PALO VERDE NUCLEAR GENERATING STATION
UNITS 1, 2 AND 3

SEMI-ANNUAL RADIOACTIVE
EFFLUENT RELEASE REPORT
JULY 1, 1987 THROUGH DECEMBER 31, 1987

USNRC Dockets STN-50-528, STN-50-529 and STN-50-530

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INTRODUCTION

This report summarizes meteorological data and doses from radioactive effluents for the Palo Verde Nuclear Generating Station (PVNGS) for the period July through December 1987 and, where required, for all of 1987. The data presented meet the reporting requirements of Regulatory Guide 1.21 of the U.S. Nuclear Regulatory Commission (Revision 1, June 1974) as well as the PVNGS Radiological Environmental Technical Specifications (RETS).

The report is organized into three parts. Appendix A presents the effluent and waste disposal source term data. Appendix B presents a summary of on-site meteorological data for the report period. Appendix C presents the radiological doses from gaseous radioactive effluents.

BIBLIOGRAPHY

U.S. Nuclear Regulatory Commission, Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants;" Revision 1, 1974.

U.S. Nuclear Regulatory Commission, Regulatory Guide 1.23 (Safety Guide 23), "Onsite Meteorological Programs," 1972.

U.S. Nuclear Regulatory Commission, NUREG/CR-2919, "XOQDOQ: Computer Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations," 1982.

U.S. Nuclear Regulatory Commission, NUREG-0579, "User's Guide to GASPAR Code," June 1980.

U.S. Nuclear Regulatory Commission, Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR 50, Appendix I," Revision 1, 1977.

U.S. Nuclear Regulatory Commission, NUREG-0172, "Age-specific Radiation Dose Commitment Factors for a One-Year Chronic Intake," 1977.

U.S. Nuclear Regulatory Commission, NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," 1978.

U.S. Nuclear Regulatory Commission, NUREG-1133, "Technical Specifications, Palo Verde Nuclear Generating Station, Unit No. 1, Docket No. 50-528, Appendix 'A' to License No. NPF-41," 1985.

U.S. Nuclear Regulatory Commission, NUREG-1181, "Technical Specifications, Palo Verde Nuclear Generating Station, Unit No. 2, Docket No. 50-529, Appendix 'A' to License No. NPF-51," 1986.

U.S. Nuclear Regulatory Commission, NUREG-1287, "Technical Specifications, Palo Verde Nuclear Generating Station, Unit No. 3, Docket No. 50-530, Appendix 'A' to License No. NPF-74," 1987.

APPENDIX A

SOURCE TERMS AND

EFFLUENT AND WASTE DISPOSAL REPORTS

Supplemental Information

1.0 Regulatory Limits

1.1 Liquid Releases

a. PVNGS Technical Specification 3.11.1.1

The concentration of radioactive material discharged from secondary system liquid waste to the onsite evaporation ponds shall be limited to the Lower Limit of Detectability (LLD) defined as 5×10^{-7} µCi/ml for the principal gamma emitters or 1×10^{-6} µCi/ml for I-131.

b. PVNGS Technical Specification 3.11.1.2

The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released, from each reactor unit, to areas at and beyond the SITE BOUNDARY shall be limited:

- During any calendar quarter to less than or equal to 1.5 mrems to the total body and to less than or equal to 5 mrems to any organ, and
- During any calendar year to less than or equal to 3 mrems to the total body and to less than or equal to 10 mrems to any organ.

1.2 Gaseous Releases

a. PVNGS Technical Specification 3.11.2.1

The dose rate due to radioactive materials released in gaseous effluents from the site shall be limited to the following:

- For noble gases: Less than or equal to 500 mrems/yr to the total body and less than or equal to 3000 mrems/yr to the skin, and
- For I-131 and I-133, for tritium, and for all radionuclides in particulate form with half-lives greater than 8 days: Less than or equal to 1500 mrems/yr to any organ.

b. PVNGS Technical Specification 3.11.2.2

The air dose due to noble gases released in gaseous effluents, from each reactor unit, to areas at and beyond the SITE BOUNDARY shall be limited to the following:

- During any calendar quarter: Less than or equal to 5 mrads for gamma radiation and less than or equal to 10 mrads for beta radiation and,

- o During any calendar year: Less than or equal to 10 mrads for gamma radiation and less than or equal to 20 mrads for beta radiation.

c. PVNGS Technical Specification 3.11.2.3

The dose to a MEMBER OF THE PUBLIC from Iodine-131, Iodine-133, Tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released, from each reactor unit, to areas at and beyond the SITE BOUNDARY shall be limited to the following:

- o During any calendar quarter: Less than or equal to 7.5 mrems to any organ and,
- o During any calendar year: Less than or equal to 15 mrems to any organ.

d. PVNGS Technical Specification 3.11.2.4

The GASEOUS RADWASTE SYSTEM and the VENTILATION EXHAUST TREATMENT SYSTEM shall be used to reduce radioactive materials in gaseous waste prior to their discharge when the projected gaseous effluent air doses due to gaseous effluent releases, from each reactor unit, from the site when averaged over 31 days, would exceed 0.2 mrad for gamma radiation and 0.4 mrad for beta radiation. The VENTILATION EXHAUST TREATMENT SYSTEM shall be used to reduce radioactive materials in gaseous waste prior to their discharge when the projected doses due to gaseous effluent releases, from each reactor unit, to areas at and beyond the SITE BOUNDARY when averaged over 31 days would exceed 0.3 mrem to any organ of a MEMBER OF THE PUBLIC.

1.3 Total Dose

a. PVNGS Technical Specification 3.11.4

The annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC due to releases of radioactivity and to radiation from uranium fuel cycle sources shall be limited to less than or equal to 25 mrems to the total body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrems.

2.0 Maximum Permissible Concentrations

Air: Release Concentrations are limited to dose rate limits described in 1.2.a of this report.

3.0 The average energy ($\overline{E}$) of the radionuclide mixture in releases of fission and activation gases is not applicable to PVNGS.

4.0 Measurement and Approximations of Total Radioactivity in Gaseous Effluents.

For continuous releases, sampling is in accordance with PVNGS Technical Specification Table 4.11-2. Particulate and iodine radionuclides are sampled continuously at the three exhaust points. The particulate filters and charcoal cartridges are exchanged for analysis four times per month. Noble gas and tritium are sampled at least once per 31 days. The hourly average Radiation Monitoring System (RMS) effluent monitor readings are used, when available, to account for increases and decreases in noble gas concentrations between noble gas grab samples. The tritium concentration is assumed constant between sampling periods.

