WNP-2 SEMI-ANNUAL EFFLUENT REPORT

JANUARY 1 TO JUNE 30, 1985

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

LICENSE NO. NPF-21

AUGUST, 1985

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1.0 INTRODUCTION

In meeting the requirements of the license, this report is submitted in compliance with Technical Specification 6.9.1.11 and Regulatory Guide 1.21.

2.0 LIQUID EFFLUENTS

The radwaste liquid effluents from WNP-2 were released in a batch mode only, no continuous release of liquid effluent occurred during the six month period. A monthly LADTAP computer run was performed to verify compliance with Technical Specification limits using the assumptions in the ODCM.

The average diluted concentrations are based on the dilution in the blowdown line and are prior to being discharged to the river.

All liquid discharges from the radwaste building are recirculated in a vented holdup tank at atmospheric pressure prior to sampling and discharge. Thus, no dissolved or entrained noble gases were present in the liquid discharges.

The "Percent of Applicable Limit" is based on 10CFR20 Appendix B, Table 2, Column 2 concentrations.

The "Estimated Total Error" is calculated to be 22% at the 95% confidence level. The estimated errors in the radioactivity are based on counting statistics, measurement of flow rates, both from the tank and in the blowdown line and in obtaining a representative sample prior to discharge.

The "Estimated Total Error" is calculated by taking the square root of the sum of the squares of the errors of the individual contributers.

No positive count of alpha activity was detected in the liquid effluent samples during the last six months.

2.1 Turbine Buildings Non-Radioactive Sumps

WNP-2 also has three non-radioactive turbine building sumps that are continuously monitored for radioactivity. These sumps are designed to discharge water to the storm drain system, which is an open pond by the WNP-2 Warehouse, or to route the water to the Radioactive Waste Building floor drain receiving tank if the radiation monitor setpoint is exceeded. Under no conditions can the sumps discharge outside of the restricted area or to the river.

During the second quarter Maintenance outage, sediment from the cooling tower basins was sampled prior to sediment removal. Analysis disclosed gross radioactivity levels of 10^{-7} uCi/cc. Isotopic analysis showed the activity to be similar to, but not conclusively the same as that found in river sediments upstream from the WNP-2 intake structure. None of the short lived isotopes such as 27.7 day chromium -51, characteristic of WNP-2 contaminated systems were present in the tower basins. Investigation of the source is continuing.

Table 2-1

WNP-2 LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

January - July 1985

	Unit	1st Quarter	2nd Quarter	Est. Total Error, %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	1.0E-03	2.8E-03	2.2 E+1
2. Average diluted concentration during period	uCi/ml	9.5E-10	3.7E-06	
3. Percent of MPC limit	%	5.0E-02	2.4E-01	
B. Tritium				
1. Total release	Ci	1.5E-01	9.2E-01	2.2 E+1
2. Average diluted concentration during period	uCi/ml	1.5E-07	3.7E-06	
3. Percent of MPC limit	%	4.9E-03	1.5E-01	
C. Gross alpha radioactivity(1)				
1. Total release	Ci	4.3E-05	8.0E-07	1.7 E+1
D. Volume of waste (prior to dilution)	liters	1.2E+05	8.6E+05	1.5 E+1
E. Volume of dilution water used during period	liters	1.0E+09	2.7E+08	1.5 E+1

(1) Below MDA values.

Table 2-2

WNP-2 LIQUID EFFLUENTS - SOURCE TERMS

January - June 1985 BATCH MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter
Strontium-89	Ci	2.3 E-05	3.8 E-05
Strontium-90	Ci	1.3 E-04	3.8 E-05
Cesium-134	Ci	1.8 E-05	3.7 E-05
Cesium-137	Ci	1.8 E-05	3.4 E-05
Iodine-131	Ci	1.9 E-05	3.2 E-05
Cobalt-58	Ci	2.1 E-05	5.8 E-04
Cobalt-60	Ci	1.8 E-05	1.4 E-04
Iron-59	Ci	3.2 E-05	2.0 E-05
Zinc-65	Ci	4.5 E-05	3.7 E-04
Manganese-54	Ci	1.8 E-05	7.1 E-05
Chromium-51	Ci	2.1 E-04	5.3 E-04
Niobium-95	Ci	1.6 E-05	4.1 E-05
Molybdenum-99	Ci	1.5 E-05	2.6 E-05
Technetium-99m	Ci	1.8 E-05	3.1 E-05
Barium-lanthanum-140	Ci	6.2 E-05	1.2 E-04
Cerium-141	Ci	2.9 E-05	5.0 E-05

TABLE 2-2 (Continued)

Cerium-144	Ci	1.3 E-04	2.2 E-04
Tritium	Ci	1.5 E-01	9.2 E-01
Iron-55	Ci	2.1 E-04	3.4 E-04
Sodium-24	Ci	$\leq$5.9 E-06	2.9 E-07
Copper-64	Ci	$\leq$2.1 E-03	5.9 E-05
Arsenic-76	Ci	$\leq$2.1 E-05	1.5 E-05
Total for Period (Above)	Ci	1.5 E-01	9.2 E-01

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

There were no abnormal releases of gaseous effluent during the first and second quarters of 1985. Monitoring and sampling of the gaseous effluents were performed according to plant procedures. The setpoints for the environmental radiation monitors were set as described in the ODCM.

Purging and venting of containment atmosphere is monitored via the continuous effluent pathway in accordance with Technical Specification 3.11.2.8. Table 3-5 summarizes batch release reporting criteria as outlined in Regulatory Guide 1.21, Appendix B, A.5. During periods of batch release there were no observable changes in average daily or steady-state gross radioactivity release rates or variances from normal effluent concentration and composition. In accordance with NUREG-0133, Section 3.3, the determination of doses due to short term releases was represented by the annual average relative concentration since it has been demonstrated that past short-term releases were sufficiently random in both time of day and duration to be represented by the annual average dispersion conditions.

