6	5	0.	0.	0.	0.	0.	0.	0.	0.	1.	8.	7.	3.	1.	2.	1.	0.
6	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	8.	2.	0.	0.	0.	0.
6	7	0.	0.	0.	0.	0.	0.	0.	0.	2.	1.	3.	2.	1.	1.	0.	0.
7	1	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
7	2	4.	10.	2.	5.	2.	2.	1.	2.	3.	4.	6.	2.	3.	1.	7.	6.
7	3	25.	15.	8.	10.	3.	2.	1.	9.	14.	8.	6.	7.	2.	4.	2.	5.
7	4	6.	1.	0.	2.	0.	0.	0.	3.	11.	5.	6.	6.	2.	3.	11.	10.
7	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	5.	7.	0.	0.	0.	0.	0.
7	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
7	7	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	3.	0.	0.	0.	0.	0.

TOTAL NUMBER OF HOURS

USED = 2057

MISSING =

28

CALC =

1

VARIABLE = 27



TABLE 5-3 2ND QUARTER 1986

JOINT FREQUENCY DISTRIBUTION FOR THE 33 FT LEVEL
CALCULATED FROM HOURLY AVERAGES FROM TAPE

MAXIMUM WIND SPEEDS FOR EACH CATEGORY IN MPH ARE:

1 - 0.6 2 - 3.0 3 - 7.0 4 - 12.0 5 - 18.0 6 - 24.0

NUMBERS GIVEN ARE HOURS

STAB CLASS	WIND CAT	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	2	5.	1.	1.	0.	1.	1.	4.	3.	2.	3.	1.	6.	3.	5.	2.	6.
1	3	5.	14.	4.	1.	1.	13.	5.	25.	25.	15.	19.	12.	10.	9.	16.	7.
1	4	0.	0.	0.	0.	0.	1.	2.	3.	16.	9.	4.	4.	2.	8.	1.	0.
1	5	0.	0.	0.	0.	0.	0.	0.	0.	3.	7.	10.	7.	0.	6.	1.	0.
1	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.	0.	0.	0.
1	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	2	3.	4.	0.	0.	0.	1.	1.	5.	3.	1.	2.	3.	3.	2.	3.	5.
2	3	4.	5.	4.	2.	2.	3.	7.	6.	7.	6.	4.	4.	2.	6.	6.	9.
2	4	0.	0.	0.	0.	0.	2.	2.	5.	8.	4.	0.	5.	2.	2.	0.	1.
2	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	2.	0.	1.	0.	0.
2	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	2	6.	1.	2.	1.	2.	3.	2.	7.	1.	1.	4.	4.	6.	2.	6.	4.
3	3	12.	5.	5.	2.	2.	5.	11.	17.	12.	6.	11.	16.	9.	9.	7.	5.
3	4	0.	0.	0.	0.	0.	2.	1.	4.	13.	4.	1.	11.	10.	3.	2.	1.
3	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	0.	1.	3.	0.	0.
3	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
3	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	2	7.	1.	0.	1.	2.	7.	6.	1.	5.	4.	4.	9.	5.	3.	9.	4.
4	3	3.	3.	2.	4.	10.	10.	18.	23.	17.	21.	9.	10.	15.	20.	18.	17.
4	4	0.	0.	0.	0.	0.	0.	8.	6.	14.	11.	12.	7.	9.	28.	3.	6.
4	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	4.	6.	16.	0.	0.
4	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	2	7.	3.	2.	1.	2.	5.	6.	3.	6.	8.	11.	5.	5.	11.	8.	9.
5	3	1.	3.	1.	1.	9.	11.	20.	25.	12.	18.	14.	20.	24.	27.	16.	5.
5	4	0.	0.	0.	0.	0.	0.	2.	7.	3.	3.	3.	9.	31.	21.	7.	0.
5	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	7.	3.	0.	0.
5	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	2	13.	8.	4.	3.	3.	8.	12.	14.	12.	11.	6.	4.	6.	13.	14.	14.
6	3	7.	1.	1.	0.	0.	6.	25.	24.	14.	7.	5.	12.	8.	22.	26.	13.
6	4	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	2.	5.	3.	0.	0.
6	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
7	2	8.	16.	2.	1.	4.	5.	6.	7.	9.	8.	1.	2.	3.	5.	9.	9.
7	3	1.	6.	0.	1.	0.	3.	16.	20.	5.	5.	4.	2.	4.	12.	7.	5.
7	4	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	1.	0.	0.	0.
7	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NUMBER OF HOURS

USED = 2031

MISSING =

CALC =

0

VARIABLE =

11

TABLE 5-4 2ND QUARTER 1926

JOINT FREQUENCY DISTRIBUTION FOR THE 245 FT LEVEL
CALCULATED FROM HOURLY AVERAGES FROM TAPE

MAXIMUM WIND SPEEDS FOR EACH CATEGORY IN MPH ARE:

1 - 0.6 2 - 3.0 3 - 7.0 4 - 12.0 5 - 16.0 6 - 24.0

NUMBERS GIVEN ARE HOURS

STAB CLASS	WIND CAT	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	2	4.	1.	1.	0.	0.	0.	4.	9.	6.	8.	5.	4.	2.	6.	3.	3.
1	3	5.	11.	7.	1.	7.	10.	21.	11.	20.	24.	15.	18.	5.	7.	7.	11.
1	4	1.	4.	1.	0.	1.	1.	2.	3.	7.	19.	3.	3.	1.	0.	2.	5.
1	5	2.	1.	2.	0.	0.	0.	0.	0.	1.	6.	7.	7.	1.	6.	6.	0.
1	6	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	2.	1.	0.	3.	2.
1	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.
2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	2	2.	2.	1.	1.	0.	0.	0.	2.	4.	2.	2.	3.	3.	0.	0.	2.
2	3	8.	3.	4.	0.	4.	6.	3.	6.	6.	11.	6.	4.	2.	3.	4.	6.
2	4	2.	2.	0.	0.	0.	0.	0.	4.	5.	9.	6.	0.	2.	3.	1.	0.
2	5	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	2.	5.	2.	0.	1.
2	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
2	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	2	4.	3.	2.	1.	0.	2.	4.	9.	4.	2.	2.	11.	4.	0.	0.	5.
3	3	8.	10.	10.	1.	1.	4.	10.	13.	14.	9.	8.	10.	11.	5.	5.	5.
3	4	4.	1.	2.	1.	0.	1.	1.	4.	6.	6.	4.	6.	9.	10.	1.	0.
3	5	2.	2.	0.	2.	0.	0.	0.	1.	0.	1.	2.	1.	3.	2.	1.	0.
3	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	2.	1.	0.	0.
3	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	2	4.	2.	4.	0.	0.	2.	1.	5.	5.	5.	3.	2.	9.	3.	4.	4.
4	3	14.	15.	3.	3.	2.	6.	8.	18.	17.	17.	10.	15.	13.	13.	7.	16.
4	4	5.	13.	1.	1.	1.	1.	1.	7.	13.	4.	10.	14.	5.	5.	9.	2.
4	5	4.	6.	0.	2.	0.	0.	2.	1.	0.	3.	12.	5.	3.	9.	21.	2.
4	6	0.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	1.	8.	0.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	2	3.	0.	2.	1.	0.	2.	0.	3.	2.	5.	4.	3.	5.	1.	4.	7.
5	3	19.	10.	3.	0.	1.	2.	2.	5.	16.	17.	5.	9.	13.	16.	9.	8.
5	4	8.	9.	2.	4.	0.	4.	2.	5.	14.	13.	12.	6.	11.	24.	24.	3.
5	5	2.	0.	0.	0.	3.	1.	0.	0.	2.	1.	2.	4.	8.	15.	26.	7.
5	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	9.	0.
5	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	2	12.	2.	4.	2.	1.	1.	2.	3.	5.	5.	7.	5.	6.	7.	6.	4.
6	3	11.	13.	6.	0.	3.	2.	4.	4.	11.	15.	11.	8.	14.	6.	14.	15.
6	4	8.	3.	3.	0.	0.	1.	5.	4.	11.	5.	3.	6.	1.	13.	24.	10.
6	5	1.	2.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	6.	3.	0.
6	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
7	2	4.	5.	2.	2.	4.	2.	1.	3.	5.	12.	8.	5.	4.	1.	1.	7.
7	3	13.	4.	2.	4.	1.	1.	3.	5.	14.	11.	13.	6.	4.	0.	4.	7.
7	4	2.	0.	0.	0.	0.	0.	0.	2.	3.	3.	2.	1.	1.	4.	2.	10.
7	5	0.	1.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	5.	1.	1.
7	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NUMBER OF HOURS

USED = 2674

MISSING = 0

CALC = 0

VARIABLE = 22



TABLE 5-5

3RD QUARTER 1986

JOINT FREQUENCY DISTRIBUTION FOR THE 33 FT LEVEL

CALCULATED FROM HOURLY AVERAGES FROM TAPE

MAXIMUM WIND SPEEDS FOR EACH CATEGORY IN MPH ARE:

1 - 0.6 2 - 3.0 3 - 7.0 4 - 12.0 5 - 18.0 6 - 24.0

NUMBERS GIVEN ARE HOURS

STAB CLASS	WIND CAT	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	2	1.	2.	1.	2.	0.	0.	2.	7.	7.	6.	4.	5.	4.	2.	9.	11.
1	3	24.	13.	7.	2.	0.	5.	21.	53.	50.	10.	16.	11.	3.	8.	14.	28.
1	4	10.	3.	3.	0.	0.	1.	4.	11.	20.	11.	15.	10.	7.	7.	2.	13.
1	5	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.	1.	0.	0.	9.	0.	0.
1	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
1	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	2	4.	1.	0.	0.	0.	0.	1.	2.	2.	4.	2.	5.	1.	3.	1.	0.
2	3	7.	6.	4.	2.	1.	4.	6.	6.	7.	8.	4.	6.	4.	10.	0.	3.
2	4	6.	5.	1.	0.	0.	1.	1.	2.	2.	2.	1.	2.	1.	2.	2.	3.
2	5	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	5.	2.	0.
2	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
2	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
3	2	1.	0.	1.	0.	0.	0.	1.	1.	1.	0.	0.	1.	2.	2.	1.	1.
3	3	6.	11.	2.	0.	4.	2.	10.	5.	8.	9.	4.	4.	2.	6.	8.	13.
3	4	3.	3.	1.	0.	1.	1.	0.	3.	1.	3.	2.	2.	3.	0.	3.	2.
3	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	2.	1.
3	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
3	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	2	2.	5.	0.	1.	0.	3.	0.	3.	7.	1.	3.	5.	0.	3.	4.	1.
4	3	14.	8.	7.	2.	11.	9.	14.	16.	9.	7.	1.	5.	3.	8.	19.	19.
4	4	17.	4.	0.	0.	1.	2.	0.	5.	4.	6.	3.	2.	17.	20.	6.	8.
4	5	0.	0.	0.	5.	0.	0.	3.	1.	1.	0.	0.	0.	2.	20.	5.	2.
4	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	2	12.	5.	4.	2.	2.	1.	2.	2.	6.	5.	6.	5.	8.	7.	9.	7.
5	3	8.	4.	4.	1.	7.	8.	6.	19.	10.	14.	4.	18.	16.	31.	17.	30.
5	4	0.	0.	0.	0.	1.	1.	7.	3.	2.	3.	1.	1.	3.	29.	7.	7.
5	5	0.	0.	0.	0.	0.	0.	1.	2.	0.	0.	0.	0.	3.	1.	0.	0.
5	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	2	9.	5.	3.	0.	1.	5.	6.	10.	8.	9.	9.	10.	3.	7.	17.	12.
6	3	20.	5.	1.	0.	3.	3.	19.	29.	34.	13.	7.	10.	6.	19.	24.	22.
6	4	0.	0.	0.	0.	0.	0.	0.	3.	3.	2.	0.	0.	0.	1.	3.	1.
6	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	2	13.	10.	5.	3.	3.	4.	7.	13.	11.	9.	4.	5.	8.	3.	17.	19.
7	3	17.	8.	14.	2.	1.	1.	16.	39.	27.	9.	2.	1.	3.	8.	13.	15.
7	4	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
7	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NUMBER OF HOURS