For batch releases, sampling is also in accordance with PVNGS Technical Specification Table 4.11-2. For containment purges, the noble gas concentration is adjusted to account for decreases or increases in concentration during the purge using RMS readings. The volume of air released during the purge is determined using the exhaust fan rated flow rate. For Waste Gas Decay Tank releases, the volume released is corrected to standard pressure.

The Lower Limit of Detection (LLD) of a measurement system is defined in Table 4.11-2 of the PVNGS Technical Specifications. An average LLD for each radionuclide is provided in Table A1.

5.0 Batch Releases

5.1 Gaseous

	Unit 1*	Unit 2*	Unit 3*
o Number of batch releases:	48	50	21
o Total time period for batch releases:	227,728	108,709	85,937
o Maximum time period for a batch release:	10,100	10,080	10,080
o Average time period for a batch release:	4,744	2,174	4,092
o Minimum time period for a batch release:	36	122	62

* All times are in minutes

5.2 Liquid

None

6.0 Abnormal Releases

None

7.0 Offsite Dose Calculation Manual (ODCM), Process Control Program (PCP) and Preplanned Alternate Sampling Program (PASP) Revisions

There were no revisions to the ODCM, the PCP, or the PASP. There were no major changes to radwaste systems.

8.0 Effluents and Solid Wastes

8.1 Gaseous Effluents

The gaseous effluents for the third and fourth quarters are included in Tables A2, A3, A5, A6, A8, and A9. Included in these tables are summaries of the effluents and estimated total error.

8.2 Liquid Effluents

There were no liquid effluents from the PVNGS site.

8.3 Solid Waste

Solid waste shipments are summarized in Table A12.

9.0 Miscellaneous Information

Releases made to the evaporation pond have been limited at the tank to the concentrations specified in Technical Specification 3.11.1.1. In addition, PVNGS has imposed a limit of 3×10^{-3} μCi/ml for tritium in tanks released to the evaporation pond. This is the maximum permissible concentration for unrestricted areas for tritium in water from 10CFR20 Appendix B. The evaporation pond was monitored in accordance with Technical Specification 3.12.1. During this report period, the analyses showed tritium concentrations in water to be less than 1.5×10^{-6} μCi/ml.

The results of the second quarter 1987 Strontium-89 and Strontium-90 analyses for continuous mode releases were less than the Lower Limit of Detection. The gaseous effluent and dose summaries are therefore correct as reported in the January - June, 1987 Semi-Annual Report.

TABLE A1

PVNGS UNITS 1, 2, AND 3

GASEOUS EFFLUENTS - LOWER LIMIT OF DETECTION

μCi/cc

NUCLIDE	CONTINUOUS	BATCH
KRYPTON 85	5.50E-06	5.50E-06
KRYPTON 85m	2.10E-08	2.10E-08
KRYPTON 87	4.90E-08	4.90E-08
KRYPTON 88	9.10E-08	9.10E-08
XENON 133	6.00E-08	6.00E-08
XENON 133m	1.10E-07	1.10E-07
XENON 135	2.40E-08	2.40E-08
XENON 135m	5.10E-07	5.10E-07
XENON 138	2.30E-06	2.30E-06
IODINE 131	3.70E-14	1.50E-11
IODINE 133	2.60E-14	1.00E-11
IODINE 135	9.60E-14	3.80E-11
BARIUM 140	1.10E-13	4.30E-11
CERIUM 141	3.30E-14	1.30E-11
CERIUM 144	1.40E-13	5.80E-11
CESIUM 134	1.60E-14	6.30E-12
CESIUM 137	2.40E-14	9.60E-12
COBALT 58	2.60E-14	1.00E-11
COBALT 60	3.00E-14	1.20E-11
IRON 59	3.50E-14	1.40E-11
LANTHANUM 140	3.00E-14	1.20E-11
MANGANESE 54	2.70E-14	1.10E-11
MOLYBDENUM 99	2.30E-13	9.20E-11
STRONTIUM 89	5.00E-16	*
STRONTIUM 90	5.00E-16	*
TRITIUM	5.00E-07	5.00E-07
ZINC 65	5.90E-14	2.30E-11
GROSS ALPHA	6.00E-15	*

*Not required for batch releases.

Table A2
PVNGS UNIT 1
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	Quarter #3	Quarter #4	Est. Total Error%*
A. Fission & activation gases				
1. Total release	Ci	4.17E+02	2.70E+02	3.97E+01
2. Average release rate for period	µCi/sec	5.24E+01	3.40E+01	
3. Percent of technical specification limit	%	NA**	NA**	
B. Iodines				
1. Total Iodine-131	Ci	1.11E-02	2.97E-02	2.93E+01
2. Average release rate for period	µCi/sec	1.40E-03	3.74E-03	
3. Percent of technical specification limit	%	NA**	NA**	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	7.52E-05	8.21E-04	2.93E+01
2. Average release rate for period	µCi/sec	9.46E-06	1.03E-04	
3. Percent of technical specification limit	%	NA**	NA**	
4. Gross Alpha radioactivity	Ci	<LLD	2.24E-07	
D. Tritium				
1. Total release	Ci	2.09E+01	3.87E+01	4.22E+01
2. Average release rate for period	µCi/sec	2.63E+00	4.87E+00	
3. Percent of technical specification limit	%	NA**	NA**	

*Estimated total error methodology is presented in Table A11.
**See Table A4 for percent of technical specification limits.

Table A3
PVNGS UNIT 1
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	Quarter #3	Quarter #4	Quarter #3	Quarter #4
1. Fission gases					
Argon 41	Ci	*	*	1.51E-01	1.38E-01
Krypton-85	Ci	1.15E+01	<LLD	6.37E+00	6.79E+00
Krypton-85m	Ci	1.28E+00	3.78E-01	2.01E-03	<LLD
Krypton-87	Ci	<LLD	<LLD	<LLD	<LLD
Krypton-88	Ci	<LLD	1.46E+00	<LLD	<LLD
Xenon-131m	Ci	*	*	1.63E-01	1.56E-01
Xenon-133	Ci	1.35E+02	5.59E+01	2.42E+02	1.99E+02
Xenon-133m	Ci	<LLD	<LLD	1.97E+00	8.73E-01
Xenon-135	Ci	1.65E+01	4.88E+00	1.93E+00	6.08E-02
Xenon-135m	Ci	<LLD	<LLD	<LLD	<LLD
Xenon-138	Ci	<LLD	<LLD	<LLD	<LLD
Unidentified	Ci	**	**	**	**
Total for period	Ci	1.64E+02	6.26E+01	2.53E+02	2.07E+02
2. Iodines					
Iodine-131	Ci	5.98E-03	2.84E-02	5.07E-03	1.33E-03
Iodine-132	Ci	*	*	7.26E-05	*
Iodine-133	Ci	4.71E-04	4.72E-04	3.60E-03	7.16E-06
Iodine-135	Ci	<LLD	<LLD	7.79E-04	<LLD
Total for period	Ci	6.45E-03	2.89E-02	9.52E-03	1.34E-03