The gaseous source terms from each release points are listed in Table 3-1 to 3-3. Table 3-4 is a summation of the total releases of gaseous effluents from WNP-2 plus the average release rate, gross alpha activities and the estimated total error associated with the measurements of radioactivity in the gaseous effluents.

The method of calculating the total estimated error associated with the gaseous effluent measurements is similar to the one described in Section 2.0 (Liquid Effluents). The error estimates were performed on the gas grab sample, volume determination, flow rates, gas analysis by gamma spectrometry, air monitoring flow, calibration error of the gas analyzer detectors, and beta scintillation readings. The final error was calculated to be 36% at the 95% confidence level.

In Table 3-4, the "Percent of Technical Specification Limit" calculations were based on the offsite exposure. For the noble gases, dose to the whole body was 3.7 E-03 mrem for the first quarter and 2.8 E-02 mrem for the second quarter.

The maximum organ dose from the noble gases was 8.6 E-03 mrem for the first quarter and 5.7 E-02 mrem for the second quarter.

The maximum whole body dose due to Iodines and particulates was 9.9 E-03 mrem for the first quarter and 1.0 E-02 mrem for the second quarter.

Gross alpha activity was based on the MDA of the counting equipment.

To verify compliance with Technical Specification limits, calculations were performed each month using the GASPAR computer program to determine the offsite radiation exposure 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.

The calculations on the radiation levels at the site boundary were used to verify compliance with Technical Specification limits from 10CFR20, and for air dose limits as listed in 10CFR50. The Taylor Flats location was used to verify compliance with Technical Specification limits from 10CFR50 Appendix I.

In addition to the reactor site, WNP-2 has a permanent laundry facility which is located approximately 0.75 miles from the site. The laundry uses a dry cleaning process so there are no liquid discharges of radioactive effluents. The ventilation system contains HEPA filters on the discharge and is continuously monitored for particulates and radio iodines. A total of 4.8E-01 microcuries were released from the laundry facility during the reporting period. The results are based on the MDA of gross beta-gamma counting of the particulate filters. Gamma analysis indicated no isotopes present other than those attributable to natural background.

During the semi-annual reporting period, a deviation from Technical Specification 3.3.7.12b occurred concerning the inoperability of the turbine building exhaust effluent flow rate monitor. The extended out of service period was a result of the delay time associated in obtaining replacement flow transmitters found to be faulty during routine instrument calibration. Total turbine building effluent flow was obtained from measurements taken in the turbine building effluent duct every four hours coupled with building effluent fan operation.

Table 3-1

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

January - June 1985

CONTINUOUS MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter
1. Fission gases			
Krypton-85	Ci	≤1.6 E-04	≤1.8 E-04
Krypton-85m	Ci	1.7 E-01	6.5 E-01
Krypton-87	Ci	8.0 E-01	6.4 E-01
Krypton-88	Ci	1.9 E+00	1.0 E+00
Xenon-133	Ci	2.5 E+00	1.3 E+00
Xenon-133m	Ci	4.3 E+00	2.2 E+00
Xenon-135	Ci	4.6 E+00	3.8 E-01
Xenon-135m	Ci	1.0 E+00	7.0 E-02
Xenon-138	Ci	4.7 E+00	3.0 E+00
Argon-41	Ci	1.2 E-01	5.9 E-01
Total for period	Ci	2.0 E+01	9.8 E+00
2. Iodines			
Iodine-131	Ci	5.3 E-04	1.7 E-04
Iodine-133	Ci	4.0 E-03	1.1 E-03
Iodine-135	Ci	≤1.3 E-03	≤1.4 E-03
Total for period	Ci	5.8 E-03	2.7 E-03

Table 3-1 (Continued)

3. Particulates

Strontium-89	Ci	3.0 E-07	2.3 E-06
Strontium-90	Ci	4.0 E-07	3.0 E-06
Cesium-134	Ci	2.2 E-04	3.2 E-04
Cesium-137	Ci	1.8 E-04	2.8 E-04
Barium-lanthanum-140	Ci	8.6 E-04	1.2 E-03
Molybdenum-99	Ci	3.5 E-04	3.8 E-04
Cerium-141	Ci	2.3 E-04	2.8 E-04
Cerium-144	Ci	8.0 E-04	1.2 E-03
Cobalt-58	Ci	1.2 E-03	1.5 E-03
Cobalt-60	Ci	3.4 E-04	5.6 E-04
Chromium-51	Ci	2.8 E-03	4.1 E-03
Zinc-65	Ci	1.1 E-03	3.0 E-03
Zirconium-95	Ci	3.9 E-04	4.6 E-04
Iron-59	Ci	4.0 E-04	5.3 E-04
Manganese-54	Ci	2.5 E-04	3.3 E-04
Total for period	Ci	9.1 E-03	1.4 E-02

4. Tritium	Ci	2.9 E-01	6.9 E-02

Total building release	Ci	2.0 E+01	9.9 E+00

Table 3-2

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

January - June 1985

CONTINUOUS MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter
1. Fission gases			
Krypton-85	Ci	≤3.9 E-04	≤3.0 E-04
Krypton-85m	Ci	2.7 E-03	≤7.5 E-01
Krypton-87	Ci	1.4 E+00	1.0 E+00
Krypton-88	Ci	2.5 E+00	1.4 E+00
Xenon-133	Ci	2.5 E+00	1.9 E+00
Xenon-133m	Ci	5.5 E+00	4.1 E+00
Xenon-135	Ci	8.3 E-01	3.0 E+00
Xenon-138	Ci	5.4 E+00	2.6 E+00
Total for period	Ci	1.8 E+01	1.5 E+01
2. Iodines			
Iodine-131	Ci	2.4 E-04	6.5 E-05
Iodine-133	Ci	1.9 E-03	5.6 E-04
Iodine-135	Ci	≤3.0 E-03	≤2.3 E-03
Total for period	Ci	5.1 E-03	2.9 E-03

