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

WNP-2 RADIOACTIVE EFFLUENT RELEASE REPORT

JANUARY THROUGH DECEMBER 1998

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

LICENSE NO. NPF-21

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1.0 Introduction

This report is submitted in compliance with 10CFR50.36a(a)(2) and Technical Specification 5.6.3. It includes a summary of the quantities of radioactive liquid and gaseous effluents and solid radwaste released from WNP-2 during the previous twelve months of operation. Effluent data is summarized on a quarterly basis.

2.0 Liquid Effluents

The radwaste liquid effluents were released in "batch mode" during the reporting period. Table 2-0 summarizes the number and duration of batch releases, dilution flow and calculated maximum individual doses. The liquid batch releases were recirculated before sampling. A representative sample was obtained and analyzed for each batch release. A composite of the batch samples for each month was analyzed for tritium, and a composite sample for each quarter in which liquids were discharged was analyzed for strontium 89, strontium 90, and iron 55. The methods used for measuring the total radioactivity were gamma spectroscopy, liquid scintillation and proportional counting. Table 2-1 provides a summation of all liquid releases during this reporting period.

The average flow rate of the Columbia River during January through December 1998 was 1.15E+05 cubic feet per second.

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

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

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

There were no liquid effluent monitors which were out of service for more than 30 days.

There were no abnormal releases.

Liquid Effluent Tables

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

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year
Number of Batch Releases	9.00E+00	3.30E+01	5.00E+00	0.00E+00	4.70E+01
Discharge Duration in Hours					
Total	2.06E+01	7.10E+01	1.11E+01	0.00E+00	1.03E+02
Average	2.29E+00	2.15E+00	2.23E+00	0.00E+00	1.67E+00
Minimum	1.98E+00	1.13E+00	2.08E+00	0.00E+00	0.00E+00
Maximum	2.77E+00	2.68E+00	2.30E+00	0.00E+00	2.77E+00
Dilution Flow					
Gallons	7.82E+05	1.03E+07	1.23E+06	0.00E+00	1.23E+07
Maximum Individual Dose (mrem)					
Whole Body (Adult)	5.42E-05	7.41E-04	1.59E-04	0.00E+00	9.52E-04
ODCM Limit	1.5	1.5	1.5	1.5	3.0
% of Limit	3.61E-05	4.94E-04	1.06E-04	0.00E+00	3.17E-04
Organ	1.14E-04	1.37E-03	1.47E-03	0.00E+00	2.95E-03
ODCM Limit	5	5	5	5	10
% of Limit	2.28E-05	2.73E-04	2.95E-04	0.00E+00	2.95E-04

ODCM Limits	
Batch	Less than the concentration specified in 10 CFR 20, Appendix B, Table II, Column 2, and less than 2.0E-04 µCi/cc dissolved or entrained noble gases.
Calendar Quarter	Less than or equal to 1.5 mrem to the total body, and less than or equal to 5 mrem to any organ.
Calendar Year	Less than or equal to 3 mrem to the total body, and less than or equal to 10 mrem to any organ.

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

Report Period: January -- December 1998

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year	Est Total Error* %
A. Fission and activation products						
Total release (not including tritium, gases, alpha) (Ci)	1.08E-03	7.58E-03	3.11E-03	N/A	1.18E-02	2.20E+01
Average diluted concentration during period (µCi/ml)	2.67E-07	1.78E-07	5.90E-07	N/A	2.27E-07	
Percent of MPC limit (%)	8.29E-03	4.71E-03	1.74E-02	N/A	6.28E-03	
B. Tritium						
Total release (Ci)	6.25E-01	3.30E+00	2.92E+00	N/A	6.85E+00	2.20E+01
Average diluted concentration during period (µCi/ml)	1.55E-04	7.74E-05	5.54E-04	N/A	1.32E-04	
Percent of MPC limit (%)	5.17E-02	2.58E-02	1.85E-01	N/A	4.40E-02	
C. Dissolved and entrained gases						
Total release (Ci)	<LLD	<LLD	<LLD	N/A	0.00E+00	2.20E+01
Average diluted concentration during period (µCi/ml)	<LLD	<LLD	<LLD	N/A	0.00E+00	
Percent of limit (%)	<LLD	<LLD	<LLD	N/A	0.00E+00	
D. Gross alpha radioactivity						
Total release (Ci)	<LLD	<LLD	<LLD	N/A	0.00E+00	5.00E+01
E.						
Volume of waste prior to dilution (liters)	5.35E+05	1.88E+06	3.01E+05	0.00E+00	2.71E+06	1.50E+01
F.						
Volume of dilution water used during period (liters)	3.49E+06	4.08E+07	4.97E+06	0.00E+00	4.92E+07	1.50E+01

* At 95% confidence level

See Table 2-3 for LLD values.

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

Report Period: January -- December 1998

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
A. Fission and activation products					
strontium-89	3.27E-06	1.99E-06	1.02E-06	N/A	6.27E-06
strontium-90	1.69E-06	1.03E-06	6.80E-07	N/A	3.39E-06
cesium-134	<LLD	<LLD	<LLD	N/A	<LLD
cesium-137	<LLD	9.72E-05	<LLD	N/A	9.72E-05
iodine-131	<LLD	<LLD	<LLD	N/A	<LLD
cobalt-58	6.12E-05	4.02E-04	5.32E-05	N/A	5.16E-04
cobalt-60	7.24E-04	4.99E-03	2.47E-03	N/A	8.18E-03
iron-59	<LLD	<LLD	<LLD	N/A	<LLD
zinc-65	1.41E-04	1.10E-03	3.90E-04	N/A	1.63E-03
manganese-54	3.84E-05	7.98E-04	1.06E-04	N/A	9.43E-04
chromium-51	5.69E-05	4.80E-05	<LLD	N/A	1.05E-04
zirconium-niobium-95	<LLD	6.49E-05	7.82E-05	N/A	1.43E-04
molybdenum-99	<LLD	<LLD	<LLD	N/A	<LLD
technetium-99m	<LLD	<LLD	<LLD	N/A	<LLD
barium-lanthanum-140	<LLD	<LLD	<LLD	N/A	<LLD
cerium-141	<LLD	<LLD	<LLD	N/A	<LLD
cerium-144	<LLD	<LLD	<LLD	N/A	<LLD
iron-55	4.88E-05	5.83E-05	5.56E-06	N/A	1.13E-04
Others					
sodium-24	<LLD	2.92E-05	<LLD	N/A	2.92E-05
Total for period above*	1.08E-03	7.58E-03	3.11E-03	0.00E+00	1.18E-02
B. Dissolved and entrained gases					
xenon-133	<LLD	<LLD	<LLD	N/A	<LLD
xenon-135	<LLD	<LLD	<LLD	N/A	<LLD
C. Tritium					
tritium	6.25E-01	3.30E+00	2.92E+00	N/A	6.85E+00

* Less than (<) values are not included in the totals.
See Table 2-3 for LLD values.

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

Report Period: January -- December 1998

Fission and Activation Products

Nuclide	LLD(µCi/cc)
strontium-89	2.00E-10
strontium-90	3.60E-09
cesium-134	8.60E-09
cesium-137	9.70E-09
barium-lanthanum-140	7.60E-09
molybdenum-99	1.20E-07
cerium-141	6.10E-09
cerium-144	1.00E-07
cobalt-58	2.50E-09
cobalt-60	5.20E-09
Iron-59	8.10E-09
chromium-51	4.70E-08
manganese-54	3.40E-09
zinc-65	6.20E-09
iodine-131	6.00E-09
iodine-133	2.10E-09
OTHERS	LLD(µCi/cc)
sodium-24	3.70E-09
copper-64	7.40E-07
antimony-124	8.80E-09
antimony-125	4.30E-08

Dissolved and entrained gasses

Nuclide	LLD(µCi/cc)
xenon-133	2.10E-08
xenon-135	5.10E-09

3.0 Gaseous Effluents

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

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

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

Radioactivity measurements for gaseous effluent releases are performed for fission and activation gases by collecting the samples in a marinelli beaker and analyzing them using gamma spectroscopy. Tritium is analyzed by collecting the sample on a desiccant, distillation, and liquid scintillation counting. Particulates and iodines are sampled using particulate filters and charcoal cartridges. Both are analyzed using gamma spectroscopy. E-bar was 0.763 MeV per disintegration.

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

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

Table 3-0 summarizes the results of these calculations.

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

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

The ODCM limits are listed in Table 3-0.

WNP-2 had a permanent laundry facility located approximately 0.75 miles from the reactor building. This facility is not presently being used for laundry processing, and may be converted for other uses in the future. (Reference PTL 150969)

The backup chemistry laboratory is located within the Emergency Operations Facility (EOF). The radiochemical hood within the backup chemistry lab contains HEPA filters and is monitored for radioactive releases when in operation. Gamma spectrometry indicated no radioactive materials present other than that attributable to natural background.