Table A3 (Continued)
PVNGS UNIT 1
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	Quarter #3	Quarter #4	Quarter #3	Quarter #4
3. Particulates					
Antimony-122	Ci	*	*	*	2.29E-07
Antimony-124	Ci	8.88E-06	8.40E-05	1.85E-05	5.88E-05
Barium-140	Ci	<LLD	<LLD	<LLD	<LLD
Bromine-82	Ci	8.97E-06	*	1.07E-05	1.33E-05
Cerium-141	Ci	<LLD	<LLD	<LLD	<LLD
Cerium-144	Ci	<LLD	<LLD	<LLD	<LLD
Cesium-134	Ci	6.33E-07	<LLD	<LLD	<LLD
Cesium-137	Ci	1.34E-08	<LLD	1.18E-05	<LLD
Chromium-51	Ci	*	3.77E-05	*	*
Cobalt-58	Ci	3.81E-06	2.17E-04	1.95E-05	1.86E-04
Cobalt-60	Ci	<LLD	1.63E-04	<LLD	<LLD
Iron-59	Ci	<LLD	7.49E-06	<LLD	<LLD
Lanthanum-140	Ci	<LLD	<LLD	<LLD	<LLD
Manganese-54	Ci	<LLD	1.99E-05	1.21E-05	<LLD
Molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
Niobium-95	Ci	*	3.51E-05	*	*
Rubidium-88	Ci	*	*	7.74E-05	*
Ruthenium-103	Ci	*	1.81E-06	*	*
Strontium-89	Ci	<LLD	***	**	**
Strontium-90	Ci	<LLD	***	**	**

Table A3 (Continued)
PVNGS UNIT 1
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	Quarter #3	Quarter #4	Quarter #3	Quarter #4
3. Particulates (Continued)					
Tritium	Ci	<LLD	<LLD	2.09E+01	3.87E+01
Zinc-65	Ci	<LLD	<LLD	<LLD	<LLD
Zirconium-95	Ci	*	1.01E-05	*	*
Unidentified	Ci	**	**	**	**
Total for period	Ci	2.23E-05	5.76E-04	2.09E+01	3.87E+01

*Not detected
**Not applicable
***Analysis not yet completed. Additional information will be included in the next Semi-annual Report.

TABLE A4

PVNGS UNIT 1

RADIATION DOSES AT AND BEYOND THE SITE BOUNDARY FOR 1987(1)

		Unit	Quarter #1	Quarter #2	Quarter #3	Quarter #4	Year To Date
1. a.	Gamma Air Dose	mrads	4.68E-02	1.76E-02	4.87E-02	3.50E-02	1.48E-01
	% of T.S. 3.11.2.2	%	9.36E-01	3.52E-01	9.74E-01	7.00E-01	1.48E+00
b.	Beta Air Dose	mrads	1.31E-01	4.96E-02	1.36E-01	8.47E-02	4.01E-01
	% of T.S 3.11.2.2	%	1.31E+00	4.96E-01	1.36E+00	8.47E-01	2.01E+00
2.	Maximum Organ Dose	mrem	7.69E-01	2.00E+00	1.70E+00	(2) 1.03E+00	(2) 5.46E+00
	% of T.S. 3.11.2.3	%	1.03E+01	2.67E+01	2.27E+01	1.37E+01	3.64E+01

(1) Calculations are based on parameters and methodologies of the ODCM using historical meteorology.

(2) Does not include 4th quarter Sr-89,90 results.

Table A5
PVNGS UNIT 2
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	Quarter #3	Quarter #4	Est. Total Error%*
A. Fission & activation gases				
1. Total release	Ci	1.23E+03	1.10E+03	5.88E+01
2. Average release rate for period	μCi/sec	1.55E+02	1.38E+02	
3. Percent of technical specification limit	%	NA**	NA**	
B. Iodines				
1. Total Iodine-131	Ci	4.53E-03	5.27E-04	5.23E+01
2. Average release rate for period	μCi/sec	5.70E-04	6.63E-05	
3. Percent of technical specification limit	%	NA**	NA**	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	7.54E-07	1.33E-05	5.23E+01
2. Average release rate for period	μCi/sec	9.49E-08	1.67E-06	
3. Percent of technical specification limit	%	NA**	NA**	
4. Gross Alpha radioactivity	Ci	6.18E-07	4.31E-08	
D. Tritium				
1. Total release	Ci	7.80E+01	1.48E+02	4.22E+01
2. Average release rate for period	μCi/sec	9.81E+00	1.86E+01	
3. Percent of technical specification limit	%	NA***	NA***	

*Estimated total error methodology is presented in Table A11.
**See Table A7 for percent of technical specification limits.

Table A6
PVNGS UNIT 2
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	Quarter #3	Quarter #4	Quarter #3	Quarter #4
1. Fission gases					
Argon 41	Ci	*	*	2.10E-01	1.85E-01
Krypton-85	Ci	<LLD	<LLD	1.39E+01	2.06E+01
Krypton-85m	Ci	1.72E+00	3.77E-01	2.32E-02	4.69E-02
Krypton-87	Ci	<LLD	<LLD	<LLD	2.18E-03
Krypton-88	Ci	<LLD	<LLD	6.80E-03	8.04E-03
Xenon-131m	Ci	*	*	2.35E+00	3.79E+00
Xenon-133	Ci	9.85E+02	9.55E+02	4.65E+01	7.77E+01
Xenon-133m	Ci	5.30E+00	3.56E-01	4.02E-01	7.72E-01
Xenon-135	Ci	1.73E+02	4.19E+01	4.17E-01	7.29E-01
Xenon-135m	Ci	<LLD	<LLD	<LLD	<LLD
Xenon-138	Ci	<LLD	<LLD	<LLD	<LLD
Unidentified	Ci	**	**	**	**
Total for period	Ci	1.17E+03	9.98E+02	6.38E+01	1.04E+02
2. Iodines					
Iodine-131	Ci	4.51E-03	5.10E-04	2.11E-05	1.69E-05
Iodine-133	Ci	1.41E-04	<LLD	8.52E-07	1.40E-06
Iodine-135	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	4.65E-03	5.10E-04	2.20E-05	1.83E-05

Table A6 (Continued)
PVNGS UNIT 2
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