Table 3-2 (Continued)

3. Particulates

Strontium-89	Ci	5.0 E-06	9.5 E-06
Strontium-90	Ci	1.2 E-06	2.3 E-06
Cesium-134	Ci	4.3 E-04	6.2 E-04
Cesium-137	Ci	3.5 E-04	4.1 E-04
Barium-lanthanum-140	Ci	1.3 E-03	2.2 E-03
Cerium-141	Ci	3.8 E-04	6.1 E-04
Cerium-144	Ci	1.5 E-03	2.5 E-03
Cobalt-58	Ci	3.4 E-04	5.3 E-04
Molybdenum-99	Ci	5.1 E-04	8.2 E-04
Cobalt-60	Ci	3.6 E-04	4.6 E-04
Chromium-51	Ci	2.7 E-03	4.0 E-03
Zinc-65	Ci	8.6 E-04	1.2 E-03
Zirconium-95	Ci	5.4 E-04	8.1 E-04
Iron-59	Ci	7.3 E-04	1.1 E-03
Manganese-54	Ci	3.4 E-04	3.9 E-04
Total for period	Ci	1.0 E-02	1.6 E-02

4. Tritium	Ci	3.4 E-01	9.3 E-02

Total building release	Ci	1.8 E+01	1.5 E+01

Table 3-3

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

January - June 1985

CONTINUOUS MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter
1. Fission gases			
Krypton-85	Ci	≤ 1.2 E-04	≤ 1.2 E-04
Krypton-85m	Ci	≤ 3.1 E-01	≤ 3.1 E-01
Krypton-87	Ci	2.7 E-01	3.7 E-01
Krypton-88	Ci	5.3 E-01	4.8 E-01
Xenon-133	Ci	9.4 E-01	7.4 E-01
Xenon-133m	Ci	1.3 E+00	1.3 E+00
Xenon-135	Ci	6.7 E-01	2.5 E-01
Xenon-138	Ci	2.0 E+00	1.3 E+00
Total for period	Ci	6.0 E+00	4.8 E+00
2. Iodines			
Iodine-131	Ci	6.1 E-05	1.9 E-05
Iodine-133	Ci	5.3 E-04	2.0 E-04
Iodine-135	Ci	≤9.8 E-04	≤9.5 E-04
Total for period	Ci	1.6 E-03	1.2 E-03

Table 3-3 (Continued)

3. Particulates

Strontium-89	Ci	2.7 E-07	4.2 E-07
Strontium-90	Ci	3.7 E-07	5.6 E-07
Cesium-134	Ci	4.2 E-05	6.1 E-05
Cesium-137	Ci	4.1 E-05	6.1 E-05
Barium-Lanthanum-140	Ci	1.5 E-04	2.2 E-04
Molybdenum-99	Ci	5.4 E-05	7.0 E-05
Cerium-141	Ci	4.7 E-05	6.7 E-05
Cerium-144	Ci	1.8 E-04	2.8 E-04
Cobalt-58	Ci	3.9 E-05	6.1 E-05
Cobalt-60	Ci	5.2 E-05	6.8 E-05
Chronium-51	Ci	3.3 E-04	4.5 E-04
Zinc-65	Ci	1.0 E-04	1.3 E-04
Zirconium-95	Ci	6.4 E-05	8.8 E-05
Iron-59	Ci	7.9 E-05	1.2 E-04
Manganese-54	Ci	4.4 E-05	5.7 E-05
Total for period	Ci	1.2 E-03	1.7 E-03

4. Tritium	Ci	3.2 E-02	1.1 E-01

Total building release	Ci	6.0 E+00	4.9 E+00

Table 3-4

WNP-2 GASEOUS EFFLUENTS
SUMMATION OF ALL RELEASES

January - June 1985

	Unit	1st Quarter	2nd Quarter	Est. Total Error %*
A. Fission & activation gases				
1. Total release	Ci	4.4 E+01	3.0 E+01	3.6 E+1
2. Average release rate for period	uCi/sec	5.7 E+00	1.1 E+01	
3. Percent of Tech. Spec. limit	%	7.4 E-04	5.6 E-03	
B. Iodines				
1. Total iodine (131, 133)	Ci	1.3 E-02	6.8 E-03	3.6 E+1
2. Average release rate for period	uCi/sec	9.4 E-04	7.9 E-04	
3. Percent of Tech. Spec. limit	%	4.7 E-04	1.3 E-04	
C. Particulates				
1. Particulates with half-lives 8 days	Ci	2.0 E-02	3.2 E-02	3.6 E+1
2. Average release rate for period	uCi/sec	2.7 E-03	1.3 E-02	
3. Percent of Tech. Spec. limit	%	1.3 E-03	2.1 E-03	
4. Gross alpha radioactivity	Ci	3.1 E-04	2.7 E-04	
D. Tritium				
1. Total releases	Ci	6.6 E-01	2.7 E-01	3.6 E+1
2. Average release rate for period	uCi/sec	8.6 E-02	1.0 E-01	
3. Percent of Tech. Spec. limit**	%	1.0 E-05	7.3 E-06	

* At 95% confidence level
** Based on offsite exposure to the maximum organ. age group, the child.