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

A review of a completed surveillance procedure identified that the sample low flow alarm for the Main Plant Vent effluent sampler did not meet the acceptance criteria. This condition existed between 11/4/97 and 2/9/98. The sample flow rate is continuously recorded. Evaluation of the recorded flow rate indicated that during this period of time the sampling system was operating normally, and had no failure which would have required this alarm to operate. There was no impact on effluent calculations. Corrective actions to prevent recurrence have been completed. (Reference: PERA 298-0200-02)

During the performance of a calibration of the Main Plant Vent exhaust flow rate instrumentation the flow rate device was technically out of service for a period of greater than four hours without performing the required compensatory measure of estimating the exhaust flow rate. The flow rate of the system was not modified during this time, and so this failure had no impact on effluent calculations. Corrective actions to prevent recurrence have been completed. (Reference: PERA 298-2146-02)

Gaseous Effluent Tables

Table 3-0 Dose

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year
		Noble Gas (mrad)			
Gamma Air Dose	6.31E-04	8.76E-05	6.88E-04	5.65E-04	1.97E-03
ODCM Limit	5	5	5	5	10
% of Limit	1.26E-02	1.75E-03	1.38E-02	1.13E-02	1.97E-02
Beta Air Dose	2.28E-04	3.08E-05	2.48E-04	2.03E-04	7.10E-04
ODCM Limit	10	10	10	10	20
% of Limit	2.28E-03	3.08E-04	2.48E-03	2.03E-03	3.55E-03
	Iodine-131, Iodine-133, Tritium, and Particulates with half-lives greater than eight days. (mrem)				
Organ Dose	1.61E-03	2.59E-04	1.05E-03	9.04E-04	3.82E-03
ODCM Limit	7.5	7.5	7.5	7.5	15
% of Limit	2.15E-02	3.45E-03	1.40E-02	1.21E-02	2.55E-02

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

Report Period: January -- December 1998

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
A. Fission gases					
krypton-85	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-85m	1.43E-01	5.81E-02	1.21E-01	8.42E-02	4.07E-01
krypton-87	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-88	5.32E-02	5.32E-02	2.80E-02	<LLD	1.34E-01
xenon-133	1.85E-01	3.13E-02	1.36E-01	1.15E-01	4.66E-01
xenon-133m	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-135	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-135m	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-138	<LLD	<LLD	<LLD	<LLD	<LLD
Others					
argon-41	4.74E+00	9.65E-01	4.46E+00	5.36E+00	1.55E+01
Total for period *	5.12E+00	1.11E+00	4.74E+00	5.56E+00	1.65E+01
B. Iodines					
iodine-131	1.35E-04	<LLD	<LLD	<LLD	1.35E-04
iodine-132	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-133	6.26E-05	<LLD	<LLD	<LLD	6.26E-05
iodine-134	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-135	<LLD	<LLD	<LLD	<LLD	<LLD
Total for period *	1.97E-04	<LLD	<LLD	<LLD	1.97E-04

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

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

Report Period: January -- December 1998

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
C. Particulates					
strontium-89	8.84E-06	<LLD	2.89E-06	6.79E-06	1.85E-05
strontium-90	<LLD	<LLD	<LLD	<LLD	<LLD
cesium-134	<LLD	<LLD	<LLD	<LLD	<LLD
cesium-137	<LLD	<LLD	<LLD	<LLD	<LLD
barium-lanthanum-140	<LLD	<LLD	<LLD	<LLD	<LLD
molybdenum-99	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-141	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-144	<LLD	<LLD	<LLD	<LLD	<LLD
cobalt-58	<LLD	<LLD	9.68E-06	<LLD	9.68E-06
cobalt-60	3.26E-05	2.37E-04	3.56E-05	3.62E-05	3.41E-04
iron-59	<LLD	<LLD	<LLD	<LLD	<LLD
manganese-54	<LLD	1.14E-05	<LLD	<LLD	1.14E-05
zinc-65	<LLD	<LLD	<LLD	<LLD	<LLD
Others					
NONE					
Total for period*	4.15E-05	2.48E-04	4.82E-05	4.30E-05	3.81E-04
Others with T 1/2 < 8 days					
None					
Total with T 1/2 < 8 days*					
D. Tritium					
tritium	5.5E-01	4.6E-01	4.6E-01	4.6E-01	1.6E+00

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

See Table 3-6 for LLD values.

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

Report Period: January -- December 1998

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
A. Fission gases					
krypton-85	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-85m	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-87	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-88	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-133	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-133m	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-135	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-135m	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-138	<LLD	<LLD	<LLD	<LLD	<LLD
Others					
argon-41	<LLD	<LLD	<LLD	<LLD	<LLD
Total for period *	<LLD	<LLD	<LLD	<LLD	<LLD
B. Iodines					
iodine-131	<LLD	2.91E-06	<LLD	<LLD	2.91E-06
iodine-132	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-133	3.11E-05	<LLD	<LLD	7.50E-06	3.86E-05
iodine-134	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-135	<LLD	<LLD	<LLD	<LLD	<LLD
Total for period *	3.11E-05	2.91E-06	<LLD	7.50E-06	4.15E-05

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

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

Report Period: January -- December 1998

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
C. Particulates					
strontium-89	4.50E-06	<LLD	4.46E-06	3.99E-06	1.30E-05
strontium-90	<LLD	4.73E-07	6.11E-07	<LLD	1.08E-06
cesium-134	<LLD	<LLD	<LLD	<LLD	<LLD
cesium-137	<LLD	<LLD	<LLD	<LLD	<LLD
barium-lanthanum-140	<LLD	<LLD	<LLD	<LLD	<LLD
molybdenum-99	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-141	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-144	<LLD	<LLD	<LLD	<LLD	<LLD
cobalt-58	<LLD	<LLD	<LLD	<LLD	<LLD
cobalt-60	<LLD	<LLD	<LLD	<LLD	<LLD
iron-59	<LLD	<LLD	<LLD	<LLD	<LLD
manganese-54	<LLD	<LLD	<LLD	<LLD	<LLD
zinc-65	<LLD	<LLD	<LLD	<LLD	<LLD
Others					
NONE					<LLD
Total for period*	4.50E-06	4.73E-07	5.08E-06	3.99E-06	1.40E-05
Others with T 1/2 < 8 days					
NONE	No nuclides with half-lives less than 8 days were identified				
Total with T 1/2 < 8 days*	No nuclides with half-lives less than 8 days were identified				
D. Tritium					
tritium	3.83E+00	1.81E+00	2.70E+00	1.08E+00	9.41E+00

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

See Table 3-6 for LLD values.

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

Report Period: January -- December 1998

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
A. Fission gases					
krypton-85	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-85m	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-87	<LLD	<LLD	<LLD	<LLD	<LLD
krypton-88	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-133	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-133m	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-135	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-135m	<LLD	<LLD	<LLD	<LLD	<LLD
xenon-138	<LLD	<LLD	<LLD	<LLD	<LLD
Others					
NONE					
Total for period *	<LLD	<LLD	<LLD	<LLD	<LLD
B. Iodines					
iodine-131	<LLD	6.26E-07	<LLD	<LLD	6.26E-07
iodine-132	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-133	8.87E-06	<LLD	3.90E-06	<LLD	1.28E-05
iodine-134	<LLD	<LLD	<LLD	<LLD	<LLD
iodine-135	<LLD	<LLD	<LLD	<LLD	<LLD
Total for period *	8.87E-06	6.26E-07	3.90E-06	<LLD	1.34E-05

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

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

Report Period: January -- December 1998

Nuclides Released	1st Quarter (Ci)	2nd Quarter (Ci)	3rd Quarter (Ci)	4th Quarter (Ci)	Year (Ci)
C. Particulates					
strontium-89	<LLD	<LLD	<LLD	<LLD	
strontium-90	<LLD	<LLD	<LLD	<LLD	<LLD
cesium-134	<LLD	<LLD	<LLD	<LLD	<LLD
cesium-137	<LLD	<LLD	<LLD	<LLD	<LLD
barium-lanthanum-140	<LLD	<LLD	<LLD	<LLD	<LLD
molybdenum-99	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-141	<LLD	<LLD	<LLD	<LLD	<LLD
cerium-144	<LLD	<LLD	<LLD	<LLD	<LLD
cobalt-58	<LLD	<LLD	<LLD	<LLD	<LLD
cobalt-60	<LLD	<LLD	<LLD	<LLD	<LLD
iron-59	<LLD	<LLD	<LLD	<LLD	<LLD
manganese-54	<LLD	<LLD	<LLD	<LLD	<LLD
zinc-65	<LLD	<LLD	<LLD	<LLD	<LLD
Others					
NONE	No other nuclides were identified				
Total for period*	<LLD	<LLD	<LLD	<LLD	0.00E+00
Others with T 1/2 < 8 days					
NONE	No other nuclides were identified				
Total with T 1/2 < 8 days*	No nuclides with half-lives less than 8 days were identified				
D. Tritium					
tritium	1.02E-01	5.89E-02	8.12E-02	7.63E-01	1.01E+00

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

Table 3-4 Summation of all Gaseous Releases

Report Period: January -- December 1998

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year	Est Total Error*%
A. Fission and activation gases						
Total release (Ci)	5.12E+00	1.11E+00	4.74E+00	5.56E+00	1.65E+01	3.60E+01
Average release rate (µCi/s)	6.58E-01	1.41E-01	5.96E-01	7.00E-01	5.24E-01	
Percent of ODCM limit (%)	**	**	**	**	**	
B. Iodines						
Total I-131 (Ci)	1.35E-04	3.53E-06	<LLD	<LLD	1.38E-04	3.60E+01
Average release rate (µCi/s)	1.71E-05	4.50E-07	<LLD	<LLD	4.38E-06	
Percent of ODCM limit (%)	**	**	**	**	**	
C. Particulates						
Particulates with half-lives >8 days (Ci)	4.60E-05	2.49E-04	5.33E-05	4.70E-05	3.95E-04	3.60E+01
Average release rate (µCi/s)	5.84E-06	3.16E-05	6.70E-06	5.91E-06	1.25E-05	
Percent of ODCM limit (%)	**	**	**	**	**	
Gross alpha radioactivity	1.32E-05	6.30E-06	5.77E-06	4.91E-06	3.02E-05	
D. Tritium						
Total release (Ci)	4.48E+00	2.33E+00	2.92E+00	2.31E+00	1.20E+01	3.60E+01
Average release rate (µCi/s)	5.70E-01	2.96E-01	3.67E-01	2.90E-01	3.82E-01	
Percent of ODCM limit (%)	**	**	**	**	**	

* At 95% confidence level
** ODCM limits are based on dose.
See Table 3-0 for percent of ODCM limits.