3. Particulates

Nuclides Released	Unit	CONTINUOUS MODE Quarter #3	CONTINUOUS MODE Quarter #4	BATCH MODE Quarter #3	BATCH MODE Quarter #4
Barium-140	Ci	<LLD	<LLD	<LLD	<LLD
Bromine-82	Ci	*	*	1.56E-05	1.18E-05
Cerium-141	Ci	<LLD	<LLD	<LLD	<LLD
Cerium-144	Ci	<LLD	<LLD	<LLD	<LLD
Cesium-134	Ci	<LLD	2.83E-06	<LLD	<LLD
Cesium-137	Ci	7.54E-07	1.05E-05	<LLD	<LLD
Cesium-138	Ci	*	*	*	3.41E-05
Cobalt-58	Ci	<LLD	<LLD	<LLD	<LLD
Cobalt-60	Ci	<LLD	<LLD	<LLD	<LLD
Iron-59	Ci	<LLD	<LLD	<LLD	<LLD
Lanthanum-140	Ci	<LLD	<LLD	<LLD	<LLD
Manganese-54	Ci	<LLD	<LLD	<LLD	<LLD
Molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
Rubidium-88	Ci	*	6.52E-05	3.24E-03	1.64E-02
Strontium-89	Ci	<LLD	***	**	**
Strontium-90	Ci	<LLD	***	**	**
Technetium-99m	Ci	*	4.44E-07	*	*
Tritium	Ci	<LLD	<LLD	7.80E+01	1.48E+02
Zinc-65	Ci	<LLD	<LLD	<LLD	<LLD
Unidentified	Ci	**	**	**	**
Total for period	Ci	7.54E-07	7.90E-05	7.80E+01	1.48E+02

*Not detected
**Not applicable
***Analysis not yet completed. Additional information will be included in the next Semi-annual Report.

TABLE A7

PVNGS UNIT 2

RADIATION DOSES AT AND BEYOND THE SITE BOUNDARY FOR 1987(1)

		Unit	Quarter #1	Quarter #2	Quarter #3	Quarter #4	Year To Date
1. a.	Gamma Air Dose	mrads	1.90E-01	1.80E-01	1.99E-01	1.27E-01	6.95E-01
	% of T.S. 3.11.2.2	%	3.80E+00	3.60E+00	3.98E+00	2.54E+00	6.95E+00
b.	Beta Air Dose	mrads	5.41E-01	4.31E-01	4.38E-01	3.49E-01	1.76E+00
	% of T.S. 3.11.2.2	%	5.41E+00	4.31E+00	4.38E+00	3.49E+00	1.76E+01
2.	Maximum Organ Dose	mrem	7.73E-01	7.07E-01	8.01E-01	(2) 5.40E-01	(2) 2.53E+00
	% of T.S. 3.11.2.3	%	1.03E+01	9.43E+00	1.07E+01	7.20E+00	1.69E+01

(1) Calculations are based on parameters and methodologies of the ODCM using historical meteorology.

(2) Does not include 4th quarter Sr-89,90 results.

Table A8
PVNGS UNIT 3
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	Quarter #3	Quarter #4	Est. Total Error%*
A. Fission & activation gases				
1. Total release	Ci	NA**	2.52E-02	5.88E+01
2. Average release rate for period	μCi/sec	NA**	3.17E-03	
3. Percent of technical specification limit	%	NA***	NA***	
B. Iodines				
1. Total Iodine-131	Ci	NA**	<LLD	5.23E+01
2. Average release rate for period	μCi/sec	NA**	<LLD	
3. Percent of technical specification limit	%	NA***	NA***	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	NA**	<LLD	5.23E+01
2. Average release rate for period	μCi/sec	NA**	<LLD	
3. Percent of technical specification limit	%	NA***	NA***	
4. Gross Alpha radioactivity	Ci	<LLD	<LLD	
D. Tritium				
1. Total release	Ci	NA**	3.10E+00	4.22E+01
2. Average release rate for period	μCi/sec	NA**	3.90E-01	
3. Percent of technical specification limit	%	NA***	NA***	

*Estimated total error methodology is presented in Table A11.
**PVNGS Unit 3 achieved initial criticality on October 25, 1987.
***See Table A10 for percent of technical specification limits.

Table A9
PVNGS UNIT 3
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

Nuclides Released	Unit	CONTINUOUS MODE Quarter #3	CONTINUOUS MODE Quarter #4	BATCH MODE Quarter #3	BATCH MODE Quarter #4
1. Fission gases					
Argon 41	Ci	*	**	*	2.33E-02
Krypton-85	Ci	*	<LLD	*	<LLD
Krypton-85m	Ci	*	<LLD	*	<LLD
Krypton-87	Ci	*	<LLD	*	<LLD
Krypton-88	Ci	*	<LLD	*	<LLD
Xenon-133	Ci	*	1.90E-03	*	<LLD
Xenon-133m	Ci	*	<LLD	*	<LLD
Xenon-135	Ci	*	<LLD	*	<LLD
Xenon-135m	Ci	*	<LLD	*	<LLD
Xenon-138	Ci	*	<LLD	*	<LLD
Unidentified	Ci	***	***	***	***
Total for period	Ci	*	1.90E-03	*	2.33E-02
2. Iodines					
Iodine-131	Ci	*	<LLD	*	<LLD
Iodine-133	Ci	*	<LLD	*	<LLD
Iodine-135	Ci	*	<LLD	*	<LLD
Total for period	Ci	*	<LLD	*	<LLD

Table A9 (Continued)
PVNGS UNIT 3
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

3. Particulates

Nuclides Released	Unit	CONTINUOUS MODE Quarter #3	CONTINUOUS MODE Quarter #4	BATCH MODE Quarter #3	BATCH MODE Quarter #4
Barium-140	Ci	*	<LLD	*	<LLD
Bromine-82	Ci	*	**	*	5.17E-06
Cerium-141	Ci	*	<LLD	*	<LLD
Cerium-144	Ci	*	<LLD	*	<LLD
Cesium-134	Ci	*	<LLD	*	<LLD
Cesium-137	Ci	*	<LLD	*	<LLD
Cobalt-58	Ci	*	<LLD	*	<LLD
Cobalt-60	Ci	*	<LLD	*	<LLD
Iron-59	Ci	*	<LLD	*	<LLD
Lanthanum-140	Ci	*	<LLD	*	<LLD
Manganese-54	Ci	*	<LLD	*	<LLD
Molybdenum-99	Ci	*	<LLD	*	<LLD
Strontium-89	Ci	*	****	*	***
Strontium-90	Ci	*	****	*	***
Tritium	Ci	*	<LLD	*	3.10E+00
Zinc-65	Ci	*	<LLD	*	<LLD
Unidentified	Ci	***	***	***	***
Total for period	Ci	*	<LLD	*	3.10E+00

*Not applicable. PVNGS Unit 3 achieved initial criticality on October 25, 1987
**Not detected
***Not applicable
****Analysis not yet completed. Additional information will be included in the next Semi-annual Report.