Table 3-5

WNP-2 GASEOUS EFFLUENTS
BATCH RELEASES

January - June 1985

Type	Number	Total Time (hrs)	Maximum Time (hrs)	Minimum Time (hrs)	Mean Time (hrs)
Purge	5	217	84	2	43
Vent	51	86.9	7.83	0.3	1.7

4.0 SOLID WASTE

A total volume of 2.19E+02 m^3 (7.74E+03 ft^3) of solid waste was transported in 27 shipments during the reporting period. The total activity of the solid waste shipped was 1.95E+02 Ci; 195.24 Ci consisting of Dewatered Spent Resins and 2.73 E-02 Ci as Dry Active Waste (DAW).

A. Dewatered Spent Resin

1.38 E+02 m^3 (4.86 E+03 ft^3) of dewatered spent resin were shipped during the reporting period. The shipping containers were CNS 14-195 liners (burial volume - 195 ft^3, actual volume - 180 ft^3) from Chemical Nuclear. The total activity shipped during the reporting period was 195 Ci. The principle nuclides and their percentage contribution to the total activity is listed in Table 4-1. The solid wastes were shipped to the U.S. Ecology burial site in Richland, Washington using flat bed trailers.

The counting error associated with the total activity of the six principle nuclides (about 99.5% of the total activity shipped) is 0.6% at one standard deviation. Since the remaining nuclides represents such a small portion of the total activity shipped, their error contribution was neglected.

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 ND6600 NBS 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. A total of 8.16 E+01 m^3 (2.88 E+03 ft^3) of dry active waste (DAW) was shipped in 32 Container Product Corporation B-25 steel boxes. 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.

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", 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. Dewatered resin samples were weighed and dryed in an oven. It was found that the dewatered resin contained about 50% water by weight.

C-14

The standard default value recommended in the AIF report of 1.0 E-8 mCi/g was used until the generic scaling factor of C-14 to Co-60 (6.0 E-4 mCi/g) became available.

I-129

The I-129 concentration is determined by scaling to Cs-137. The Cs-137 detected and resulting values, if less than typical MDA for these nuclides, are reported as less than the typical MDA. The following scaling factors were taken from the AIF report and the associated MDAs (typical) were used for the waste streams indicated.

	COND	RWCU	FDR/EDR	DAW
Scaling Factors	7.0E-05 uCi/g	7.0E-05 uCi/g	7.0E-05 uCi/g	7.0E-05 uCi/g
Typical MDA	5.0E-07 uCi/g	5.0E-07 uCi/g	5.0E-07 uCi/g	5.0E-07 uCi/g

Where:

COND = Condensate Resins
RWCU = Reactor Water Cleanup Resins
FDR/EDR = Floor Drain and Equipment Drain Resins
DAW = Dry Active Waste

Tc-99

The Tc-99 concentration was determined by scaling to Cs-137. The Cs-137 MDA is used if no Cs-137 was detected and the resulting values, if less than typical MDA for these nuclides, were reported as less than the typical MDA. The following scaling factors from the final AIF report and typical MDAs were used for the waste streams indicated.

	COND	RWCU	FDR/EDR	DAW
Scaling Factors	9.0E-05 uCi/g	9.0E-05 uCi/g	9.0E-05 uCi/g	9.0E-05 uCi/g
Typical MDA	6.0E-08 uCi/g	6.0E-08 uCi/g	6.0E-08 uCi/g	6.0E-08 uCi/g

TRU, Sr-90, Ni-63

TRU nuclides are 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. During the reporting period the Cs-137 MDA was used to estimate the concentrations. Based on the scaling factors the calculated concentrations of TRUs, Pu-241 and Cm-242 were below the threshold values to report and were assumed not to be present.

Sr-90 is scaled to Cs-137 and Ni-63 is scaled to Co-60. The following table contains the scaling factors used for the various waste streams.

TABLE 4-1

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

Scaled Nuclide	Scaling Nuclide	Scaling Factor	Scaling Nuclide Reporting Limit
Pu-238	Ce-144	7.5 E-3 uCi/g	1.33 E-1 uCi/g
Pu-239	Ce-144	5.0 E-3	2.00 E-1
Pu-241	Ce-144	5.5 E-1	6.36 E-2
Am-241	Ce-144	3.5 E-3	2.86 E-1
Cm-242	Ce-144	1.5 E-2	1.33 E+1
Cm-244	Ce-144	3.0 E-3	3.33 E-1
Ni-63	Co-60	2.0 E-2	Co-60 MDA
Sr-90	Cs-137	1.0 E-2	4.0 E-2

4.2 Process Control Program

No substantial changes were initiated in Chem Nuclear's process Control Program during the last semi-annual reporting period.

Table 4-2
WNP-2 SOLID WASTE SHIPMENTS

January - June 1985

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

1. Type of waste	Unit	6-month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3 Ci	1.38E+2 1.95E+2	2.0 E+1
b. Dry active waste, contaminated equip., etc.	m^3 Ci	8.16E+1 3.10E-2	2.0 E+1
c. Irradiated components, control rods, etc.	m^3 Ci	No Shipment	
d. Other (describe)	m^3 Ci	No Shipment	

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

a. Dewatered Spent Resins

	%	Ci
Cr-51	27.98	54.56
Co-58	38.72	75.50
Zn-65	25.12	48.98
Co-60	5.34	10.41
Fe-59	0.71	1.39
Mn-54	1.66	3.24

b. Dry Active Wastes (DAW)

	%	Ci
Cr-51	22.97	7.12 E-3
Co-58	33.55	1.04 E-2
Zn-65	18.35	5.69 E-3
Co-60	12.32	3.82 E-3
Mn-54	2.80	8.67 E-4
Fe-59	2.74	8.49 E-4
Zr-95	3.29	1.02 E-3

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
27	Flat bed trailer (6) 14-195H Cask (4) 21-300 Cask (17)	US Ecology Richland, WA

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
None		

5.0 METEOROLOGY

The meteorological data contained in Tables 5-1 through 5-4 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 first half of 1985 was cooler 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% data recovery for the joint frequency parameters.