Table 3-5 Gaseous Batch Releases

Report Period: January -- December 1998

Type	Number	Total Time (hr.)	Maximum Time (hr.)	Minimum Time (hr.)	Mean Time (hr.)
Purge	6.00E+00	9.96E+01	5.72E+01	2.33E+00	1.66E+01
Vent	5.90E+01	9.48E+01	9.08E+00	5.67E-01	1.61E+00

Table 3-6 Gaseous Lower Limit of Detection

Reporting Period: January -- December 1998

Fission Gases

Nuclide	LLD (µCi/cc)
krypton-85	2.60E-07
krypton-85m	3.70E-07
krypton-87	3.00E-09
krypton-88	1.30E-08
xenon-133	1.10E-08
xenon-135	1.32E-09
xenon-135m	4.00E-09
xenon-138	1.20E-08
argon-41	2.60E-09
xenon-137	6.70E-08

Iodines

Nuclide	LLD (µCi/cc)
iodine-131	2.40E-13
iodine-132	3.90E-13
iodine-133	3.50E-13
iodine-134	5.60E-13
iodine-135	1.60E-12

Particulates

Nuclide	LLD (µCi/cc)
strontium-89	5.50E-15
strontium-90	4.20E-15
cesium-134	5.30E-13
cesium-137	3.20E-13
barium-lanthanum-140	1.10E-12
molybdenum-99	3.20E-12
cerium-141	2.30E-13
cerium-144	1.60E-12
cobalt-58	3.20E-13
cobalt-60	6.00E-13
iron-59	1.10E-12
manganese-54	3.70E-13
zinc-65	1.10E-12
Gross Alpha	4.30E-16

4.0 Solid Radwaste:

Required by ODCM

Class A

1. Container Volumes

*	B-25 Steel Box	92.5
*	EL-142 Poly HIC	132.4 ft^3
*	ES-190 Steel Liner	170.2 ft^3
*	Sea Land Container (CVAN)	N/A

2. Total Curies

* 8.94E+01 Ci

3. Principal Radionuclides

Nuclide	Percent	Curies
Co-60	5.49E+01	4.91E+01
Zn-65	1.23E+01	1.10E+01
Fe-55	7.32E+00	6.54E+00
Mn-54	6.60E+00	5.90E+00
Cr-51	4.81E+00	4.30E+00
Cs-137	3.92E+00	3.51E+00
Co-58	3.27E+00	2.92E+00
C-14	2.18E+00	1.95E+00
Ni-63	1.60E+00	1.43E+00
Nb-95	1.02E+00	9.08E-01
Sb-125	6.10E-01	5.45E-01
H-3	5.62E-01	5.02E-01
Zr-95	5.14E-01	4.50E-01

Cs-134	2.26E-01	2.02E-01
Fe-59	6.31E-02	5.64E-02

4. Source

* Resins 8.00E+01 Ci
* DAW 9.40E+00 Ci
* Irradiated Components None
* Other None

5. Type of Container

* All containers shipped as LSA, SCO or Radioactive material, n.o.s. in IP-1, IP-2 or Type A (including casks) as appropriate.

6. Solidification Agent

* None

Class B

None

Class C

None

Required by Reg. Guide 1.21

Table 4-1, WNP-2 Solid Waste Shipments, January -- December, 1998.
Solid waste shipped offsite for burial or disposal.

Type of Waste

Waste Stream	Unit	Annual Cumulative	Est. Total Error %
Spent resins, filter sludges, evaporator bottoms, etc.	m^3	1.15E+02	
	Ci	8.00E+01	2.5E+01%
Dry Active Waste	m^3	5.82E+01	
	Ci	9.40E+00	2.5E+01%

Irradiated Components -- None

Other Waste -- None

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

a. Dewatered Spent Resins -- All Classes

Nuclide	%	Curies
Co-60	5.74E+01	4.59E+01
Zn-65	1.19E+01	9.53E+00
Fe-55	7.41E+00	5.93E+00
Mn-54	7.12E+00	5.70E+00
Cs-137	4.24E+00	3.40E+00
Co-58	3.21E+00	2.57E+00
C-14	2.43E+00	1.94E+00
Ni-63	1.69E+00	1.35E+00

Cr-51	1.26E+00	1.01E+00
Nb-95	1.14E+00	9.08E-01
Sb-125	6.01E-01	4.81E-01
Zr-95	5.75E-01	4.60E-01
H-3	5.51E-01	4.41E-01
Cs-134	2.52E-01	2.02E-01
Fe-59	7.05E-02	5.64E-02

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

Nuclide	%	Curies
Cr-51	3.53E+01	3.42E+00
Co-60	3.35E+01	3.25E+00
Zn-65	1.52E+01	1.47E+00
Fe-55	6.64E+00	6.24E-01
Co-58	3.70E+00	3.58E-01
Mn-54	2.15E+00	2.09E-01
Cs-137	1.22E+00	1.18E-01
Ni-63	8.52E-01	8.25E-02
H-3	7.69E-01	7.44E-02
Sb-125	6.83E-01	6.61E-02
Ce-144	7.82E-02	7.57E-03

c. Irradiated Components -- None

d. Other Waste -- None

Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
19	Tractor - Trailer via Public Highway	US Ecology, Inc. P.O. Box 638

		Hanford Res. Richland, WA. 99352
14*	Tractor - Trailer via Public Highway	ATG, Inc. 2025 Battelle Blvd. Richland, WA. 99352

*Fourteen radioactive materials shipments were made to ATG, portions of which were sent to US Ecology as waste shipments after the completion of volume reduction activities.

5.0 Meteorology

The meteorological data contained in Tables 5-1 through 5-10 were obtained from the WNP-2 meteorological tower located 2500 ft (762 m) west of WNP-2. Data was recovered from instruments at the 33 ft (10 m) and 245 (75 m) levels. The meteorological data is a composite file from the automated data recovery systems for the calendar year 1998. Data is archived on the Supply System Local Area Network.

Precipitation was slightly above normal in 1998. Total precipitation measured at the Hanford Meteorology Station was 6.5 inches (16.4 cm), which is 103% of the normal 6.3 inches (15.9 cm). Snowfall for January through March of the year was 6.3 inches (16 cm), 102% of the normal 6.2 inches (15.7 cm), although all the measurable snowfall for that period was during the month of January. The total snowfall for the November-December period was 12% of the normal 7.5 inches (19.1 cm) at 0.9 inches (2.3 cm), all of which occurred in December.

Calendar year 1998 was warmer than normal, averaging 56.4°F (13.6°C) or 3.1°F (1.8°C) above normal. The warmest day, July 27, had a high temperature of 112°F (44.4°C). The coldest day occurred on December 21, with a low temperature of -1°F (-18.3°C). The occurrence of fog, haze, and blowing dust in 1998 was similar to that observed in previous years. In summary, the dispersive environment for WNP-2 for 1998 was near normal.

Joint data recovery for 1998 was 94.1%. Scheduled power outages at WNP-2 coincided with the outages of the data recovery system. Lightning strikes and thunderstorms were of minor concern and had no significant effect on meteorological tower operations

Tables 5-1 through 5-8 list the joint frequency distributions at the 33 ft and 245 ft levels by quarter for 1998. Table 5-9 and 5-10 list the annual joint frequency distributions for those levels for 1998. The NRC stability classes A through G and seven wind categories along with the 16 wind sectors were used to prepare each joint frequency table. The annual joint frequency tables should be used to evaluate any vents and purges during 1998 as the releases were random in time.

Calibrations performed in 1998 produced no values exceeding WNP-2 FSAR meteorological equipment tolerances and required no corrections be applied to the raw data. Data below 0.07 MPH has been determined to result from system malfunction and is not included in the results.

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

JOINT FREQUENCY DISTRIBUTION FOR THE TIME PERIOD FROM HOUR 00 ON 01/01/98 TO HOUR 23 ON 03/31/98
The total hours are 2160, 2110 hours read and 50 missing.