TABLE A10

PVNGS UNIT 3

RADIATION DOSES AT AND BEYOND THE SITE BOUNDARY FOR 1987(1)

		Unit	Quarter #1	Quarter #2	Quarter #3	Quarter #4	Year To Date
1. a.	Gamma Air Dose	mrads	(2) NA	NA	NA	6.15E-05	6.15E-05
	% of T.S. 3.11.2.2	%	NA	NA	NA	1.23E-03	6.15E-04
b.	Beta Air Dose	mrads	NA	NA	NA	2.22E-05	2.22E-05
	% of T.S 3.11.2.2	%	NA	NA	NA	2.22E-04	1.11E-04
2.	Maximum Organ Dose	mrem	NA	NA	NA	(3) 1.11E-02	(3) 1.11E-02
	% of T.S. 3.11.2.3	%	NA	NA	NA	1.48E-01	7.40E-02

(1) Calculations are based on parameters and methodologies of the ODCM using historical meteorology.

(2) Unit 3 achieved initial criticality on October 25, 1987.

(3) Does not include 4th quarter Sr-89,90 results.

Table A11
Estimation Methodology of Total Percent Error

The estimated total errors is calculated as follows:

$$\text{Total Percent Error} = (E_1^2 + E_2^2 + E_3^2 ,\ldots, + E_n^2)^{1/2}$$

Where E_n = Percent error associated with each contributing parameter.

Parameters contributing to errors in the measurement of gaseous effluents are process flow rates, sample collection, analytical counting and tank volumes.

Table A12

Solid Waste Summary for July-December 1987

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

1. Type of Waste

	Unit	6-Month Period	Estimated Total Error %
a. Spent resins, filter sludges, evaporator bottoms, etc.	M^3	3.45E+02	
	Ci	9.56E+02*	+/-2.50E+01
b. Dry compressible waste, contaminated equipment, etc.	M^3	4.81E+00	
	Ci	1.33E+00*	+/-2.50E+01
c. Irradiated components, control rods, etc.	M^3	0.00E+00	
	Ci	0.00E+00	NA
d. Other (filters in a HIC)	M^3	0.00E+00	
	Ci	0.00E+00	NA

*As determined by measurement; see A.2 for scaled nuclides.

2. a. Estimate of Major Nuclide Composition for Spent Resins, Filter Sludges, Evaporator Bottoms, etc., as Determined by Measurement.

Waste Class	Nuclide	% Abundance[a]	Curies
A	Sb-124	66.193	8.86E+01
A	**H-3	8.786	1.18E+01
A	Cs-137	6.013	8.05E+00
A	Co-60	6.008	8.04E+00
A	Co-58	5.706	7.63E+00
A	**Fe-55	2.626	3.51E+00
A	Cs-134	1.932	2.58E+00
A	Mn-54	1.360	1.82E+00
A	**Ni-63	0.613	8.21E-01
A	Ce-144	0.508	6.80E-01
A	Nb-95	0.158	2.11E-01
A	**C-14	0.035	4.70E-02
A	I-131	0.035	4.70E-02
A	**Sr-90	0.012	1.66E-02
A	Sb-125	0.010	1.34E-02
A	**Co-57	0.000	5.71E-04
A	**Tc-99	0.000	9.78E-05
		Total	1.34E+02

Table A12 (Continued)

Solid Waste Summary for July-December 1987

Waste Class	Nuclide	% Abundance[a]	Curies
B	Co-58	46.113	3.79E+02
B	Co-60	15.572	1.28E+02
B	Cs-137	8.719	7.17E+01
B	Sb-124	7.799	6.41E+01
B	**Fe-55	7.674	6.31E+01
B	Mn-54	7.080	5.82E+01
B	Cs-134	4.846	3.99E+01
B	**Fe-59	1.158	9.52E+00
B	**Ni-63	0.873	7.18E+00
B	**Sr-90	0.063	5.18E-01
B	Ce-144	0.058	4.77E-01
B	**C-14	0.029	2.39E-01
B	**H-3	0.016	1.30E-01
B	**Tc-99	0.000	6.67E-04
		Total	8.22E+02

[a]There is a 0.1% error from rounding.
**Isotopic concentration derived using scaling factors in accordance with 10 CFR 61.55.

Table A12 (Continued)

Solid Waste Summary for July-December 1987

2. b. Estimate of Major Nuclide Composition for Dry Compressable Waste, Contaminated Equipment, etc., as Determined by Measurement.

Waste Class	Nuclide	% Abundance[a]	Curies
A	Cr-51	21.690	2.89E-01
A	I-131	15.461	2.06E-01
A	Sb-124	11.708	1.56E-01
A	**Fe-55	11.633	1.55E-01
A	Ce-144	7.378	9.83E-02
A	Cs-137	5.464	7.28E-02
A	Co-58	5.104	6.80E-02
A	Co-60	3.940	5.25E-02
A	**C-14	3.700	4.93E-02
A	Nb-95	3.130	4.17E-02
A	**Fe-59	3.070	4.09E-02
A	Ce-141	2.184	2.91E-02
A	Zr-95	1.966	2.62E-02
A	Cs-134	1.936	2.58E-02
A	Mn-54	1.351	1.80E-02
A	**Sr-90	0.158	2.11E-03
A	**H-3	0.124	1.65E-03
A	**Tc-99	0.002	2.48E-05
		Total	1.33E+00

[a]There is 0.01% error from rounding.

**Isotopic concentration derived using scaling factors in accordance with 10 CFR 61.55.

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
17	Exclusive Use Truck	Richland, Washington
20	Exclusive Use Truck	Beatty, Nevada

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
0	NA	NA

Table A12 (Continued)

Solid Waste Summary for July-December 1987

C. ADDITIONAL INFORMATION

Thirty seven shipments:

1. 87-RW-009, three at 199.4 cubic foot each, steel liners, dewatered resin.

2. 87-RW-010, one at 199.4 cubic foot, steel liner, dewatered resin.

3. 87-RW-011, sixty at 7.5 cubic foot each, 55 gallon drums, concentrates, bitumen.

4. 87-RW-012, one at 130.8 cubic foot, HIC, dewatered resin.