Tables 5-1 through 5-4 list the joint frequency distribution at the 33 ft. and 245 ft. levels for the first and second quarters. The tabulated stability classes, A-G, are denoted by numerals 1-7 respectively. Numerals 1-7 were used for the wind subfields as is noted at the top of each sensor level reported. The 16 compass sectors in Tables 5-1 through 5-4 pertain to the direction the wind is coming from.

Calibration performed in March 1985 produced no values exceeding WNP-2 FSAR meteorological equipment tolerances. Therefore, no correction has been made to the raw data. A cross check of Sigma Theta versus Delta Temperature was made with the Delta Temperature Stability Class being the most conservative. The NRC Delta Temperature Stability Classification scheme was utilized in the production of all joint frequency tables.

The plant was shutdown for routine maintenance on May 6, 1985 for a period of six weeks. Testing on related electrical systems resulted in periods of power and data loss at the meteorology tower. As part of the scheduled maintenance outage, the PRIME computer system for WNP-2 was upgraded resulting in information losses on the automated data recovery system. The primary (245 ft. - 33 ft.) delta temperature system experienced a decrease of approximately 1°F/100m at the beginning of the second quarter. A recalibration of the equipment has been performed and the data will be corrected for the annual report in January 1986.

TABLE 5-1

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

FIRST QUARTER 1985
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.	0.	0.	0.	0.	0.	0.	1.	2.	1.	0.	1.	1.
1	3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
1	4	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
1	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	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.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	2	0.	0.	1.	0.	0.	0.	0.	0.	0.	2.	2.	0.	0.	0.	0.	1.
2	3	1.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	1.
2	4	0.	0.	0.	0.	0.	0.	0.	3.	1.	2.	0.	0.	0.	0.	0.	0.
2	5	4.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.
2	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	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.	1.	0.	0.	0.	0.	0.	0.	2.	1.	0.	1.	0.	2.	4.	5.
3	3	3.	1.	0.	0.	0.	0.	0.	5.	1.	7.	2.	1.	1.	0.	0.	8.
3	4	2.	0.	0.	0.	0.	0.	0.	0.	2.	5.	2.	4.	2.	0.	1.	3.
3	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	4.	0.	0.	2.	1.	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.	1.	1.	0.	0.	1.	0.	0.	1.	1.	2.	1.	2.	0.	2.
4	2	29.	11.	9.	4.	3.	2.	9.	6.	10.	16.	18.	13.	23.	25.	34.	22.
4	3	40.	21.	7.	1.	0.	3.	6.	7.	29.	22.	10.	9.	15.	22.	36.	52.
4	4	10.	0.	0.	0.	0.	2.	1.	4.	15.	10.	4.	7.	4.	5.	4.	7.
4	5	1.	0.	0.	0.	0.	0.	0.	0.	2.	2.	4.	0.	1.	2.	2.	4.
4	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	1.	1.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	1.	2.	0.
5	1	0.	0.	1.	1.	0.	0.	0.	1.	1.	0.	3.	1.	1.	1.	1.	5.
5	2	17.	10.	7.	2.	4.	4.	4.	8.	16.	13.	10.	15.	20.	38.	41.	27.
5	3	19.	19.	14.	1.	1.	1.	7.	20.	25.	14.	9.	19.	25.	28.	65.	29.
5	4	3.	3.	2.	0.	0.	0.	8.	19.	19.	22.	7.	3.	12.	16.	16.	19.
5	5	0.	0.	0.	0.	0.	0.	1.	3.	5.	2.	0.	0.	0.	2.	5.	0.
5	6	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	3.	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.	1.	0.	0.	0.
6	2	8.	5.	7.	3.	4.	2.	3.	11.	6.	6.	5.	8.	12.	11.	33.	15.
6	3	11.	13.	12.	3.	0.	0.	2.	16.	23.	10.	7.	8.	7.	11.	27.	28.
6	4	0.	0.	0.	3.	0.	0.	1.	23.	6.	2.	0.	0.	0.	6.	6.	6.
6	5	0.	0.	0.	0.	0.	0.	2.	3.	3.	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.	1.	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.	6.	1.	1.	1.	0.	3.	6.	3.	5.	3.	6.	8.	8.	14.	13.
7	3	8.	10.	12.	3.	0.	0.	3.	21.	26.	8.	6.	3.	4.	2.	12.	8.
7	4	0.	1.	3.	0.	0.	0.	0.	10.	9.	4.	0.	1.	1.	0.	0.	0.
7	5	0.	0.	0.	0.	0.	0.	0.	1.	0.	2.	0.	0.	0.	0.	0.	0.
7	6	0.	0.	0.	0.	0.	0.	0.	0.	4.	2.	0.	0.	0.	0.	0.	0.
7	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.