NRC CATEGORY A

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

NRC CATEGORY B

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

NRC CATEGORY C

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

NRC CATEGORY D

	MPH						
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	8	25	18	6	1	0
11.25	0	4	9	3	0	0	0
33.75	0	4	5	3	4	0	0
56.25	0	2	3	0	0	0	0
78.75	0	3	0	0	0	0	0
101.25	0	1	0	1	0	0	0
123.75	1	2	9	9	0	0	0
146.25	0	3	7	16	3	0	0
168.75	0	4	12	17	7	1	0
191.25	0	1	11	18	19	10	1
213.75	0	5	7	3	3	2	2
236.25	0	3	5	3	4	0	0
258.75	0	6	4	4	0	0	0
281.25	1	5	8	7	6	0	3
303.75	0	13	33	36	12	0	0
326.25	0	5	31	36	14	0	0

NRC CATEGORY E

	MPH						
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	12	20	2	2	0	0
11.25	1	6	16	3	0	0	0
33.75	0	4	9	2	0	0	0
56.25	0	5	1	0	0	0	0
78.75	0	1	1	0	0	0	0
101.25	0	4	1	1	0	0	0
123.75	0	3	7	9	3	0	0
146.25	2	3	21	38	15	0	0
168.75	0	8	20	29	22	0	0
191.25	0	8	10	14	28	7	3
213.75	0	7	7	6	11	12	1
236.25	0	8	9	4	1	1	0
258.75	0	7	4	1	1	0	0
281.25	0	13	18	27	16	2	0
303.75	1	9	48	40	13	0	0
326.25	2	7	42	12	2	1	0

NRC CATEGORY F

	MPH						
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	1	15	25	1	0	0	0
11.25	1	3	7	0	0	0	0
33.75	0	4	5	3	0	0	0
56.25	2	5	0	0	0	0	0
78.75	0	1	1	0	0	0	0
101.25	2	2	1	0	0	0	0
123.75	0	2	4	4	2	0	0
146.25	0	4	28	31	5	0	0
168.75	0	9	29	19	7	0	0
191.25	0	9	19	8	0	3	0
213.75	0	7	3	3	0	0	0
236.25	0	7	8	1	0	0	0
258.75	0	16	6	1	1	0	0
281.25	0	16	12	9	4	0	0
303.75	1	20	31	27	0	0	0
326.25	2	17	46	10	5	0	0

NRC CATEGORY G

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	3	6	1	0	0	0
11.25	0	6	8	0	0	0	0
33.75	1	2	0	0	0	0	0
56.25	0	2	0	0	0	0	0
78.75	0	0	0	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	2	4	4	1	0	0	0
146.25	0	1	18	16	0	0	0
168.75	0	5	15	8	0	0	0
191.25	1	4	8	1	0	0	0
213.75	0	5	2	0	0	0	0
236.25	0	1	1	1	0	0	0
258.75	0	4	3	0	0	0	0
281.25	0	4	6	0	0	0	0
303.75	0	13	33	7	0	0	0
326.25	0	7	36	2	0	0	0

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

JOINT FREQUENCY DISTRIBUTION FOR THE TIME PERIOD FROM HOUR 00 ON 01/01/98 TO HOUR 23 ON 03/31/98
The total hours are 2160, 2109 hours read and 51 missing.

NRC CATEGORY A

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

NRC CATEGORY B

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

NRC CATEGORY C

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

NRC CATEGORY D

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	6	18	13	12	3	0
11.25	1	3	8	3	2	0	0
33.75	0	2	4	1	5	0	0
56.25	0	1	3	0	0	0	0
78.75	0	2	1	0	0	0	0
101.25	0	2	0	0	0	0	0
123.75	0	0	4	6	1	0	0
146.25	0	1	9	9	3	0	0
168.75	0	5	16	14	5	3	0
191.25	0	2	8	10	24	13	8
213.75	0	5	10	3	6	4	6
236.25	0	4	2	4	5	3	0
258.75	0	3	5	2	3	0	0
281.25	0	2	9	11	11	6	5
303.75	0	7	22	34	29	5	1
326.25	0	0	26	28	18	2	0

NRC CATEGORY E

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	2	11	10	1	2	0
11.25	0	3	3	5	4	0	0
33.75	0	5	9	4	2	0	0
56.25	0	3	5	0	0	0	0
78.75	1	3	0	2	0	0	0
101.25	1	2	1	0	0	0	0
123.75	1	3	5	4	3	1	0
146.25	0	1	9	18	15	3	0
168.75	0	3	11	22	18	19	1
191.25	0	3	11	14	23	19	18
213.75	0	2	6	4	11	16	25
236.25	0	4	7	3	4	0	0
258.75	0	1	5	6	1	0	0
281.25	0	4	9	14	29	32	8
303.75	0	3	18	42	34	15	0
326.25	0	1	26	30	5	1	3

NRC CATEGORY F

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	7	12	6	0	1	1
11.25	0	3	13	8	1	0	0
33.75	0	5	10	0	2	0	0
56.25	1	3	3	0	1	0	0
78.75	0	1	3	2	0	0	0
101.25	1	0	4	1	0	0	0
123.75	0	0	3	10	0	1	1
146.25	1	2	14	19	13	1	0
168.75	1	3	13	19	12	5	0
191.25	0	5	10	19	11	4	3
213.75	0	4	11	6	6	0	1
236.25	0	3	7	7	0	0	0
258.75	0	4	8	3	2	0	0
281.25	0	7	6	11	10	8	6
303.75	1	3	13	15	42	6	0
326.25	0	5	24	17	15	2	3

NRC CATEGORY G

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

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

JOINT FREQUENCY DISTRIBUTION FOR THE TIME PERIOD FROM HOUR 00 ON O4/01/98 TO HOUR 23 ON 06/30/98
The total hours are 2184, 1898 read and 286 missing.

NRC CATEGORY A

	MPH						
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	3	11	21	10	0	0
11.25	0	4	9	24	14	1	0
33.75	0	5	5	5	5	0	0
56.25	0	4	2	0	0	0	0
78.75	0	3	2	3	0	0	0
101.25	0	6	12	4	0	0	0
123.75	0	2	10	8	2	0	0
146.25	0	3	19	26	6	2	0
168.75	0	5	15	31	37	13	0
191.25	0	3	7	9	8	1	2
213.75	0	4	6	6	0	2	1
236.25	0	0	3	1	0	0	0
258.75	0	2	5	0	0	0	0
281.25	0	4	4	0	2	2	0
303.75	0	4	4	0	1	2	0
326.25	0	4	9	1	0	0	0

NRC CATEGORY B

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

NRC CATEGORY C

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

NRC CATEGORY D

	MPH						
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	2	12	10	0	0	0
11.25	0	5	6	4	2	0	0
33.75	1	2	5	3	0	0	0
56.25	0	2	1	1	0	0	0
78.75	1	0	0	0	0	0	0
101.25	0	2	4	0	0	0	0
123.75	0	5	11	9	1	0	0
146.25	0	4	12	16	5	0	0
168.75	0	3	13	22	18	2	0
191.25	0	55	9	19	17	13	0
213.75	0	2	8	1	0	2	0
236.25	0	2	2	2	2	1	0
258.75	0	1	5	5	1	0	0
281.25	1	1	3	9	5	4	2
303.75	0	1	8	4	4	2	1
326.25	0	1	1	6	3	0	0

NRC CATEGORY E

	MPH						
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	1	6	2	4	0	0
11.25	1	3	10	1	0	0	0
33.75	0	0	9	1	0	0	0
56.25	1	0	1	0	0	0	0
78.75	0	0	1	0	0	0	0
101.25	0	3	4	0	0	0	0
123.75	0	2	14	9	0	0	0
146.25	0	6	16	30	6	0	0
168.75	2	4	24	21	6	0	0
191.25	0	4	8	8	8	3	0
213.75	0	1	3	5	4	0	1
236.25	0	3	3	6	1	0	0
258.75	1	4	10	10	3	0	0
281.25	0	5	10	30	25	8	2
303.75	0	3	5	9	8	2	0
326.25	0	3	8	9	3	0	0

NRC CATEGORY F

	MPH						
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	3	6	0	0	0	0
11.25	0	5	13	0	0	0	0
33.75	0	5	6	2	0	0	0
56.25	0	0	2	0	0	0	0
78.75	1	0	0	0	0	0	0
101.25	0	1	3	1	0	0	0
123.75	0	0	8	4	0	0	0
146.25	0	5	25	14	0	0	0
168.75	1	2	14	27	0	0	0
191.25	0	6	13	6	1	0	0
213.75	0	4	11	3	0	0	0
236.25	0	3	10	1	0	0	0
258.75	0	4	3	3	0	0	0
281.25	0	7	15	9	3	0	0
303.75	0	11	10	6	0	0	0
326.25	1	8	14	1	0	0	0

NRC CATEGORY G

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

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

JOINT FREQUENCY DISTRIBUTION FOR THE TIME PERIOD FROM HOUR 00 ON 04/01/98 TO HOUR 23 ON 06/30/98
The total hours are 2184, 1898 read and 286 missing.