USED = 2084

MISSING =

18

CALM =

0

VARIABLE =

52

TABLE 5-6

3RD QUARTER 1986

JOINT FREQUENCY DISTRIBUTION FOR THE 245 FT LEVEL
CALCULATED FROM HOURLY AVERAGES FROM TAPE

MAXIMUM WIND SPEEDS FOR EACH CATEGORY IN MPH ARE:

1 - 0.6 2 - 3.0 3 - 7.0 4 - 12.0 5 - 18.0 6 - 24.0

NUMBERS GIVEN ARE HOURS

STAB CLASS	WIND CAT	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	2	0.	0.	0.	0.	2.	0.	3.	6.	4.	6.	9.	5.	8.	6.	9.	0.
1	3	11.	7.	8.	5.	6.	14.	28.	27.	27.	15.	16.	17.	35.	24.	9.	13.
1	4	17.	8.	5.	1.	4.	2.	6.	7.	2.	6.	5.	4.	19.	11.	10.	11.
1	5	3.	4.	0.	0.	0.	0.	0.	1.	0.	0.	2.	1.	3.	10.	3.	0.
1	6	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.
1	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	1	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	2	0.	0.	0.	0.	0.	0.	0.	2.	0.	4.	4.	4.	5.	2.	1.	3.
2	3	6.	1.	8.	1.	1.	1.	6.	4.	7.	7.	8.	6.	7.	3.	3.	6.
2	4	10.	4.	3.	0.	0.	0.	0.	2.	2.	4.	0.	1.	2.	2.	2.	6.
2	5	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.	0.
2	6	0.	1.	1.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
2	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	2	0.	0.	1.	1.	0.	0.	0.	1.	2.	0.	1.	1.	0.	0.	0.	1.
3	3	14.	7.	6.	1.	1.	5.	3.	5.	10.	6.	5.	6.	3.	7.	3.	8.
3	4	3.	3.	0.	2.	2.	4.	2.	1.	1.	2.	4.	1.	5.	1.	2.	2.
3	5	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	1.	2.
3	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
3	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	2	3.	1.	0.	0.	0.	2.	3.	2.	3.	1.	3.	2.	1.	0.	2.	2.
4	3	22.	8.	4.	4.	10.	4.	6.	6.	12.	9.	3.	4.	7.	11.	12.	13.
4	4	24.	2.	2.	3.	3.	4.	4.	6.	3.	6.	3.	2.	6.	10.	5.	8.
4	5	12.	13.	4.	1.	2.	1.	0.	0.	0.	0.	0.	0.	0.	7.	8.	1.
4	6	0.	3.	6.	0.	0.	0.	2.	2.	1.	1.	0.	0.	1.	4.	5.	0.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	2	2.	1.	3.	2.	0.	0.	0.	5.	3.	0.	2.	4.	3.	3.	2.	4.
5	3	20.	7.	5.	6.	7.	3.	5.	8.	8.	4.	4.	7.	14.	22.	15.	14.
5	4	18.	7.	5.	2.	2.	3.	4.	6.	8.	0.	1.	2.	6.	21.	14.	12.
5	5	4.	3.	2.	4.	2.	0.	0.	1.	1.	1.	1.	0.	1.	24.	8.	3.
5	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
5	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
6	2	1.	4.	2.	6.	2.	3.	4.	4.	7.	5.	3.	8.	7.	7.	3.	6.
6	3	20.	14.	0.	12.	6.	9.	5.	6.	6.	11.	6.	8.	20.	16.	15.	12.
6	4	3.	4.	4.	9.	7.	1.	3.	2.	4.	5.	3.	4.	8.	12.	26.	8.
6	5	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	2.	4.	0.
6	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	1	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	2	6.	2.	6.	4.	4.	2.	4.	6.	8.	6.	4.	6.	8.	7.	4.	3.
7	3	12.	5.	13.	9.	8.	8.	7.	15.	13.	12.	4.	7.	6.	11.	13.	14.
7	4	0.	2.	4.	9.	6.	1.	2.	2.	5.	2.	0.	0.	2.	6.	14.	16.
7	5	0.	0.	3.	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.	1.	0.
7	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NUMBER OF HOURS

USED = 2099

MISSING =

18

CALM =

:

VARIABLE =

36



TABLE 5-7

4TH QUARTER 1986 JOINT FREQUENCY DISTRIBUTION FOR THE 33 FT LEVEL
CALCULATED FROM HOURLY AVERAGES FROM TAPE

MAXIMUM WIND SPEEDS FOR EACH CATEGORY IN MPH ARE:

1 - 0.6 2 - 3.0 3 - 7.0 4 - 12.0 5 - 18.0 6 - 24.0

NUMBERS GIVEN ARE HOURS

STAB CLASS	WIND CAT	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	2	0.	1.	0.	0.	0.	2.	0.	4.	2.	1.	0.	2.	0.	1.	3.	1.
1	3	0.	0.	0.	0.	0.	0.	0.	0.	2.	1.	0.	1.	0.	0.	0.	1.
1	4	0.	0.	0.	0.	0.	0.	0.	1.	2.	3.	3.	2.	0.	0.	0.	0.
1	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
1	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	2	2.	1.	0.	0.	1.	0.	2.	1.	0.	0.	0.	1.	2.	1.	3.	1.
2	3	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.	1.	0.	0.	1.
2	4	1.	0.	0.	0.	0.	0.	0.	0.	2.	1.	1.	2.	0.	0.	0.	0.
2	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	2	3.	2.	1.	1.	1.	1.	0.	0.	3.	0.	0.	2.	0.	3.	4.	3.
3	3	0.	2.	2.	0.	0.	0.	0.	1.	0.	0.	1.	0.	1.	0.	0.	0.
3	4	3.	0.	0.	0.	0.	0.	0.	1.	0.	1.	4.	0.	0.	0.	0.	2.
3	5	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.
3	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	1	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	2	17.	9.	5.	5.	3.	11.	5.	5.	10.	10.	6.	7.	3.	15.	19.	19.
4	3	14.	7.	10.	1.	0.	1.	5.	22.	17.	7.	5.	1.	1.	8.	25.	31.
4	4	5.	3.	0.	0.	0.	0.	3.	8.	4.	12.	5.	3.	2.	2.	8.	11.
4	5	0.	0.	0.	0.	0.	0.	0.	1.	2.	3.	0.	0.	0.	0.	0.	0.
4	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	1	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	1.	0.	2.	0.	1.
5	2	14.	14.	8.	3.	4.	6.	10.	17.	25.	18.	16.	8.	14.	24.	25.	20.
5	3	5.	9.	9.	2.	0.	2.	14.	48.	35.	3.	7.	8.	8.	18.	29.	22.
5	4	0.	0.	0.	0.	0.	0.	8.	16.	25.	26.	10.	4.	1.	4.	1.	1.
5	5	0.	0.	0.	0.	0.	0.	1.	6.	14.	13.	5.	1.	2.	1.	0.	0.
5	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	16.	0.	0.	0.	0.	0.	0.
5	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
6	1	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.
6	2	15.	12.	4.	3.	0.	2.	5.	8.	15.	6.	11.	9.	11.	11.	25.	22.
6	3	11.	5.	10.	1.	0.	1.	7.	25.	18.	8.	8.	4.	9.	12.	14.	14.
6	4	0.	0.	0.	0.	0.	0.	5.	7.	4.	6.	1.	0.	2.	2.	0.	0.
6	5	0.	0.	0.	0.	0.	0.	3.	0.	1.	2.	0.	0.	0.	0.	0.	0.
6	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
6	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	1	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.
7	2	14.	12.	6.	6.	3.	2.	9.	6.	4.	10.	4.	5.	5.	13.	16.	16.
7	3	1.	3.	6.	2.	0.	0.	3.	18.	12.	4.	4.	2.	4.	4.	4.	2.
7	4	0.	0.	1.	0.	0.	0.	0.	0.	5.	1.	0.	0.	0.	0.	0.	0.
7	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NUMBER OF HOURS

USED = 1640

MISSING = 2

CALM = 2

VARIABLE = 114

TABLE 5-8

4TH QUARTER 1986 JOINT FREQUENCY DISTRIBUTION FOR THE 245 FT LEVEL
CALCULATED FROM HOURLY AVERAGES FROM TAPE

MAXIMUM WIND SPEEDS FOR EACH CATEGORY IN MPH ARE:

1 - 0.6 2 - 3.0 3 - 7.0 4 - 12.0 5 - 18.0 6 - 24.0

NUMBERS GIVEN ARE HOURS

STAB CLASS	WIND CAT	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	2	1.	1.	2.	0.	1.	1.	1.	0.	2.	3.	0.	0.	0.	3.	2.	1.
1	3	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.	0.	0.	1.
1	4	0.	0.	0.	0.	0.	0.	0.	0.	4.	3.	1.	1.	0.	0.	0.	0.
1	5	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.	3.	1.	0.	0.	0.	0.
1	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	2	2.	1.	0.	0.	0.	0.	3.	1.	0.	0.	0.	2.	1.	0.	1.	4.
2	3	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.	1.	0.	0.	0.	2.	0.
2	4	1.	0.	0.	0.	0.	0.	0.	0.	1.	0.	2.	3.	0.	0.	0.	0.
2	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	2	1.	2.	0.	1.	3.	2.	0.	0.	0.	0.	1.	2.	1.	3.	2.	4.
3	3	0.	1.	3.	1.	1.	0.	0.	1.	0.	1.	2.	0.	0.	0.	0.	0.
3	4	2.	1.	0.	0.	0.	0.	0.	2.	0.	0.	1.	0.	0.	0.	0.	1.
3	5	0.	1.	0.	0.	0.	0.	0.	0.	0.	2.	1.	1.	2.	0.	0.	0.
3	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
4	2	14.	8.	1.	2.	4.	6.	5.	4.	7.	12.	8.	5.	4.	6.	16.	17.
4	3	15.	13.	8.	4.	5.	3.	0.	11.	16.	16.	5.	5.	2.	8.	17.	12.
4	4	18.	8.	2.	0.	0.	0.	0.	4.	5.	11.	4.	8.	2.	2.	7.	14.
4	5	1.	2.	0.	0.	0.	0.	1.	3.	2.	3.	5.	7.	1.	1.	1.	2.
4	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	2.	0.	0.	0.	0.
5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	1.	0.	0.
5	2	13.	10.	8.	7.	4.	7.	6.	10.	12.	12.	7.	12.	8.	6.	12.	13.
5	3	25.	19.	11.	15.	12.	4.	4.	12.	18.	23.	11.	5.	12.	13.	22.	21.
5	4	6.	2.	0.	0.	1.	1.	1.	7.	11.	25.	20.	10.	2.	3.	5.	16.
5	5	0.	0.	0.	0.	0.	0.	0.	7.	6.	12.	20.	17.	4.	4.	3.	1.
5	6	0.	0.	0.	0.	0.	0.	0.	1.	2.	7.	10.	8.	4.	0.	1.	0.
5	7	0.	0.	0.	0.	0.	0.	0.	0.	1.	14.	1.	16.	0.	0.	0.	0.
6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	2	5.	7.	5.	4.	0.	7.	5.	3.	4.	8.	6.	4.	5.	5.	4.	8.
6	3	23.	16.	13.	11.	3.	4.	2.	9.	10.	8.	11.	7.	6.	7.	14.	16.
6	4	5.	0.	1.	0.	1.	0.	0.	4.	10.	8.	10.	6.	3.	5.	8.	17.
6	5	0.	0.	0.	0.	0.	0.	0.	0.	3.	7.	8.	4.	2.	0.	3.	5.
6	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.	2.	0.	0.	0.	0.
6	7	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.	0.	0.	0.	0.	0.
7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
7	2	4.	7.	2.	8.	3.	5.	6.	2.	6.	7.	5.	4.	3.	5.	6.	1.
7	3	10.	1.	7.	9.	2.	3.	2.	10.	14.	10.	8.	7.	1.	2.	2.	11.
7	4	2.	0.	1.	0.	0.	0.	0.	4.	5.	9.	3.	2.	1.	0.	4.	3.
7	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	2.	0.	0.	0.	0.
7	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NUMBER OF HOURS