TOTAL NUMBER OF HOURS
USED = 2093 MISSING = 48 CALM = 1 VARIABLE = 30

TABLE 5-2

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

FIRST QUARTER 1985
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.	0.	1.	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.	0.	0.	0.
1	3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
1	4	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
1	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	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	0.	1.	0.	0.	0.	0.	0.	1.	0.	1.	1.	2.	0.	0.	0.	2.
2	3	1.	0.	0.	0.	0.	0.	0.	0.	3.	0.	0.	0.	0.	0.	0.	1.
2	4	0.	0.	0.	0.	0.	0.	0.	1.	1.	1.	1.	0.	0.	0.	0.	0.
2	5	3.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.
2	6	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.
2	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	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.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	2.	0.	2.	5.	4.
3	3	4.	1.	0.	0.	0.	0.	0.	5.	1.	6.	4.	0.	1.	2.	1.	7.
3	4	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	0.	3.	2.	2.	0.	2.
3	5	1.	0.	0.	0.	0.	0.	0.	0.	0.	4.	4.	0.	0.	2.	0.	2.
3	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	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.	1.	2.	0.	0.	2.	0.	0.	1.	0.	1.	0.	0.
4	2	19.	6.	6.	2.	0.	3.	12.	8.	18.	15.	14.	17.	20.	19.	28.	24.
4	3	42.	16.	13.	0.	0.	2.	3.	15.	19.	15.	10.	5.	15.	22.	41.	45.
4	4	13.	5.	0.	0.	0.	2.	1.	2.	13.	8.	5.	9.	3.	5.	11.	19.
4	5	0.	0.	0.	0.	0.	2.	1.	1.	5.	9.	5.	1.	2.	1.	1.	4.
4	6	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	2.	1.	0.	3.	3.	5.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.
5	1	0.	0.	0.	1.	1.	1.	1.	2.	3.	2.	0.	1.	1.	0.	0.	0.
5	2	10.	8.	5.	3.	4.	11.	8.	18.	17.	13.	10.	14.	12.	20.	22.	30.
5	3	24.	10.	9.	1.	5.	3.	11.	20.	19.	8.	8.	10.	10.	35.	68.	30.
5	4	9.	11.	1.	1.	0.	0.	10.	13.	23.	12.	9.	4.	7.	16.	25.	10.
5	5	0.	0.	0.	0.	0.	0.	0.	0.	10.	23.	1.	3.	5.	14.	10.	10.
5	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	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.	1.	0.	0.	1.	2.	1.	0.	0.	0.	0.	0.
6	2	7.	13.	5.	6.	6.	7.	5.	8.	6.	6.	7.	11.	4.	8.	4.	9.
6	3	10.	9.	11.	11.	2.	1.	5.	10.	22.	6.	3.	4.	5.	12.	25.	19.
6	4	0.	4.	3.	1.	0.	0.	7.	13.	15.	5.	1.	1.	3.	11.	20.	4.
6	5	0.	0.	0.	0.	0.	0.	3.	1.	2.	2.	0.	0.	0.	11.	2.	1.
6	6	0.	0.	0.	0.	0.	0.	0.	1.	3.	1.	1.	0.	0.	1.	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.	2.	0.	0.	0.	0.	1.	0.	0.
7	2	4.	0.	4.	2.	2.	3.	5.	1.	6.	9.	6.	3.	2.	1.	5.	5.
7	3	13.	10.	8.	0.	3.	3.	2.	12.	21.	13.	8.	5.	4.	2.	8.	15.
7	4	0.	4.	3.	0.	0.	0.	1.	7.	18.	8.	1.	0.	3.	2.	7.	6.
7	5	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	0.	0.	0.	1.	1.	0.
7	6	0.	0.	0.	0.	0.	0.	0.	0.	2.	3.	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 = 2105 MISSING = 48 CALM = 5 VARIABLE = 14

TABLE 5-3

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

SECOND QUARTER 1985
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.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	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	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	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	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	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	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	3	0.	1.	0.	0.	0.	1.	0.	1.	2.	3.	0.	0.	0.	0.	0.	0.
4	4	3.	3.	0.	0.	0.	0.	0.	1.	6.	13.	2.	2.	0.	2.	3.	0.
4	5	0.	0.	0.	0.	0.	0.	0.	0.	8.	1.	1.	1.	1.	2.	6.	0.
4	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	1.	0.	0.	0.
5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	2	4.	6.	3.	0.	0.	3.	12.	11.	12.	5.	6.	6.	5.	8.	7.	8.
5	3	20.	23.	5.	3.	5.	12.	21.	52.	53.	50.	35.	35.	22.	25.	30.	39.
5	4	23.	8.	4.	3.	0.	0.	1.	8.	20.	43.	24.	19.	17.	16.	36.	20.
5	5	0.	0.	0.	0.	0.	0.	0.	0.	14.	15.	13.	10.	11.	20.	29.	0.
5	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	5.	0.	2.	0.	3.	0.
5	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.	0.	0.	0.	0.
6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	2	3.	5.	3.	0.	2.	4.	4.	6.	3.	8.	6.	6.	5.	6.	8.	7.
6	3	6.	2.	4.	3.	1.	3.	12.	20.	13.	8.	10.	17.	16.	25.	29.	20.
6	4	0.	1.	0.	1.	0.	0.	1.	14.	8.	5.	8.	5.	11.	39.	27.	5.
6	5	0.	0.	0.	0.	0.	0.	0.	0.	5.	5.	1.	1.	1.	7.	11.	0.
6	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	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	21.	16.	11.	6.	4.	1.	5.	13.	15.	15.	10.	8.	4.	12.	8.	13.
7	3	15.	13.	8.	9.	1.	3.	21.	46.	27.	17.	9.	12.	6.	20.	17.	22.
7	4	0.	0.	2.	0.	0.	0.	0.	7.	5.	3.	2.	1.	1.	8.	6.	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 = 1831 MISSING = 201 CALM = 0 VARIABLE = 47