NRC CATEGORY A

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	3	11	21	12	0	0
11.25	0	5	4	18	20	9	0
33.75	0	0	5	7	6	0	0
56.25	0	1	1	0	0	1	0
78.75	0	2	7	0	1	0	0
101.25	0	3	3	4	2	0	0
123.75	0	1	12	7	4	0	0
146.25	0	2	19	18	9	1	0
168.75	0	3	13	26	30	15	3
191.25	0	0	10	10	21	12	4
213.75	0	0	2	8	1	4	2
236.25	0	1	4	3	1	0	0
258.75	0	1	6	1	0	0	0
281.25	0	2	8	0	1	1	1
303.75	0	2	4	2	1	0	3
326.25	0	0	3	0	1	0	0

NRC CATEGORY B

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

NRC CATEGORY C

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

NRC CATEGORY D

	MPH						
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	2	8	8	5	0	0
11.25	0	1	3	3	2	2	0
33.75	0	2	3	2	2	0	0
56.25	0	0	2	1	1	0	0
78.75	0	0	0	2	0	0	0
101.25	0	0	3	1	0	0	0
123.75	0	5	6	5	1	0	0
146.25	0	0	8	8	5	0	0
168.75	0	3	10	16	14	6	0
191.25	0	55	6	28	21	19	12
213.75	0	3	3	7	1	2	2
236.25	0	3	4	3	1	2	1
258.75	0	0	4	4	3	0	0
281.25	0	1	4	5	8	3	4
303.75	0	0	7	1	5	3	4
326.25	0	6	3	3	4	2	0

NRC CATEGORY E

	MPH						
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	2	5	5	3	3	0
11.25	0	5	6	4	1	1	0
33.75	0	0	5	5	0	0	0
56.25	0	0	2	3	1	0	0
78.75	0	1	1	0	0	0	0
101.25	0	0	4	0	0	0	0
123.75	0	1	5	7	0	0	0
146.25	0	5	5	9	5	0	0
168.75	0	3	9	16	16	11	0
191.25	0	3	4	20	16	14	3
213.75	0	3	5	5	4	4	4
236.25	0	1	6	2	7	3	0
258.75	0	1	2	7	6	1	0
281.25	0	3	3	10	16	36	17
303.75	0	1	1	9	7	11	4
326.25	0	2	0	5	5	4	0

NRC CATEGORY F

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

NRC CATEGORY G

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

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

JOINT FREQUENCY DISTRIBUTION FOR THE TIME PERIOD FROM HOUR 00 ON 07/01/98 TO HOUR 23 ON 09/30/98
The total hours are 2208, 2107 read and 101 missing.

NRC CATEGORY A

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	8	13	6	1	1	0
11.25	0	12	15	6	0	0	0
33.75	0	9	13	2	0	0	0
56.25	2	5	5	6	0	0	0
78.75	1	6	6	2	0	0	0
101.25	0	5	14	2	1	0	0
123.75	0	12	25	10	0	0	0
146.25	1	4	30	27	1	0	0
168.75	0	5	22	23	11	0	0
191.25	0	7	7	10	2	0	0
213.75	0	4	2	5	3	0	0
236.25	1	4	2	1	0	0	0
258.75	1	7	3	3	0	0	0
281.25	1	6	1	1	0	0	0
303.75	1	5	10	1	0	0	0
326.25	1	7	10	0	0	0	0

NRC CATEGORY B

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

NRC CATEGORY C

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

NRC CATEGORY D

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	2	12	1	0	0	0
11.25	1	4	9	5	0	0	0
33.75	0	3	6	6	0	0	0
56.25	0	7	4	6	0	0	0
78.75	0	6	11	6	0	0	0
101.25	1	3	6	3	1	0	0
123.75	0	5	12	20	2	0	0
146.25	0	4	25	17	1	0	0
168.75	0	2	6	12	6	0	0
191.25	0	3	1	6	8	1	0
213.75	0	1	3	2	1	0	1
236.25	0	2	4	0	0	1	0
258.75	0	0	2	6	3	1	0
281.25	0	1	6	4	7	1	0
303.75	1	2	5	4	7	5	0
326.25	0	1	9	3	0	0	0

NRC CATEGORY E

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	5	9	1	0	0	0
11.25	1	4	10	1	0	0	0
33.75	0	7	7	3	0	0	0
56.25	0	1	3	1	0	0	0
78.75	0	3	1	0	0	0	0
101.25	1	3	6	1	0	0	0
123.75	0	6	9	12	1	0	0
146.25	1	5	20	17	1	0	0
168.75	0	1	13	5	0	0	0
191.25	2	6	7	3	2	0	0
213.75	0	5	8	2	2	0	0
236.25	0	4	9	1	1	1	0
258.75	2	4	9	9	5	1	0
281.25	0	8	8	29	17	6	2
303.75	0	2	13	25	14	1	0
326.25	1	2	6	3	0	0	0

NRC CATEGORY F

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	1	8	4	0	0	0	0
11.25	0	10	4	0	0	0	0
33.75	0	6	7	2	0	0	0
56.25	0	2	2	0	0	0	0
78.75	0	1	0	0	0	0	0
101.25	2	5	4	0	0	0	0
123.75	1	6	11	10	0	0	0
146.25	1	13	21	11	0	0	0
168.75	0	16	28	10	0	0	0
191.25	1	9	12	6	0	0	0
213.75	3	3	10	2	0	0	0
236.25	2	8	9	2	0	0	0
258.75	1	3	11	2	0	0	0
281.25	0	5	4	3	0	0	0
303.75	0	8	16	7	0	0	0
326.25	0	8	13	0	0	0	

NRC CATEGORY G

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	2	27	16	2	0	0	0
11.25	5	33	11	0	0	0	0
33.75	2	30	9	5	0	0	0
56.25	1	7	1	0	0	0	0
78.75	2	2	0	0	0	0	0
101.25	1	2	1	0	0	0	0
123.75	1	12	6	1	0	0	0
146.25	1	17	25	5	0	0	0
168.75	1	13	25	5	0	0	0
191.25	2	17	6	3	0	0	0
213.75	1	13	3	2	0	0	1
236.25	2	10	1	0	0	0	0
258.75	1	2	1	0	0	0	0
281.25	1	15	7	0	0	0	0
303.75	1	13	7	5	0	0	0
326.25	2	22	16	2	0	0	0

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

JOINT FREQUENCY DISTRIBUTION FOR THE TIME PERIOD FROM HOUR 00 ON 07/01/98 TO HOUR 23 ON 09/30/98
The total hours are 2208, 2106 read and 102 missing.

NRC CATEGORY A

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	6	15	5	2	1	0
11.25	0	3	8	13	1	1	0
33.75	0	7	10	1	0	0	0
56.25	1	6	8	6	1	0	0
78.75	0	6	12	1	0	0	0
101.25	0	6	16	5	0	0	0
123.75	0	6	11	12	3	0	0
146.25	2	6	29	25	1	0	0
168.75	0	6	28	31	8	4	0
191.25	0	3	7	21	6	3	0
213.75	1	1	0	2	3	3	0
236.25	0	6	1	3	0	0	0
258.75	0	2	3	5	0	0	0
281.25	0	5	2	2	0	0	0
303.75	0	4	9	0	0	0	0
326.25	0	2	10	1	0	0	0

NRC CATEGORY B

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

NRC CATEGORY C

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

NRC CATEGORY D

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

NRC CATEGORY E

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	2	6	2	2	0	0
11.25	0	2	7	1	1	0	0
33.75	0	1	2	5	0	0	0
56.25	0	0	5	1	1	0	0
78.75	0	0	4	3	0	0	0
101.25	0	3	5	2	0	0	0
123.75	1	2	7	4	3	1	0
146.25	0	4	5	9	9	1	0
168.75	0	3	14	22	11	1	0
191.25	0	3	4	7	6	1	1
213.75	0	0	4	6	0	2	0
236.25	0	3	6	4	1	1	0
258.75	0	0	5	9	5	3	3
281.25	0	0	6	8	24	17	11
303.75	0	0	4	13	24	22	8
326.25	0	2	4	7	2	0	0

NRC CATEGORY F

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

NRC CATEGORY G

	MPH						
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	1	3	9	1	0	0	0
11.25	0	7	12	5	1	0	0
33.75	0	5	11	3	2	0	0
56.25	1	2	13	8	1	0	0
78.75	0	7	6	0	0	0	0
101.25	0	4	6	0	0	0	0
123.75	0	7	5	1	0	0	0
146.25	1	12	17	13	2	0	0
168.75	0	7	29	27	4	0	0
191.25	0	8	25	19	3	0	0
213.75	0	11	5	6	2	1	1
236.25	0	5	9	6	0	0	0
258.75	0	5	6	0	0	0	0
281.25	0	5	9	2	2	3	0
303.75	0	4	11	13	8	0	0
326.25	0	4	12	9	0	0	0

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

JOINT FREQUENCY DISTRIBUTION FOR THE TIME PERIOD FROM HOUR 00 ON 10/1/98 TO HOUR 23 ON 12/31/98
The total hours are 2208, 2133 read and 75 missing.