5. 87-RW-013, three at 199.4 cubic foot each, steel liners, dewatered resin.

6. 87-RW-014, one at 130.8 cubic foot, HIC, dewatered resin.

7. 87-RW-015, two at 206.1 cubic foot each, steel liners, solidified concentrates, cement.

8. 87-RW-016, two at 206.1 cubic foot each, steel liners, solidified concentrates, cement.

9. 87-RW-017, two at 199.4 and one at 170.4 cubic foot each, steel liners, dewatered resin.

10. 87-RW-018, sixty seven at 7.5 cubic foot each, 55 gallon drums, concentrates and resin, bitumen.

11. 87-RW-019, two at 206.1 cubic foot each, steel liners, solidified concentrates, cement.

12. 87-RW-020, two at 206.1 cubic foot each, steel liners, solidified concentrates, cement.

13. 87-RW-021, three at 199.4 cubic foot each, steel liners, dewatered resin.

14. 87-RW-022, two at 199.4 and one at 170.2 cubic foot each, steel liners, dewatered resin.

15. 87-RW-023, one at 49.9 cubic foot, HIC, filters.

16. 87-RW-024, one at 206.1 cubic foot, steel liner, solidified concentrates, cement.

Table A12 (Continued)

Solid Waste Summary for July-December 1987

17. 87-RW-025, sixty-three at 7.5 cubic foot each, 55 gallon drums, resin and concentrates, bitumen.

18. 87-RW-026, one at 206.1 cubic foot, steel liner, solidified concentrates, cement.

19. 87-RW-027, two at 199.4 cubic foot each, steel liners, solidified concentrates, cement.

20. 87-RW-028, one at 130.8, cubic foot, HIC, dewatered resin.

21. 87-RW-029, two at 199.4 cubic foot each, steel liners, solidified concentrates, cement.

22. 87-RW-030, two at 199.4 cubic foot each, steel liners, solidified concentrates, cement.

23. 87-RW-031, one at 206.1 cubic foot, steel liner, solidified concentrates, cement.

24. 87-RW-032, one at 206.1 cubic foot, steel liner, solidified concentrates, cement.

25. 87-RW-033, two at 199.4 cubic foot each, steel liners, solidified concentrates, cement.

26. 87-RW-034, two at 199.4 cubic foot each, steel liners, solidified concentrates, cement.

27. 87-RW-035, one at 206.1 cubic foot, steel liner, solidified concentrates, cement.

28. 87-RW-036, one at 206.1 cubic foot, steel liner, solidified concentrates, cement.

29. 87-RW-037, one at 206.1 cubic foot, steel liner, solidified concentrates, cement.

30. 87-RW-038, one at 199.4 cubic foot, steel liner, dewatered resin.

31. 87-RW-039, one at 206.1 cubic foot, steel liner, solidified concentrates, cement.

32. 87-RW-040, one at 206.1, one at 199.4 and one at 170.2 cubic foot each, steel liners, solidified concentrates, cement.

33. 87-RW-041, one at 199.4 and two at 170.2 cubic foot each, steel liners, dewatered resin.

Table A12 (Continued)

Solid Waste Summary for July-December 1987

34. 87-RW-042, one at 206.1 cubic foot, steel liner, solidified concentrates, cement.

35. 87-RW-043, one at 206.1 cubic foot, steel liner, solidified concentrates, cement.

36. 87-RW-044, one at 170.2 cubic foot, steel liner, dry active waste.

37. 87-RW-045, void. (Number never used).

38. 87-RW-046, one at 170.2 cubic foot, steel liner, dewatered resin.

Table A13
PVNGS UNITS 1, 2 and 3
EFFLUENT MONITORING INSTRUMENTATION OUT OF SERVICE GREATER THAN 30 DAYS

Instrument	Inoperability Date	Inoperability Cause	Explanation
RU 145/146 Unit 2	9/15/87 - 12/3/87 (approximately)	Voltage spiking and false background radiation reading	Unable to recreate intermittent problem

APPENDIX B

METEOROLOGY

JOINT FREQUENCY DISTRIBUTION TABLES

The tables presented in this section are results obtained from processing the hourly meteorological data collected at the Palo Verde Nuclear Generating Station for 1987. The joint frequency distribution (JFD) tables represent the frequency, in terms of the number of observations, that a particular wind speed, wind direction, and stability category occurred simultaneously. On a quarterly, semi-annual and annual basis, the JFDs were produced for 35-foot wind speed and wind direction by atmospheric stability class corresponding to the seven Pasquill stability categories, and for wind speed and wind direction for all stability classes combined. Atmospheric stability was classified per Regulatory Guide 1.23, using the 200-foot to 35-foot temperature difference (delta T).

In accordance with NUREG-0133, the batch releases for the third and fourth quarters for 1987 were considered as "long term", since for each quarter, the sum of the batch release periods for each unit exceeded 150 hours. Consequently, the JFDs for the batch releases for both quarters are the same as for the continuous releases.

Table B1

JFDs of 35-Foot Wind Versus Delta T

July - September 1987

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR 3RD QUARTER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 7/ 1/87 - 9/30/87

*** 3RD QTR 1987 ***

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.51- 4.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4.51- 5.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.51- 6.50	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2
6.51- 8.50	1	0	0	0	2	3	0	0	1	3	1	2	1	0	1	0	15
8.51-11.50	1	1	1	1	7	1	0	4	13	20	16	3	2	1	0	0	71
11.51-14.50	0	0	1	1	3	0	0	1	6	11	18	2	0	0	0	0	43
14.51-20.50	0	0	1	1	0	0	0	0	2	16	6	0	0	0	0	0	26
>20.50	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2
TOTAL	2	1	4	3	13	4	0	6	22	51	41	7	3	1	1	0	159

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.51- 4.50	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2
4.51- 5.50	0	0	0	1	1	0	3	0	0	0	0	0	0	0	0	0	5
5.51- 6.50	0	0	0	1	1	4	2	2	2	8	5	1	1	0	1	0	28
6.51- 8.50	0	1	1	2	2	1	1	4	4	16	13	0	2	0	0	1	48
8.51-11.50	1	0	0	3	6	3	0	2	4	18	14	8	2	1	0	0	54
11.51-14.50	0	0	0	0	6	1	2	0	4	5	3	0	0	0	0	0	21
14.51-20.50	0	0	0	3	4	0	0	0	0	3	0	0	0	0	0	0	10
>20.50	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
TOTAL	1	1	1	10	20	9	8	8	15	43	35	9	6	1	1	1	169

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR 3RD QUARTER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 7/ 1/87 - 9/30/87