TABLE S-4 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

SECOND QUARTER 1985
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.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	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	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	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	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	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	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	4	7.	0.	0.	0.	0.	1.	0.	1.	4.	11.	2.	1.	0.	0.	1.	0.
4	5	0.	0.	0.	0.	0.	0.	0.	1.	8.	6.	0.	1.	0.	8.	2.	0.
4	6	0.	0.	0.	0.	0.	0.	0.	0.	2.	1.	1.	2.	1.	2.	1.	0.
4	7	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	2.	1.	0.	0.	0.	0.
5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	2	6.	1.	1.	0.	0.	1.	5.	3.	10.	3.	7.	5.	5.	3.	4.	3.
5	3	22.	14.	3.	8.	2.	9.	22.	41.	47.	43.	22.	21.	22.	10.	27.	28.
5	4	17.	9.	3.	5.	2.	4.	4.	15.	40.	42.	34.	20.	15.	22.	17.	23.
5	5	5.	1.	0.	0.	0.	0.	0.	1.	10.	24.	15.	15.	16.	28.	17.	10.
5	6	0.	0.	0.	0.	0.	0.	0.	0.	1.	8.	6.	8.	8.	22.	4.	0.
5	7	0.	0.	0.	0.	0.	0.	0.	0.	6.	4.	10.	6.	2.	12.	0.	0.
6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	2	0.	1.	1.	0.	0.	0.	3.	2.	1.	3.	1.	2.	5.	2.	3.	0.
6	3	1.	4.	2.	2.	3.	2.	3.	7.	10.	9.	7.	13.	14.	17.	9.	9.
6	4	2.	0.	0.	2.	1.	0.	6.	14.	14.	10.	6.	6.	15.	34.	13.	9.
6	5	2.	0.	0.	3.	0.	0.	0.	4.	6.	3.	5.	3.	9.	50.	10.	1.
6	6	0.	0.	0.	0.	0.	0.	0.	1.	2.	5.	0.	5.	8.	22.	1.	0.
6	7	0.	0.	0.	0.	0.	0.	0.	0.	3.	3.	2.	1.	1.	10.	0.	0.
7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	2	4.	5.	2.	1.	1.	0.	1.	1.	5.	8.	8.	4.	8.	3.	6.	3.
7	3	9.	9.	5.	7.	3.	4.	9.	22.	21.	26.	17.	16.	5.	10.	16.	12.
7	4	2.	7.	2.	4.	2.	3.	3.	14.	15.	9.	7.	4.	8.	16.	14.	9.
7	5	1.	0.	4.	1.	0.	0.	3.	1.	3.	0.	3.	4.	6.	20.	11.	4.
7	6	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.	2.	7.	6.	0.
7	7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.

TOTAL NUMBER OF HOURS
USED = 1856 MISSING = 201 CALM = 0 VARIABLE = 22

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 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 during the first and the second 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 data was obtained from calculations using the LADTAP computer code.

Gaseous Effluents - The NRC GASPAR computer code was used to calculate the doses at 1.2 mile site boundary and Taylor Flats location 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 updated annual averaged X/Q and D/Q values, site specific input parameters pertaining to food productions (e.g., goat and cow grazing periods, etc.) Since no residential area and crops are present at the site boundary, the exposure pathways considered for the 1.2 mile site boundary were plume submersion, ground and inhalation, with the child age group being the maximum exposed individual.

The air doses at 1.2 miles were used to verify compliance with Technical Specifications. To verify compliance with 10CFR50, Appendix I limits the doses at Taylor Flats, were used with the infant age group being the maximum exposed individual. Taylor Flats is the nearest residential location with a significant home garden food production. (4.2 miles SE) Table 6-4 lists the doses at the two special locations.

6.1 EXPOSURE TO THE PUBLIC WITHIN 1.2 MILE EXCLUSION AREA

Within the WNP-2 exclusion area there are five special locations where the dose from gaseous effluents are routinely calculated. These areas are unique in that access is not completely controlled to them by WNP-2 personnel. These areas are:

1. Wye burial site - normally controlled by DOE
2. The DOE train has tracks through the area
3. The BPA Ashe Substation
4. The WNP-2 Visitor Center
5. WNP-2 Parking Lot
6. WNP-1/4 parking lot and construction site

The WNP-2 Visitor Center and the WNP-2 parking lot were assumed to be the location with the highest potential for exposure to a member of the public due to their close proximity to the plant. Although the workers at the BPA Ashe Substation have a higher assumed occupancy, 2000 hours/year versus 8 hours/year for the Visitor Center, they are not considered members of the public as defined in the Technical Specifications because they are "occupationally associated with the plant".

The ODCM assumes an eight (8) hour/year occupancy by a non-Supply System individual at the Visitor Center. This resulted in a calculated whole body dose committment from the noble gases for the first and second quarters of 2.5 E-04 mrem and 1.7 E-04 mrem respectively at the WNP-2 Visitor Center. The maximum organ dose commitment from noble gases was: 4.6 E-04 mrem for the first quarter and 3.7 E-04 mrem for the second quarter.

The whole body dose commitment from iodines and particulates was 6.3 E-05 mrem and 5.8 E-05 mrem for the first and second quarters respectively. The maximum organ dose commitment from the iodines and particulates for the first and second quarters were 1.4 E-04 mrem and 1.6 E-04 mrem respectively.