USED = 1686

MISSING =

2

CALM =

2

VARIABLE =

68

TABLE 5-9

1986 YEARLY JOINT FREQUENCY DISTRIBUTION FOR THE 33 FT LEVEL
CALCULATED FROM HOURLY AVERAGES FROM TAPE

MAXIMUM WIND SPEEDS FOR EACH CATEGORY IN MPH ARE:

1 - 0.6 2 - 3.0 3 - 7.0 4 - 12.0 5 - 18.0 6 - 24.0

NUMBERS GIVEN ARE HOURS

STAS CLASS	WIND CAT	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	2	7.	8.	2.	2.	1.	4.	9.	15.	15.	13.	5.	18.	12.	11.	18.	20.
1	3	36.	28.	15.	3.	1.	19.	35.	80.	87.	31.	36.	29.	21.	29.	37.	45.
1	4	10.	10.	4.	0.	0.	2.	9.	21.	55.	31.	24.	24.	10.	23.	3.	16.
1	5	0.	0.	0.	0.	0.	0.	0.	1.	3.	15.	13.	8.	0.	18.	1.	0.
1	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.	1.	0.	0.
1	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	2	9.	4.	0.	1.	2.	5.	4.	9.	4.	5.	5.	10.	6.	9.	6.	6.
2	3	12.	12.	10.	6.	4.	7.	10.	19.	16.	15.	14.	14.	10.	17.	11.	11.
2	4	6.	5.	1.	0.	0.	3.	3.	9.	17.	5.	3.	11.	6.	3.	3.	4.
2	5	2.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	2.	0.	5.	2.	0.
2	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
2	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
3	2	9.	4.	4.	2.	2.	2.	3.	7.	4.	1.	3.	6.	7.	8.	10.	7.
3	3	14.	14.	6.	1.	5.	6.	21.	19.	16.	11.	13.	17.	10.	16.	12.	18.
3	4	6.	3.	1.	0.	1.	3.	0.	7.	12.	8.	8.	9.	11.	2.	4.	4.
3	5	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	3.	1.	2.	4.	2.	1.
3	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.
3	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	1	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	2	33.	15.	5.	8.	7.	22.	17.	18.	26.	15.	16.	29.	22.	35.	44.	30.
4	3	35.	21.	20.	8.	21.	23.	41.	65.	45.	39.	18.	30.	36.	59.	80.	75.
4	4	23.	7.	0.	0.	1.	3.	11.	23.	29.	36.	21.	12.	42.	57.	23.	28.
4	5	0.	0.	0.	5.	0.	0.	3.	4.	4.	4.	3.	4.	11.	36.	6.	2.
4	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	2.	0.	0.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
5	1	0.	0.	0.	0.	0.	0.	1.	0.	1.	1.	0.	1.	0.	4.	1.	1.
5	2	51.	26.	17.	10.	21.	27.	40.	46.	60.	50.	51.	39.	66.	91.	78.	61.
5	3	20.	20.	17.	4.	19.	50.	76.	107.	73.	50.	31.	64.	110.	169.	109.	82.
5	4	1.	1.	0.	0.	1.	4.	28.	38.	44.	43.	17.	18.	53.	75.	31.	11.
5	5	0.	0.	0.	0.	0.	0.	5.	21.	24.	17.	5.	1.	12.	5.	1.	0.
5	6	0.	0.	0.	0.	0.	0.	0.	0.	3.	16.	0.	0.	0.	0.	0.	0.
5	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
6	1	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	2.	2.	0.	0.	0.
6	2	44.	28.	16.	8.	6.	24.	29.	38.	51.	38.	35.	36.	43.	53.	83.	71.
6	3	43.	17.	13.	1.	9.	33.	82.	99.	87.	41.	28.	40.	34.	90.	96.	55.
6	4	0.	0.	0.	0.	0.	1.	10.	19.	12.	12.	2.	2.	7.	6.	3.	1.
6	5	0.	0.	0.	0.	0.	0.	2.	5.	9.	5.	0.	0.	0.	0.	0.	0.
6	6	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.
6	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	1	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.	1.	1.	0.
7	2	43.	40.	13.	12.	10.	13.	24.	31.	26.	30.	13.	20.	29.	46.	60.	58.
7	3	26.	19.	20.	5.	1.	17.	52.	89.	48.	19.	12.	7.	18.	46.	33.	30.
7	4	1.	1.	2.	0.	0.	3.	6.	8.	8.	1.	0.	0.	1.	0.	1.	0.
7	5	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.
7	6	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
7	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NUMBER OF HOURS

USED = 7746

MISSING =

56

CALM =

3

VARIABLE = 258

TABLE 5-10

1986 YEARLY JOINT FREQUENCY DISTRIBUTION FOR THE 245 FT LEVEL
CALCULATED FROM HOURLY AVERAGES FROM TAPE

MAXIMUM WIND SPEEDS FOR EACH CATEGORY IN MPH ARE:

1 - 0.6 2 - 3.0 3 - 7.0 4 - 12.0 5 - 18.0 6 - 24.0

NUMBERS GIVEN ARE HOURS

STAB CLASS	WIND CAT	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	2	9.	2.	4.	0.	3.	1.	9.	18.	14.	18.	19.	10.	11.	15.	15.	9.
1	3	20.	23.	19.	6.	11.	25.	51.	43.	52.	43.	38.	36.	42.	38.	29.	37.
1	4	20.	15.	3.	2.	5.	4.	8.	12.	17.	37.	17.	12.	27.	12.	20.	20.
1	5	5.	5.	2.	0.	0.	0.	0.	2.	1.	10.	18.	14.	6.	18.	12.	2.
1	6	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.	7.	2.	1.	0.	6.	2.
1	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.	0.	0.	0.
2	1	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	2	5.	3.	0.	1.	2.	0.	5.	6.	5.	7.	5.	13.	10.	2.	3.	8.
2	3	16.	4.	15.	2.	4.	10.	10.	10.	18.	22.	19.	14.	11.	6.	9.	15.
2	4	16.	5.	4.	0.	0.	0.	0.	5.	11.	11.	6.	6.	9.	7.	5.	6.
2	5	0.	0.	0.	2.	0.	0.	0.	1.	3.	1.	2.	1.	3.	2.	3.	0.
2	6	0.	1.	1.	0.	0.	1.	0.	0.	0.	0.	1.	0.	1.	1.	1.	0.
2	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	2	5.	5.	3.	3.	3.	4.	3.	11.	4.	1.	3.	9.	3.	3.	2.	11.
3	3	17.	16.	15.	3.	3.	5.	10.	18.	18.	12.	11.	11.	14.	11.	9.	12.
3	4	5.	5.	1.	3.	2.	5.	3.	6.	6.	9.	11.	6.	8.	9.	3.	4.
3	5	2.	4.	0.	1.	0.	0.	0.	1.	0.	3.	3.	2.	6.	2.	2.	3.
3	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	2.	2.	1.	0.
3	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
4	2	31.	16.	7.	2.	5.	11.	11.	14.	24.	24.	15.	10.	14.	12.	35.	32.
4	3	62.	44.	21.	15.	18.	14.	14.	37.	53.	46.	20.	31.	24.	34.	48.	65.
4	4	52.	27.	5.	6.	4.	5.	5.	16.	22.	26.	23.	28.	15.	21.	41.	32.
4	5	18.	21.	4.	3.	2.	1.	3.	4.	3.	8.	25.	15.	4.	19.	37.	6.
4	6	0.	6.	6.	0.	0.	0.	2.	2.	1.	1.	2.	0.	4.	5.	13.	0.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	2.	1.	1.	2.	0.
5	1	1.	0.	0.	1.	0.	1.	2.	0.	2.	0.	1.	2.	3.	1.	1.	0.
5	2	33.	22.	22.	12.	11.	14.	19.	31.	40.	39.	27.	28.	32.	21.	35.	47.
5	3	100.	54.	31.	27.	22.	13.	13.	43.	78.	65.	27.	31.	51.	63.	89.	139.
5	4	69.	27.	8.	6.	4.	8.	7.	34.	45.	51.	48.	26.	23.	57.	89.	69.
5	5	9.	4.	2.	4.	5.	1.	0.	12.	15.	26.	38.	33.	16.	46.	53.	13.
5	6	0.	0.	0.	0.	0.	0.	0.	1.	2.	10.	23.	9.	4.	4.	11.	0.
5	7	0.	0.	0.	0.	0.	0.	0.	0.	2.	14.	5.	16.	0.	2.	0.	0.
6	1	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.	0.	1.	1.	0.
6	2	28.	25.	14.	14.	10.	17.	17.	16.	21.	24.	23.	22.	21.	21.	14.	23.
6	3	78.	55.	23.	28.	23.	17.	14.	37.	47.	49.	41.	33.	53.	37.	55.	73.
6	4	19.	8.	13.	10.	10.	3.	9.	19.	42.	39.	29.	16.	20.	36.	73.	73.
6	5	1.	2.	0.	0.	0.	0.	0.	0.	3.	14.	16.	7.	3.	10.	11.	5.
6	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.	11.	4.	0.	0.	0.	0.
6	7	0.	0.	0.	0.	0.	0.	0.	0.	3.	3.	3.	2.	1.	1.	0.	0.
7	1	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	2.	0.
7	2	18.	23.	13.	19.	13.	11.	12.	12.	20.	28.	23.	15.	19.	14.	19.	16.
7	3	58.	25.	30.	32.	14.	14.	13.	39.	53.	39.	30.	25.	13.	17.	21.	34.
7	4	9.	3.	5.	11.	6.	1.	2.	11.	22.	19.	11.	3.	6.	13.	31.	38.
7	5	0.	1.	3.	0.	0.	0.	1.	0.	0.	8.	7.	2.	0.	3.	2.	1.
7	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
7	7	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	3.	0.	0.	0.	0.	0.

TOTAL NUMBER OF HOURS

USED = 7852

MISSING = 56

CALM = 7

VARIABLE = 148

6.0 DOSE ASSESSMENT - IMPACT ON MAN

Liquid Effluents - The doses to the maximum individual from WNP-2 liquid effluents were calculated using the LADTAP II computer code and the site specific input parameters applicable to the reporting period (e.g., food production, agricultural productivity, etc.) The maximum exposed individual considered in the analysis was assumed to be an adult residing in Richland, who fishes at the WNP-2 slough area and eats food locally grown at the Riverview area district southwest of Pasco, Washington.

Table 6-1 lists the doses to the maximum individual by calendar quarters respectively. The liquid source terms used in the analyses are listed in Table 2-2 of this report.

The doses to the average exposed individual are listed in Table 6-2. The 50-mile population doses are listed in Table 6-3. All doses were calculated using the LADTAP II computer code.

Gaseous Effluents - The GASPAR computer code was used to calculate doses at the 1.2 mile site boundary and Taylor Flats, located at 4.2 miles southeast. The sector with the highest X/Q values at the 1.2 mile location was used to verify compliance with Technical Specifications. The quarterly GASPAR runs utilized the quarterly averaged X/Q and D/Q values, and site specific input parameters pertaining to food productions (e.g., goat and cow grazing periods, etc.) The air doses at the site boundary were used to verify compliance with Technical Specification 3.11.2.2. To verify compliance with Technical Specification 3.11.2.3, the maximum organ dose to the maximum exposed individual located at Taylor Flats was evaluated. Table 6-4 lists the doses at these special locations.

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 whole body dose of $1.1\text{E}-02$ mrem. The annual thyroid dose was $6.9\text{E}-02$ mrem and the maximum dose to any other organ was $1.3\text{E}-02$ mrem.