*** 3RD QTR 1987 ***

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.51- 4.50	0	0	0	0	1	1	1	1	5	1	0	2	0	0	0	0	12
4.51- 5.50	1	0	1	1	2	1	4	4	11	8	4	2	0	2	0	1	42
5.51- 6.50	1	0	1	1	3	3	0	15	14	16	11	2	4	0	2	2	75
6.51- 8.50	0	0	0	4	0	5	5	6	12	8	12	4	2	1	0	0	59
8.51-11.50	0	0	0	1	4	0	6	0	4	1	6	3	3	1	0	1	30
11.51-14.50	0	0	0	2	4	0	0	0	2	4	3	2	0	0	0	0	17
14.51-20.50	0	0	1	1	2	0	0	0	0	0	2	0	0	0	0	0	6
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	0	3	10	16	10	16	26	48	38	38	15	9	4	2	4	241

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	2	2	2	1	3	3	4	1	1	3	0	1	2	2	1	28
2.51- 3.50	1	3	1	2	4	4	4	8	6	5	1	1	1	1	2	4	48
3.51- 4.50	3	1	5	4	4	1	4	19	15	8	7	5	0	2	0	2	80
4.51- 5.50	1	1	4	1	3	2	6	16	14	14	6	1	0	1	0	0	70
5.51- 6.50	2	3	1	1	2	2	2	7	12	4	6	7	7	1	2	0	59
6.51- 8.50	1	2	3	5	5	3	11	1	6	6	11	9	4	1	0	3	71
8.51-11.50	0	3	0	5	6	10	3	2	1	9	14	10	2	2	2	0	69
11.51-14.50	0	0	1	4	8	1	5	3	7	6	6	1	0	0	0	1	43
14.51-20.50	0	0	2	1	4	2	2	1	2	10	5	0	0	0	0	1	30
>20.50	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
TOTAL	8	15	19	25	37	29	40	61	64	63	59	34	15	10	8	12	499

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR 3RD QUARTER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 7/ 1/87 - 9/30/87

*** 3RD QTR 1987 ***

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	1	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	5
1.51- 2.50	2	4	1	1	0	0	1	0	0	1	1	2	0	3	3	1	20
2.51- 3.50	5	2	6	3	0	1	2	1	0	0	4	0	4	4	2	2	36
3.51- 4.50	1	3	1	1	1	0	0	0	4	8	7	3	6	0	2	2	39
4.51- 5.50	1	2	2	2	1	0	1	1	4	9	3	5	1	2	3	3	40
5.51- 6.50	1	2	3	3	1	2	1	0	4	7	7	4	1	0	0	1	37
6.51- 8.50	0	5	5	9	2	4	5	3	5	16	25	10	3	0	0	0	92
8.51-11.50	2	4	5	21	7	6	9	5	6	30	16	10	3	0	1	3	128
11.51-14.50	0	1	0	2	16	2	1	2	6	6	6	0	0	0	0	1	43
14.51-20.50	0	4	2	2	17	0	0	2	3	5	1	0	0	0	0	0	36
>20.50	0	0	1	1	4	0	0	0	0	0	0	0	0	0	0	0	6
TOTAL	13	28	26	45	49	15	20	15	32	82	71	34	19	9	11	13	482

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.76- 1.50	1	0	1	0	0	0	0	0	1	0	0	0	1	0	2	0	6
1.51- 2.50	6	3	1	0	3	1	1	0	0	0	1	1	1	2	3	1	24
2.51- 3.50	10	6	1	0	0	1	1	1	1	3	8	8	6	4	12	10	72
3.51- 4.50	2	3	2	1	0	0	1	2	1	4	1	5	2	2	2	3	31
4.51- 5.50	4	5	2	0	2	0	0	2	3	6	6	4	4	2	1	2	43
5.51- 6.50	1	4	2	1	0	0	0	2	0	1	10	4	1	1	1	0	28
6.51- 8.50	0	1	7	0	0	0	1	4	4	9	30	9	9	1	0	0	75
8.51-11.50	0	0	2	5	0	0	1	0	0	3	10	5	0	0	0	1	27
11.51-14.50	0	0	0	2	0	0	1	0	0	1	0	1	1	0	0	0	6
14.51-20.50	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2	4
>20.50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	24	22	19	9	6	2	6	11	10	27	66	37	25	12	22	19	318

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR 3RD QUARTER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 7/ 1/87 - 9/30/87

*** 3RD QTR 1987 ***

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.76- 1.50	1	0	0	0	0	0	0	0	0	1	1	0	0	0	2	0	5
1.51- 2.50	4	4	0	1	0	0	0	1	0	0	1	2	3	4	6	4	30
2.51- 3.50	21	14	6	2	0	3	1	0	0	3	4	4	3	5	10	20	96
3.51- 4.50	43	27	2	3	0	0	0	1	1	1	0	1	3	6	6	13	107
4.51- 5.50	15	20	5	0	0	1	0	0	1	2	2	2	0	1	5	2	56
5.51- 6.50	6	12	2	0	0	0	0	0	0	0	0	3	1	0	0	3	27
6.51- 8.50	2	4	1	0	1	0	0	0	0	0	0	0	2	0	0	0	10
8.51-11.50	0	2	0	0	0	0	0	0	0	1	2	1	0	0	0	0	6
11.51-14.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14.51-20.50	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	92	84	16	6	1	4	1	2	2	8	10	13	12	16	29	42	340

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.76- 1.50	3	1	1	0	0	0	0	1	1	1	2	0	2	0	4	0	16
1.51- 2.50	12	13	4	4	4	4	5	5	1	2	6	5	5	11	14	7	102
2.51- 3.50	37	25	14	7	4	9	8	10	7	11	17	13	14	14	26	36	252
3.51- 4.50	49	34	10	9	6	2	6	23	27	22	15	16	12	10	10	20	271
4.51- 5.50	22	28	14	5	9	4	14	23	33	39	21	14	5	8	9	8	256
5.51- 6.50	11	21	9	7	8	11	5	27	32	36	39	21	15	2	6	6	256
6.51- 8.50	4	13	17	20	12	16	23	18	32	58	92	34	23	3	1	4	370
8.51-11.50	4	10	8	36	30	20	19	13	28	74	78	40	12	5	3	5	385
11.51-14.50	0	1	2	11	37	4	9	6	25	33	36	6	1	0	0	2	173
14.51-20.50	0	5	7	8	27	2	2	3	7	34	14	0	0	0	1	3	113
>20.50	0	0	2	1	5	1	0	0	0	2	0	0	0	0	0	0	11
TOTAL	142	151	88	108	142	73	91	129	193	312	320	149	89	53	74	91	2208