Table 6-1

MAXIMUM INDIVIDUAL DOSES FROM WNP-2 LIQUID EFFLUENTS(1)

First Quarter 1985				
Pathway	Whole Body (mrem/qtr)	1985 Cumulative Whole Body (mrem/yr)	Max. Organ. (mrem/qtr)	1985 Cumulative Max. Organ. (mrem/yr)
Drinking	1.8E-06	1.8E-06	3.8E-06	3.8E-06
Shoreline	5.7E-08	5.7E-08	6.7E-08	6.7E-08
Fishing	1.1E-03	1.1E-03	1.8E-03	1.8E-03
Swimming	-0-	-0-	-0-	-0-
Boating	-0-	-0-	-0-	-0-
Leafy Veg.(2)	-0-	-0-	-0-	-0-
Vegetables(2)	-0-	-0-	-0-	-0-
Milk(2)	-0-	-0-	-0-	-0-
Meat(2)	-0-	-0-	-0-	-0-
Total	1.1E-03	1.1E-03	1.8E-03	1.8E-03

Second Quarter 1985				
Pathway	Whole Body (mrem/qtr)	1985 Cumulative Whole Body (mrem/yr)	Max. Organ. (mrem/qtr)	1985 Cumulative Max. Organ. (mrem/yr)
Drinking	1.2E-06	3.0E-06	1.4E-06	5.2E-06
Shoreline	3.1E-07	3.7E-07	3.1E-07	3.8E-07
Fishing	1.8E-03	2.9E-03	3.1E-03	4.9E-03
Swimming	1.4E-09	1.4E-09	1.4E-09	1.4E-09
Boating	1.8E-09	1.8E-09	1.8E-09	1.8E-09
Leafy Veg.	3.7E-07	3.7E-07	1.1E-06	1.1E-06
Vegetables	2.2E-06	2.2E-06	5.5E-06	5.5E-06
Milk	3.3E-05	3.3E-05	4.5E-05	4.5E-05
Meat	1.2E-07	1.2E-07	2.8E-07	2.8E-07
Total	1.8E-03	2.9E-03	3.2E-03	5.0E-03

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

(2) No food was grown locally during the first quarter of 1985.

Table 6-2

AVERAGE INDIVIDUAL DOSES FROM WNP-2 LIQUID EFFLUENTS(1)

1ST AND 2ND QUARTERS

	Total per 1st Quarter		Total per 2nd Quarter	
Pathway	Max. Organ. (mrem)	Whole Body (mrem)	Max. Organ. (mrem)	Whole Body (mrem)
Drinking Water	2.3E-06	6.9E-07	8.4E-07	6.9E-07
Shoreline	2.2E-09	1.9E-09	1.3E-08	1.0E-08
Fishing	4.6E-06	2.6E-06	7.7E-06	4.5E-06
Swimming	-0-	-0-	1.5E-10	1.5E-10
Boating	-0-	-0-	8.4E-11	8.4E-11
Vegetables(2)	-0-	-0-	9.8E-05	3.8E-05
Leafy vegetables(2)	-0-	-0-	9.4E-05	3.1E-05
Milk(2)	-0-	-0-	2.9E-06	2.1E-06
Meat(2)	-0-	-0-	1.2E-06	5.1E-07
Total	6.9E-06	3.3E-06	2.0E-04	7.7E-05

(1) Age group - Adult. Average individual residing at Richland.

(2) No food was grown locally during the first quarter of 1985.

Table 6-3

50-MILE POPULATION DOSES FROM WNP-2 LIQUID EFFLUENTS

1ST AND 2ND QUARTERS 1985

	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	2.2E-06	1.2E-06	3.2E-06	2.2E-06
Drinking water	9.1E-05	2.8E-05	3.4E-05	2.8E-05
Shoreline	7.2E-07	6.2E-07	4.0E-06	3.4E-06
Swimming	-0-	-0-	4.7E-08	4.7E-08
Boating	-0-	-0-	1.1E-08	1.1E-08
Vegetables(1)	-0-	-0-	9.8E-05	3.8E-05
Leafy vegetables(1)	-0-	-0-	9.4E-05	3.1E-05
Milk(1)	-0-	-0-	2.9E-06	2.1E-06
Meat(1)	-0-	-0-	1.2E-06	5.1E-07
Total	9.4E-05	3.0E-05	2.4E-04	1.1E-04

(1) No food was grown locally during the first quarter of 1985.

Table 6-4

SEMI-ANNUAL SUMMARY OF DOSES FROM WNP-2 GASEOUS EFFLUENTS

Location: 1.2 miles site boundary

Reporting Period: First and Second Quarter, 1985

Age Group: Child

	First Quarter	Second Quarter	Cumulative	Balance to Year-End
Beta air dose (mrad)	6.5E-03	3.1E-02	3.75E-02	1.99E+01
Gamma air dose (mrad)	5.6E-03	4.2E-02	4.76E-02	9.95E+00
Whole body dose from Noble gases (mrem)*	3.7E-03	2.8E-02	3.2E-02	4.99E+02
Maximum organ dose from Noble gases (mrem)*	8.6E-03	5.7E-02	6.6E-02	2.99E+03
Whole body dose from Iodines and particulates (mrem)**	9.9E-03	1.0E-02	1.99E-02	1.49E+03
Maximum organ dose from Iodines and particulates (mrem)**	2.1E-02	2.7E-02	4.8E-02	1.49E+03

Location: Taylor Flats, 4.2 miles SE

Reporting Period: First and Second Quarters, 1985

Age Group: Infant

	First Quarter	Second Quarter	Cumulative	Balance to Year-End
Whole body dose (mrem)***	1.2E-03	1.9E-03	3.1E-03	1.49E+01
Maximum organ dose (mrem)***	1.3E-02	8.6E-03	2.2E-02	1.49E+01
50 mile population whole body dose (man-rem)	9.8E-03	2.2E-02		
50 mile maximum organ dose (man-rem)	2.0E-02	8.7E-02		

* Plume submersion exposure pathway.
** Inhalation and ground contamination exposure pathways.
*** Ground, goat milk, and inhalation exposure pathways.

7.0 REVISIONS TO THE ODCM

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