The annual assessment of radiation doses to the likely most 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 SE). The Gaspar 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 Taylor Flats. The assessment resulted in annual calculated whole body dose of $9.0\text{E}-03$ mrem. The annual thyroid dose was $4.7\text{E}-02$ mrem and the maximum dose to any other organ was $9.7\text{E}-03$ mrem.

The direct radiation contribution showed no significant amount above normal background for that area which is approximately 80 mrem per year.



Table 6-1

MAXIMUM INDIVIDUAL DOSES FROM WNP-2 LIQUID EFFLUENTS

1ST AND 2ND QUARTERS 1986

First Quarter 1986				
Pathway	Whole Body (mrem/qtr)	1986 Cumulative Whole Body (mrem/yr)	Max. Organ. (mrem/qtr)	1986 Cumulative Max. Organ. (mrem/yr)
Drinking	3.7E-07	3.7E-07	5.0E-07	5.0E-07
Shoreline	1.1E-07	1.1E-07	1.3E-07	1.3E-07
Swimming	6.5E-10	6.5E-10	6.5E-10	6.5E-10
Fishing	7.4E-04	7.4E-04	1.1E-03	1.1E-03
Boating	7.9E-10	7.9E-10	7.9E-10	7.9E-10
Leafy Veg.	8.3E-08	8.3E-08	2.1E-07	2.1E-07
Vegetables	5.3E-07	5.3E-07	1.0E-06	1.0E-06
Milk	1.3E-05	1.3E-05	1.9E-05	1.9E-05
Meat	<u>4.6E-08</u>	<u>4.6E-08</u>	<u>1.1E-07</u>	<u>1.1E-07</u>
Total	7.5E-04	7.5E-04	1.1E-03	1.1E-03

Second Quarter 1986				
Pathway	Whole Body (mrem/qtr)	1986 Cumulative Whole Body (mrem/yr)	Max. Organ. (mrem/qtr)	1986 Cumulative Max. Organ. (mrem/yr)
Drinking	3.5E-06	3.9E-06	5.1E-06	5.6E-06
Shoreline	4.0E-06	4.1E-06	4.6E-06	4.8E-06
Swimming	2.2E-08	2.2E-08	1.1E-06	1.1E-06
Fishing	2.2E-02	2.2E-02	4.2E-02	4.4E-02
Boating	2.5E-07	2.5E-07	2.7E-07	2.7E-07
Leafy Veg.	1.5E-06	1.5E-06	3.0E-06	3.2E-06
Vegetables	8.3E-06	8.8E-06	1.5E-05	1.6E-05
Milk	4.3E-04	4.5E-04	8.9E-04	9.1E-04
Meat	<u>1.5E-06</u>	<u>1.5E-06</u>	<u>2.9E-06</u>	<u>3.1E-06</u>
Total	2.2E-02	2.2E-02	4.3E-02	4.5E-02

Table 6-1

MAXIMUM INDIVIDUAL DOSES FROM WNP-2 LIQUID EFFLUENTS(1)3RD AND 4TH QUARTERS 1986
(Continued)

Third Quarter 1986				
Pathway	Whole Body (mrem/qtr)	1986 Cumulative Whole Body (mrem/yr)	Max. Organ. (mrem/qtr)	1986 Cumulative Max. Organ. (mrem/yr)
Drinking	3.1E-07	4.2E-07	4.3E-07	6.0E-07
Shoreline	1.2E-07	4.2E-06	1.4E-07	4.9E-06
Swimming	6.1E-10	2.3E-08	6.1E-10	1.1E-06
Fishing	8.4E-04	2.3E-02	1.4E-03	4.5E-02
Boating	8.3E-09	2.6E-07	8.3E-09	2.8E-07
Leafy Veg.	8.0E-08	1.6E-06	1.8E-07	3.4E-06
Vegetables	5.0E-07	9.3E-06	9.0E-07	1.7E-05
Milk	1.4E-05	4.6E-04	2.4E-05	9.3E-04
Meat	4.9E-08	1.5E-06	1.1E-07	3.2E-06
Total	8.6E-04	2.3E-02	1.4E-03	4.6E-02

Fourth Quarter 1986				
Pathway	Whole Body (mrem/qtr)	1986 Cumulative Whole Body (mrem/yr)	Max. Organ. (mrem/qtr)	1986 Cumulative Max. Organ. (mrem/yr)
Drinking	4.5E-07	4.7E-06	7.0E-07	6.7E-06
Shoreline	3.9E-07	4.6E-06	4.5E-07	5.4E-06
Swimming	2.2E-09	2.5E-08	2.2E-09	1.1E-06
Fishing	1.3E-03	2.4E-02	2.1E-03	4.7E-02
Boating	3.3E-08	2.9E-07	3.3E-08	3.1E-07
Leafy Veg.	7.4E-08	1.7E-06	2.4E-07	3.6E-06
Vegetables	5.3E-07	9.8E-06	1.2E-06	1.8E-05
Milk	2.3E-07	4.6E-04	3.9E-07	9.3E-04
Meat	7.6E-08	1.6E-06	2.0E-07	3.4E-06
Total	1.3E-03	2.4E-02	2.1E-03	4.8E-02

(1) Age Group - Adult: Maximum individual resides at Richland and fishes at the WNP-2 slough area.