NRC CATEGORY A

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

NRC CATEGORY B

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

NRC CATEGORY C

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

NRC CATEGORY D

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	9	16	3	1	0	0
11.25	0	6	2	3	5	5	0
33.75	0	5	5	3	0	3	0
56.25	0	3	0	0	0	0	0
78.75	0	0	0	0	0	0	0
101.25	0	1	0	0	0	0	0
123.75	0	2	3	0	0	0	0
146.25	0	0	9	9	0	0	0
168.75	0	9	25	22	6	0	0
191.25	0	5	5	11	13	7	1
213.75	1	5	5	2	9	14	10
236.25	0	7	2	1	2	5	3
258.75	1	2	5	1	1	0	0
281.25	0	13	1	3	1	0	0
303.75	0	7	9	18	4	0	0
326.25	0	11	23	12	1	0	0

NRC CATEGORY E

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	1	7	11	5	1	1	0
11.25	0	9	3	1	7	4	0
33.75	0	1	4	2	2	7	0
56.25	0	5	2	0	0	0	0
78.75	0	1	0	0	0	0	0
101.25	0	1	1	1	0	0	0
123.75	3	3	2	8	2	0	0
146.25	0	4	17	44	15	0	0
168.75	0	7	22	47	43	10	0
191.25	0	11	19	19	28	27	7
213.75	1	8	13	18	29	21	14
236.25	0	11	13	10	5	2	1
258.75	0	7	9	4	1	3	1
281.25	0	19	16	7	2	0	0
303.75	0	23	24	18	1	0	0
326.25	1	12	29	20	3	0	0

NRC CATEGORY F

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	1	11	16	0	0	0	0
11.25	0	14	12	0	0	0	0
33.75	0	3	13	0	0	0	0
56.25	1	2	2	1	0	0	0
78.75	0	1	0	0	0	0	0
101.25	1	1	0	0	0	0	0
123.75	0	0	0	3	0	0	0
146.25	0	1	19	18	2	0	0
168.75	0	6	36	37	7	0	0
191.25	1	10	21	11	1	0	0
213.75	0	15	7	2	3	0	1
236.25	1	7	6	0	0	0	0
258.75	1	11	6	5	0	1	0
281.25	0	16	19	5	2	0	0
303.75	0	23	21	10	1	0	0
326.25	2	16	35	7	0	0	0

NRC CATEGORY G

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	1	13	22	2	0	0	0
11.25	0	10	16	1	0	0	0
33.75	1	7	12	0	0	0	0
56.25	0	3	2	1	0	0	0
78.75	0	1	0	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	0	2	0	0	0	0	0
146.25	2	0	9	4	0	0	0
168.75	0	5	35	11	0	0	0
191.25	1	8	17	4	0	0	0
213.75	1	8	7	1	0	0	1
236.25	0	11	10	0	0	0	0
258.75	0	10	8	0	0	0	0
281.25	0	10	7	1	0	0	0
303.75	0	8	17	3	0	0	0
326.25	0	17	27	6	0	0	0

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

JOINT FREQUENCY DISTRIBUTION FOR THE TIME PERIOD FROM HOUR 00 ON 10/1/98 TO HOUR 23 ON 12/31/98
The total hours are 2208, 2134 read and 74 missing.

NRC CATEGORY A

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

NRC CATEGORY B

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

NRC CATEGORY C

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

NRC CATEGORY D

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	1	9	5	2	1	0
11.25	0	3	2	2	3	2	5
33.75	0	4	5	2	2	0	3
56.25	0	2	1	0	0	0	0
78.75	0	2	0	0	0	0	0
101.25	0	2	0	0	0	0	0
123.75	0	1	3	0	0	0	0
146.25	0	2	9	6	2	0	0
168.75	2	4	19	25	4	0	0
191.25	0	3	11	11	13	9	4
213.75	0	6	3	2	6	9	28
236.25	3	9	2	1	3	1	6
258.75	0	9	6	1	0	0	0
281.25	0	6	1	7	1	1	0
303.75	0	8	10	16	6	3	0
326.25	0	5	15	14	2	0	0

NRC CATEGORY E

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	8	15	6	3	1	1
11.25	0	4	6	2	4	4	6
33.75	0	0	9	1	1	2	8
56.25	0	5	3	1	0	0	0
78.75	0	6	4	0	0	0	0
101.25	0	0	0	0	0	0	0
123.75	0	5	2	2	0	1	0
146.25	0	7	5	12	20	10	0
168.75	0	7	8	22	44	27	9
191.25	0	6	15	20	33	29	31
213.75	0	3	8	11	18	24	66
236.25	1	5	5	6	12	5	5
258.75	0	3	9	5	1	1	4
281.25	0	3	11	11	9	4	0
303.75	0	10	13	15	19	3	1
326.25	1	5	21	13	13	2	0

NRC CATEGORY F

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	2	13	4	0	0	0
11.25	0	2	13	4	0	0	0
33.75	0	3	8	4	0	0	0
56.25	1	3	10	7	0	0	0
78.75	0	3	8	0	0	0	0
101.25	0	4	0	0	0	0	0
123.75	0	5	4	1	0	0	0
146.25	0	5	20	16	12	3	0
168.75	0	3	18	29	11	2	0
191.25	0	4	15	17	17	9	1
213.75	0	1	15	6	6	5	0
236.25	0	1	10	2	0	0	1
258.75	0	6	8	3	0	1	1
281.25	0	4	3	11	15	4	2
303.75	0	1	8	15	15	3	0
326.25	0	5	16	22	4	1	0

NRC CATEGORY G

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

Table 5-9 Year 1998, 33 FT AGL.

JOINT FREQUENCY DISTRIBUTION FOR THE TIME PERIOD FROM HOUR 00 ON 01/01/98 TO HOUR 23 ON 12/31/98
The total hours are 8760, 8248 read and 512 missing.

NRC CATEGORY A

	MPH						
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	14	30	27	11	1	0
11.25	0	21	30	31	16	1	0
33.75	0	22	23	7	5	0	0
56.25	2	11	7	6	0	0	0
78.75	2	10	8	5	0	0	0
101.25	0	13	27	6	1	0	0
123.75	0	15	35	19	2	0	0
146.25	1	8	50	53	8	2	0
168.75	0	11	41	56	51	13	0
191.25	0	15	14	21	15	1	2
213.75	0	8	11	12	6	2	2
236.25	1	5	5	2	0	0	0
258.75	1	10	10	3	0	0	0
281.25	1	13	6	1	2	2	0
303.75	2	10	14	2	1	2	0
326.25	3	16	22	4	2	0	0

NRC CATEGORY B

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

NRC CATEGORY C

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

NRC CATEGORY D

	MPH					
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	21	65	32	7	1	0
11.25	1	19	26	15	7	5	0
33.75	1	14	21	15	4	3	0
56.25	0	14	8	7	0	0	0
78.75	1	9	11	6	0	0	0
101.25	1	7	10	4	1	0	0
123.75	1	14	35	38	3	0	0
146.25	0	11	53	58	9	0	0
168.75	0	18	56	73	37	3	0
191.25	0	64	26	54	57	31	2
213.75	1	13	23	8	13	18	13
236.25	0	14	13	6	8	7	3
258.75	1	9	16	16	5	1	0
281.25	2	20	18	23	19	5	5
303.75	1	23	55	62	27	7	1
326.25	0	18	64	57	18	0	0

NRC CATEGORY E

	MPH					
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	1	25	46	10	7	1	0
11.25	3	22	39	6	7	4	0
33.75	0	12	29	8	2	7	0
56.25	1	11	7	1	0	0	0
78.75	0	5	3	0	0	0	0
101.25	1	11	12	3	0	0	0
123.75	3	14	32	38	6	0	0
146.25	3	18	74	129	37	0	0
168.75	2	20	79	102	71	10	0
191.25	2	29	44	44	66	37	10
213.75	1	21	31	31	46	33	16
236.25	0	26	34	21	8	4	1
258.75	3	22	32	24	10	4	1
281.25	0	45	52	93	60	16	4
303.75	1	37	90	92	36	3	0
326.25	4	24	85	44	8	1	0

NRC CATEGORY F

	MPH					
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	3	37	51	1	0	0	0
11.25	1	32	36	0	0	0	0
33.75	0	18	31	7	0	0	0
56.25	3	9	6	1	0	0	0
78.75	1	3	1	0	0	0	0
101.25	5	9	8	1	0	0	0
123.75	1	8	23	21	2	0	0
146.25	1	23	93	74	7	0	0
168.75	1	33	107	93	14	0	0
191.25	2	34	65	31	2	3	0
213.75	3	29	31	10	3	0	1
236.25	3	25	33	4	0	0	0
258.75	2	34	26	11	1	1	0
281.25	0	44	50	26	9	0	0
303.75	1	62	78	50	1	0	0
326.25	5	49	108	18	5	0	0

NRC CATEGORY G

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	3	53	47	5	0	0	0
11.25	5	59	43	2	0	0	0
33.75	4	49	31	5	0	0	0
56.25	1	13	3	1	0	0	0
78.75	3	6	0	0	0	0	0
101.25	1	6	1	0	0	0	0
123.75	3	19	14	2	0	0	0
146.25	4	25	74	31	0	0	0
168.75	2	28	83	33	0	0	0
191.25	5	37	36	9	0	0	0
213.75	2	29	13	3	0	0	4
236.25	3	27	12	1	0	0	0
258.75	1	21	12	2	0	0	0
281.25	1	33	23	1	0	0	0
303.75	2	41	76	21	0	0	0
326.25	3	60	92	10	0	0	0

Table 5-10 Year 1998, 245 FT AGL.

JOINT FREQUENCY DISTRIBUTION FOR THE TIME PERIOD FROM HOUR 00 ON 01/01/98 TO HOUR 23 ON 12/31/98
The total hours are 8760, 8247 read and 513 missing.