Table 6-2

AVERAGE INDIVIDUAL DOSES FROM WNP-2 LIQUID EFFLUENTS

1ST AND 2ND QUARTERS 1986

	Total per 1st Quarter		Total per 2nd Quarter	
Pathway	Max. Organ. (mrem)	Whole Body (mrem)	Max. Organ. (mrem)	Whole Body (mrem)
Fish	2.8E-06	1.8E-06	1.0E-04	5.3E-05
Drinking Water	2.9E-07	2.2E-07	3.0E-06	8.5E-06
Shoreline	4.3E-09	3.6E-09	1.6E-07	1.3E-07
Swimming	7.6E-11	7.6E-11	1.6E-09	1.6E-09
Boating	4.5E-11	4.5E-11	9.5E-10	9.5E-10
Vegetables	3.3E-06	1.6E-06	2.0E-05	1.3E-05
Leafy vegetables	3.2E-06	1.2E-06	2.3E-05	1.1E-05
Milk	1.2E-07	7.7E-08	3.9E-06	1.9E-06
Meat	<u>5.2E-08</u>	<u>2.5E-08</u>	<u>1.2E-06</u>	<u>5.8E-07</u>
Total	9.8E-06	4.9E-06	1.5E-04	8.8E-05

3RD AND 4TH QUARTERS 1986

	Total per 3rd Quarter		Total per 4th Quarter	
Pathway	Max. Organ. (mrem)	Whole Body (mrem)	Max. Organ. (mrem)	Whole Body (mrem)
Fish	3.4E-06	2.1E-06	4.8E-06	3.4E-06
Drinking Water	2.6E-07	1.8E-07	4.2E-07	2.7E-07
Shoreline	4.7E-09	4.0E-09	1.5E-08	1.3E-08
Swimming	6.8E-11	6.8E-11	2.7E-10	2.7E-10
Boating	4.0E-11	4.0E-11	1.6E-10	1.6E-10
Vegetables	1.5E-06	8.1E-07	2.0E-06	8.4E-07
Leafy vegetables	1.4E-06	6.0E-07	1.8E-06	5.6E-07
Milk	1.0E-07	6.3E-08	1.6E-07	9.3E-08
Meat	<u>4.6E-08</u>	<u>2.0E-08</u>	<u>8.0E-08</u>	<u>3.1E-08</u>
Total	6.7E-06	3.8E-06	9.3E-06	5.2E-06



Table 6-3

50-MILE POPULATION DOSES FROM WNP-2 LIQUID EFFLUENTS

1ST AND 2ND QUARTERS 1986

	Total per 1st Quarter		Total per 2nd Quarter	
Pathway	Max. Organ. (man-rem)	Whole Body (man-rem)	Max. Organ. (man-rem)	Whole Body (man-rem)
Fish	1.8E-06	1.1E-06	6.5E-05	3.4E-05
Drinking water	1.7E-05	1.3E-05	1.7E-04	1.3E-04
Shoreline	1.4E-06	1.2E-06	5.1E-05	4.4E-05
Swimming	2.5E-08	2.5E-08	5.2E-07	5.2E-07
Boating	6.2E-09	6.2E-09	1.3E-07	1.3E-07
Vegetables	3.6E-05	1.7E-05	5.1E-04	2.9E-04
Leafy vegetables	3.5E-05	1.3E-05	2.8E-04	4.0E-04
Milk	1.8E-06	1.1E-06	8.3E-05	4.2E-05
Meat	<u>5.3E-07</u>	<u>2.5E-07</u>	<u>8.5E-06</u>	<u>1.6E-05</u>
Total	9.4E-05	4.7E-05	1.2E-03	9.6E-04

3RD. AND 4TH QUARTERS 1986

	Total per 3rd Quarter		Total per 4th Quarter	
Pathway	Max. Organ. (man-rem)	Whole Body (man-rem)	Max. Organ. (man-rem)	Whole Body (man-rem)
Fish	2.2E-06	1.2E-06	3.4E-06	2.0E-06
Drinking water	1.6E-05	1.1E-05	2.4E-05	1.6E-05
Shoreline	1.5E-06	1.3E-06	5.0E-06	4.3E-06
Swimming	2.2E-08	2.2E-08	8.7E-08	8.7E-08
Boating	5.5E-09	5.5E-09	2.2E-08	2.2E-08
Vegetables	3.3E-05	1.6E-05	3.3E-05	1.6E-05
Leafy vegetables	3.1E-05	1.2E-05	2.9E-05	1.1E-05
Milk	2.2E-06	1.3E-06	3.3E-06	1.9E-06
Meat	<u>5.5E-07</u>	<u>2.7E-07</u>	<u>9.7E-07</u>	<u>4.2E-07</u>
Total	8.6E-05	4.3E-05	9.9E-05	5.2E-05

Table 6-4

SUMMARY OF DOSES FROM WNP-2 GASEOUS EFFLUENTS

CALENDAR QUARTERS 1986

Location: 1.2 miles site boundaryReporting Period: Calendar Quarters Plus Annual Cumulative, 1986

	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Annual Cumulative</u>
Beta air dose (mrad)*	3.4E-02	2.7E-01	4.0E-02	7.0E-02	1.5E-01
Gamma air dose (mrad)*	5.7E-02	3.7E-03	6.6E-02	1.2E-01	2.5E-01

Location: Taylor Flats, 4.2 miles SEReporting Period: Calendar Quarters Plus Annual Cumulative, 1986

	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Annual Cumulative</u>
Maximum organ dose (mrem)**	3.5E-03	3.9E-03	2.6E-02	7.8E-03	4.1E-02

* Technical Specification 3.11.2.2.

** Technical Specification 3.11.2.3.



7.0 REVISIONS TO THE ODCM

During this semi-annual reporting period, no revisions were made to the Offsite Dose Calculation Manual (ODCM).



Washington Public Power Supply System

3000 George Washington Way P.O. Box 968 Richland, Washington 99352-0968 (509)372-5000

February 24, 1987
G02-87-063

Docket No. 50-397

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

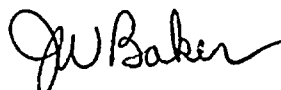
Dear Gentlemen:

Subject: NUCLEAR PLANT NO. 2
SEMI-ANNUAL EFFLUENT REPORT
JULY 1, 1986 TO DECEMBER 31, 1986 (ATTACHED)

In accordance with Title 10 of the Code of Federal Regulations, Part 50.36a (a) (2), the subject report is herewith being submitted.

Should you have any questions, please contact Mr. R. G. Graybeal, Manager, WNP-2 Health Physics/Chemistry.

Very truly yours,



C. M. Powers
WNP-2 Plant Manager

tmh
Attachment

cc: JO Bradfute - NRC
C Eschels - EFSEC
D Jaquish - DOE
JB Martin - NRC RV (2)
D Sherman - Amer. Nuclear Insurers
TR Strong - DSHS
JM Taylor - NRC
NRC Site Inspector

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