NRC CATEGORY A

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	11	33	27	14	1	0
11.25	0	16	16	34	21	12	0
33.75	0	7	20	8	6	0	0
56.25	1	7	9	6	1	1	0
78.75	0	10	19	1	1	0	0
101.25	0	12	21	9	2	0	0
123.75	0	11	24	19	7	0	0
146.25	2	9	50	43	12	1	0
168.75	0	10	43	57	41	19	3
191.25	1	7	18	33	32	18	4
213.75	2	3	4	11	4	10	3
236.25	0	7	6	6	1	0	0
258.75	0	5	11	6	0	0	0
281.25	0	8	10	3	1	1	1
303.75	1	9	14	4	2	0	3
326.25	0	6	13	2	4	0	0

NRC CATEGORY B

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

NRC CATEGORY C

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	3	8	5	3	1	0
11.25	1	1	9	7	2	0	0
33.75	0	3	3	3	2	0	0
56.25	0	3	6	2	0	0	0
78.75	0	2	4	1	0	0	0
101.25	0	1	3	4	0	0	0
123.75	0	1	2	2	0	0	0
146.25	0	3	8	13	2	1	0
168.75	0	7	17	25	7	2	0
191.25	0	3	6	15	21	4	1
213.75	0	3	3	4	6	2	2
236.25	0	0	5	3	2	0	0
258.75	0	1	1	4	0	1	1
281.25	1	0	2	5	2	1	4
303.75	0	0	4	2	3	2	1
326.25	0	0	10	10	4	1	0

NRC CATEGORY D

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	9	44	31	19	4	0
11.25	1	8	20	16	8	4	5
33.75	1	12	15	7	9	0	3
56.25	0	4	12	9	1	0	0
78.75	0	9	12	9	2	0	0
101.25	0	6	8	8	0	0	0
123.75	0	8	19	23	7	0	0
146.25	0	5	39	38	16	0	0
168.75	2	17	61	81	29	10	0
191.25	1	61	31	59	65	46	24
213.75	0	16	17	15	16	17	38
236.25	3	18	10	12	9	6	8
258.75	0	12	15	10	12	1	1
281.25	0	10	16	28	23	14	9
303.75	1	15	41	53	43	16	12
326.25	0	11	48	49	25	4	0

NRC CATEGORY E

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	0	14	37	23	9	6	1
11.25	0	14	22	12	10	5	6
33.75	0	6	25	15	3	2	8
56.25	0	8	15	5	2	0	0
78.75	1	10	9	5	0	0	0
101.25	1	5	10	2	0	0	0
123.75	2	11	19	17	6	3	0
146.25	0	17	24	48	49	14	0
168.75	0	16	42	82	89	58	10
191.25	0	15	34	61	78	63	53
213.75	0	8	23	26	33	46	95
236.25	1	13	24	15	24	9	5
258.75	0	5	21	27	13	5	7
281.25	0	10	29	43	78	89	36
303.75	0	14	36	79	84	51	13
326.25	1	10	51	55	25	7	3

NRC CATEGORY F

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	1	11	39	16	0	1	1
11.25	0	9	38	13	1	0	0
33.75	0	11	29	9	4	2	0
56.25	2	12	21	13	1	0	0
78.75	0	4	15	3	0	0	0
101.25	1	10	13	3	0	0	0
123.75	1	9	14	16	1	1	1
146.25	1	14	48	62	40	4	0
168.75	1	10	52	86	39	8	0
191.25	0	11	44	57	47	20	4
213.75	2	14	40	21	20	6	1
236.25	0	13	38	17	4	0	1
258.75	0	14	34	24	8	2	1
281.25	0	14	23	33	47	22	12
303.75	2	7	36	59	75	14	0
326.25	0	12	53	53	24	3	3

NRC CATEGORY G

			MPH				
deg	0.07	0.60	3.00	7.00	12.00	18.00	24.00
0.00	1	18	39	15	1	0	0
11.25	0	13	34	17	1	0	0
33.75	1	14	23	15	5	1	00
56.25	1	9	32	12	4	0	0
78.75	1	10	8	1	0	0	0
101.25	1	10	7	0	0	0	0
123.75	0	11	9	8	1	0	0
146.25	3	24	43	45	17	1	0
168.75	1	14	56	65	16	1	0
191.25	1	15	64	53	14	0	1
213.75	0	20	44	23	3	1	2
236.25	0	9	28	11	0	0	.1
258.75	1	12	16	5	0	0	0
281.25	0	11	25	14	14	7	0
303.75	0	11	24	32	35	4	0
326.25	1	15	29	61	23	0	0

6.0 DOSE ASSESSMENT -- IMPACT ON MAN

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

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

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

Exposure to "A Member of the Public"

The WNP-2 Visitor Center was evaluated for assessment of radiation doses to "Members of the Public" due to their activities within the site boundary. The ODCM assumes an eight (8) hour per year occupancy by "A Member of the Public" at the Visitor Center. The dose assessment resulted in an annual calculated total body dose of 3.46E-05 mrem. The annual thyroid dose was 3.53E-05 mrem and the maximum dose to any other organ was 4.09E-05 mrem. The air dose contribution was as follows; Beta air dose was 4.69E-03 mrad and the Gamma air dose was 1.31E-02 mrad. The direct radiation contribution from TLD results calculated to an average of 2.29E-01 mrem per day.

The 1998 TLD summary showed no significant change from pre-operational values. Based on one sigma error, the maximum direct radiation exposure to the public for calendar year 1998 was less than 10 mrem.

Table 6-1A Maximum Individual Doses From Liquid Effluents:
First and Second Quarters -- 1998

1st Quarter				
Pathway	Total Body (mrem/qtr)	1998 Cumulative Total Body (mrem/yr)	Max. Organ (mrem/qtr)	1998 Cumulative Max. Organ (mrem/yr)
Fishing	5.12E-05	5.12E-05	1.05E-04	1.05E-04
Drinking	3.45E-07	3.45E-07	3.37E-07	3.37E-07
Shoreline	1.11E-06	1.11E-06	1.11E-06	1.11E-06
Swimming	1.81E-09	1.81E-09	1.81E-09	1.81E-09
Boating	2.01E-07	2.01E-07	2.01E-07	2.01E-07
Vegetables	1.03E-06	1.03E-06	5.58E-06	5.58E-06
Leafy Veg.	1.06E-07	1.06E-07	5.36E-07	5.36E-07
Milk	1.53E-07	1.53E-07	7.72E-07	7.72E-07
Meat	5.85E-08	5.85E-08	2.20E-07	2.20E-07
Total	5.42E-05	5.42E-05	1.14E-04	1.14E-04

2nd Quarter				
Pathway	Total Body (mrem/qtr)	1998 Cumulative Total Body (mrem/yr)	Max. Organ (mrem/qtr)	1998 Cumulative Max. Organ (mrem/yr)
Fishing	7.25E-04	7.76E-04	1.34E-03	1.45E-03
Drinking	1.94E-06	2.29E-06	1.96E-06	2.30E-06
Shoreline	7.83E-06	8.94E-06	7.83E-06	8.94E-06
Swimming	1.33E-08	1.51E-08	1.33E-08	1.51E-08
Boating	1.48E-06	1.68E-06	1.48E-06	1.68E-06
Vegetables	2.78E-06	2.06E-06	7.47E-06	1.12E-05
Leafy Veg.	7.98E-07	2.12E-07	3.84E-06	1.07E-06
Milk	1.18E-06	1.33E-06	2.01E-06	2.78E-06
Meat	3.90E-07	4.49E-07	4.58E-07	6.78E-07
Total	7.41E-04	7.93E-04	1.37E-03	1.47E-03

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

Third and Fourth Quarters -- 1998

3rd Quarter				
Pathway	Total Body (mrem/qtr)	1998 Cumulative Total Body (mrem/yr)	Max. Organ (mrem/qtr)	1998 Cumulative Max. Organ (mrem/yr)
Fishing	1.48E-04	9.24E-04	1.45E-03	2.90E-03
Drinking	1.55E-06	3.84E-06	2.32E-06	4.62E-06
Shoreline	3.80E-06	1.27E-05	3.80E-06	1.27E-05
Swimming	6.18E-09	2.13E-08	6.18E-09	2.13E-08
Boating	6.87E-07	2.37E-06	6.87E-07	2.37E-06
Vegetables	4.00E-06	6.06E-06	1.27E-05	2.39E-05
Leafy Veg.	3.64E-07	5.76E-07	1.86E-06	2.93E-06
Milk	5.53E-07	1.89E-06	8.16E-07	3.60E-06
Meat	2.18E-07	6.67E-07	8.80E-07	1.56E-06
Total	1.59E-04	9.52E-04	1.47E-03	2.95E-03

4th Quarter				
Pathway	Total Body (mrem/qtr)	1998 Cumulative Total Body (mrem/yr)	Max. Organ (mrem/qtr)	1998 Cumulative Max. Organ (mrem/yr)
Fishing	0.00E+00	9.24E-04	0.00E+00	2.90E-03
Drinking	0.00E+00	3.84E-06	0.00E+00	4.62E-06
Shoreline	0.00E+00	1.27E-05	0.00E+00	1.27E-05
Swimming	0.00E+00	2.13E-08	0.00E+00	2.13E-08
Boating	0.00E+00	2.37E-06	0.00E+00	2.37E-06
Vegetables	0.00E+00	6.06E-06	0.00E+00	2.39E-05
Leafy Veg.	0.00E+00	5.76E-07	0.00E+00	2.93E-06
Milk	0.00E+00	1.89E-06	0.00E+00	3.60E-06
Meat	0.00E+00	6.67E-07	0.00E+00	1.56E-06
Total	0.00E+00	9.52E-04	0.00E+00	2.95E-03

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

Table 6-2 Average Individual Doses From Liquid Effluents -- 1998

Pathway	1st Quarter		2nd Quarter	
	Total Body (mrem)	Max. Organ (mrem)	Total Body (mrem)	Max. Organ (mrem)
Fishing	5.12E-05	1.05E-04	7.25E-04	1.34E-03
Drinking	3.45E-07	5.67E-07	1.94E-06	1.96E-06
Shoreline	1.11E-06	1.11E-06	7.83E-06	7.83E-06
Swimming	1.81E-09	1.81E-09	1.33E-08	1.33E-08
Boating	2.01E-07	2.01E-07	1.48E-06	1.48E-06
Vegetables*	3.26E-07	8.38E-07	2.14E-06	5.71E-06
Leafy Veg.*	5.33E-08	2.20E-07	3.92E-07	1.57E-06
Milk*	1.11E-07	1.26E-07	8.33E-07	1.40E-06
Meat*	2.83E-08	8.91E-08	1.89E-07	6.46E-07
Total	5.34E-05	1.08E-04	7.40E-04	1.36E-03

Pathway	3rd Quarter		4th Quarter	
	Total Body (mrem)	Max. Organ (mrem)	Total Body (mrem)	Max. Organ (mrem)
Fishing	1.48E-04	3.01E-04	0.00E+00	0.00E+00
Drinking	1.55E-06	1.53E-06	0.00E+00	0.00E+00
Shoreline	3.80E-06	3.80E-06	0.00E+00	0.00E+00
Swimming	6.18E-09	6.18E-09	0.00E+00	0.00E+00
Boating	6.87E-07	6.87E-07	0.00E+00	0.00E+00
Vegetables*	1.03E-06	2.52E-06	0.00E+00	0.00E+00
Leafy Veg.*	1.82E-07	7.64E-07	0.00E+00	0.00E+00
Milk*	3.90E-07	5.52E-07	0.00E+00	0.00E+00
Meat*	2.10E-08	1.84E-08	0.00E+00	0.00E+00
Total	1.56E-04	3.11E-04	0.00E+00	0.00E+00

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

Table 6-3 50-Mile Population Doses From Liquid Effluents -- 1998

Pathway	1st Quarter		2nd Quarter	
	Total Body (person-rem)	Max. Organ (person-rem)	Total Body (person-rem)	Max. Organ (person-rem)
Fishing	4.02E-07	7.77E-07	5.18E-06	1.09E-05
Drinking	1.37E-05	2.04E-05	7.71E-05	1.25E-04
Shoreline	1.48E-05	1.74E-05	1.04E-04	1.22E-04
Swimming	7.09E-08	7.09E-08	5.19E-07	5.19E-07
Boating	1.77E-08	1.77E-08	1.30E-07	1.30E-07
Vegetables	3.26E-06	8.38E-06	2.14E-05	5.71E-05
Leafy Veg.	5.33E-07	2.20E-06	3.92E-06	1.57E-05
Milk	1.06E-06	1.20E-06	7.95E-06	1.34E-05
Meat	2.86E-07	9.00E-07	1.91E-06	6.52E-06
Total	3.41E-05	5.13E-05	2.22E-04	3.51E-04

Pathway	3rd Quarter		4th Quarter	
	Total Body (person-rem)	Max. Organ (person-rem)	Total Body (person-rem)	Max. Organ (person-rem)
Fishing	1.16E-06	8.54E-06	0.00E+00	0.00E+00
Drinking	6.11E-05	8.47E-05	0.00E+00	0.00E+00
Shoreline	5.05E-05	5.94E-05	0.00E+00	0.00E+00
Swimming	2.42E-07	2.42E-07	0.00E+00	0.00E+00
Boating	6.05E-08	6.05E-08	0.00E+00	0.00E+00
Vegetables	1.03E-05	2.52E-05	0.00E+00	0.00E+00
Leafy Veg.	1.82E-06	7.64E-06	0.00E+00	0.00E+00
Milk	3.72E-06	5.27E-06	0.00E+00	0.00E+00
Meat	2.12E-07	1.86E-07	0.00E+00	0.00E+00
Total	1.29E-04	1.91E-04	0.00E+00	0.00E+00

Table 6-4 Annual Ladtap II Results for 1998

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

Pathway	Total Body (person-rem)	Max. Organ (person-rem)
Fishing	6.72E-06	2.01E-05
Drinking	1.54E-04	2.32E-04
Shoreline	1.69E-04	1.99E-04
Swimming	2.34E-06	2.34E-06
Boating	5.86E-07	5.86E-07
Vegetables	3.70E-05	9.56E-05
Leafy Veg.	6.24E-06	2.55E-05
Milk	1.27E-05	2.02E-05
Meat	3.24E-06	1.10E-05
Total	3.92E-04	6.06E-04

B. Average individual doses from WNP-2 liquid effluents

Pathway	Total Body (mrem)	Max. Organ (mrem)
Fishing	3.07E-06	3.50E-03
Drinking	2.74E-06	4.98E-06
Shoreline	1.36E-05	1.60E-05
Swimming	2.10E-08	2.10E-08
Boating	2.34E-06	2.34E-06
Vegetables*	3.70E-06	9.56E-06
Leafy Veg.*	6.24E-07	2.55E-06
Milk*	1.33E-06	2.12E-06
Meat*	3.21E-07	1.09E-06
Total	2.77E-05	3.54E-03

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

Table 6-5A Summary of Doses from WNP-2 Gaseous Effluents, 1998

1 Location: Site Boundary

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Cumulative
Beta air dose (mrad)	3.59E-04	7.54E-05	1.91E-04	3.57E-04	9.82E-04
Gamma air dose	1.00E-03	2.14E-04	5.34E-04	9.98E-04	2.75E-03

2 Location: Beyond Site Boundary

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Cumulative
Beta air dose (mrad)	2.28E-04	3.08E-05	2.48E-04	2.03E-04	7.10E-04
Gamma air dose	6.31E-04	8.76E-05	6.88E-04	5.65E-04	1.97E-03

3 Location: Site Boundary

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

4 Location: Beyond Site Boundary

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

Table 6-5B Summary of Doses from WNP-2 Gaseous Effluents, 1998

5 Location: Site Boundary

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Cumulative
Maximum Organ dose (mrem)	1.20E-02	2.59E-04	1.36E-03	1.58E-03	1.52E-02

6 Location: Beyond Site Boundary

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Cumulative
Maximum Organ dose (mrem)	1.61E-03	2.59E-04	1.05E-03	9.04E-04	3.82E-03

7 Location: Land Use Census; 4.10E+00 Miles ESE

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Cumulative
Maximum Organ dose (mrem)	7.14E-04	4.99E-04	6.40E-04	2.10E-03	3.95E-03

Table 6-6 50-Mile Population Doses From 1998 Gaseous Effluents

A. 50-mile population

Exposure Pathway	Total Body (person-rem)	Max. Organ (person-rem)
Plume	1.16E-03	1.16E-03
Ground	9.59E-04	9.59E-04
Inhalation	4.46E-03	1.78E-05
Vegetables	4.98E-03	1.95E-04
Milk	1.74E-03	1.19E-05
Meat	1.10E-03	3.45E-06
Total	1.44E-02	2.34E-03

Population => 2.50E+05

B. Average individual*

Exposure Pathway	Total Body (mrem)	Max. Organ (mrem)
Plume	4.64E-06	4.64E-06
Ground	3.84E-06	3.84E-06
Inhalation	1.78E-05	7.12E-08
Vegetables	1.99E-05	7.80E-07
Milk	6.96E-06	4.76E-08
Meat	4.40E-06	1.38E-08
Total	5.76E-05	9.39E-06

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

7.0 REVISIONS TO THE ODCM

This section completes the requirement of Technical Specification 5.5.1. A complete, legible copy of the entire ODCM is included as an enclosure to the letter transmitting this Radioactive Effluent Release Report. ODCM's are sent only to the Nuclear Regulatory Commission (NRC).

8.0 REVISIONS TO THE PROCESS CONTROL PROGRAM (PCP)

The Process Control Program (formerly PPM 1.12.2) was revised during the reporting period (7/31/98) and is now designated as SWP-RMP-02. Changes primarily resulted from alignment with the Site Wide Procedure improvement and Requirements Tracking System programs and incorporation of Nuclear Operating Standard 41 (NOS-41), "Quality Assurance Program for Radioactive Material Shipping Packages". Guidance was added with respect to procurement quality level, specification detail and applicability of Operation Quality Assurance Program Description (OQAPD) sections, Nuclear Operating Standards and Site Wide Procedures when initiating radioactive material transportation and radwaste disposal-related procurements. Basically the application of the OQAPD to radioactive transportation and disposal activities was specified to be commensurate with Commercial Grade or Procurement Level 3 as applied to activities that are not nuclear safety-related. Other changes included minor rewording or format changes.

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

In April 1998, sampling was discontinued at milk sampling station 96 in Sunnyside. This station served as a control location and sampling was discontinued when the dairy herd was sold. While looking in the area for a replacement dairy, the usual broadleaf vegetable samples were taken. No suitable replacement has been found and the REMP personnel have been sampling grass or chopped corn from milk sampling station 9 in Sunnyside. Station 9 is not a suitable control as the majority of the feed, in the form of alfalfa hay, comes from Franklin County. (Reference: PTL 150039)

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

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