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR 3RD QUARTER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 7/ 1/87 - 9/30/87

*** 3RD QTR 1987 ***

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 2208

TOTAL NUMBER OF VALID OBSERVATIONS: 2208

TOTAL NUMBER OF MISSING OBSERVATIONS: 0

PERCENT DATA RECOVERY FOR THIS PERIOD: 100.0 %

MEAN WIND SPEED FOR THIS PERIOD: 7.2 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
7.20	7.65	10.91	22.60	21.83	14.40	15.40

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	2	1	4	3	13	4	0	6	22	51	41	7	3	1	1	0	0
B	1	1	1	10	20	9	8	8	15	43	35	9	6	1	1	1	0
C	2	0	3	10	16	10	16	26	48	38	38	15	9	4	2	4	0
D	8	15	19	25	37	29	40	61	64	63	59	34	15	10	8	12	0
E	13	28	26	45	49	15	20	15	32	82	71	34	19	9	11	13	0
F	24	22	19	9	6	2	6	11	10	27	66	37	25	12	22	19	1
G	92	84	16	6	1	4	1	2	2	8	10	13	12	16	29	42	2
TOTAL	142	151	88	108	142	73	91	129	193	312	320	149	89	53	74	91	3

Table B2

JFDs of 35-Foot Wind Versus Delta T

October - December 1987

PVNGS JFD: 35FT WIND VS DELTA T-(200'-35') FOR 4TH QUARTER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 10/ 1/87 - 12/31/87

*** 4TH QTR 1987 ***

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.51- 4.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4.51- 5.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.51- 6.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.51- 8.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8.51-11.50	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
11.51-14.50	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	3
14.51-20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>20.50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	0	0	0	2	2	0	0	0	0	1	0	0	0	0	0	0	5

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.51- 4.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4.51- 5.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.51- 6.50	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
6.51- 8.50	0	0	0	1	1	2	1	0	0	1	0	0	0	0	0	0	6
8.51-11.50	0	0	0	2	2	0	0	0	1	1	0	0	0	0	0	0	6
11.51-14.50	0	0	0	0	3	1	0	0	1	1	1	0	0	2	2	1	12
14.51-20.50	0	0	0	1	2	0	0	0	0	0	0	0	4	2	0	1	10
>20.50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	0	0	0	4	9	4	1	0	2	3	1	0	4	4	2	2	36

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR 4TH QUARTER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 10/ 1/87 - 12/31/87

*** 4TH QTR 1987 ***

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
3.51- 4.50	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2
4.51- 5.50	2	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	6
5.51- 6.50	0	0	0	1	0	1	2	1	3	0	1	0	0	1	0	0	10
6.51- 8.50	0	0	2	4	1	1	1	4	0	0	1	1	2	0	0	0	17
8.51-11.50	0	0	0	3	5	1	1	0	2	2	1	0	1	6	1	0	23
11.51-14.50	0	0	0	2	2	0	0	0	0	1	1	1	1	0	0	0	8
14.51-20.50	0	0	0	4	2	0	0	0	0	0	0	0	2	1	0	1	10
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	0	2	15	11	3	6	6	6	4	4	2	6	8	1	1	77

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	3
1.51- 2.50	4	3	2	3	4	2	5	4	7	10	2	3	4	4	6	6	69
2.51- 3.50	6	13	7	4	5	5	10	9	13	11	15	10	9	7	13	8	145
3.51- 4.50	4	12	12	17	8	7	2	6	9	14	10	6	5	3	4	6	125
4.51- 5.50	2	3	6	9	1	2	2	8	5	6	5	3	5	2	0	2	61
5.51- 6.50	3	4	13	11	1	2	2	4	2	3	4	2	0	0	1	1	53
6.51- 8.50	0	1	6	14	0	4	13	2	1	3	3	4	4	4	1	1	61
8.51-11.50	0	0	3	16	2	4	2	2	0	2	3	5	4	6	4	1	54
11.51-14.50	0	0	2	7	3	0	1	0	1	1	3	0	2	6	2	1	29
14.51-20.50	0	0	0	8	11	0	0	1	0	1	1	0	2	4	2	1	31
>20.50	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4
TOTAL	20	36	51	89	39	26	37	36	38	52	46	33	35	36	34	27	635

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR 4TH QUARTER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 10/ 1/87 - 12/31/87

*** 4TH QTR 1987 ***

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.76- 1.50	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	4
1.51- 2.50	5	1	3	0	3	2	2	2	2	1	3	2	3	4	7	4	44
2.51- 3.50	5	5	1	2	2	4	1	0	3	4	3	4	1	6	7	8	56
3.51- 4.50	4	4	1	1	0	1	0	2	1	3	3	1	3	5	9	4	42
4.51- 5.50	5	5	2	4	1	0	1	2	3	5	1	3	1	3	1	4	41
5.51- 6.50	3	6	1	6	0	0	1	0	0	2	2	0	0	3	5	3	32
6.51- 8.50	0	2	5	2	3	1	2	0	1	2	6	0	2	7	2	2	37
8.51-11.50	0	2	5	5	0	5	3	1	4	0	3	0	3	7	7	1	46
11.51-14.50	0	3	0	4	2	2	0	0	1	0	0	1	5	5	4	2	29
14.51-20.50	0	0	0	0	11	0	0	0	1	0	0	0	0	4	1	2	19
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	22	28	18	24	22	15	10	8	16	17	21	11	19	45	44	30	353

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.76- 1.50	2	2	0	0	1	1	0	0	0	0	0	0	1	3	1	1	12
1.51- 2.50	9	5	3	2	3	2	5	1	1	1	1	7	2	6	7	4	59
2.51- 3.50	10	11	8	0	1	2	1	0	1	0	6	2	2	5	10	15	74
3.51- 4.50	20	5	4	1	0	0	0	1	1	1	4	3	5	7	9	15	76
4.51- 5.50	10	6	4	2	0	1	0	0	1	1	2	2	1	1	8	9	48
5.51- 6.50	4	6	2	1	0	0	0	0	1	0	3	1	2	2	1	2	25
6.51- 8.50	1	3	6	0	1	2	0	0	0	0	2	3	1	1	4	2	26
8.51-11.50	1	0	1	1	0	1	0	1	0	0	1	5	1	0	0	1	13
11.51-14.50	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
14.51-20.50	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	57	38	28	8	6	10	6	3	5	3	19	23	15	25	40	49	337

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR 4TH QUARTER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 10/ 1/87 - 12/31/87

*** 4TH QTR 1987 ***

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.76- 1.50	2	1	0	0	1	0	1	0	0	2	0	0	0	1	2	3	13
1.51- 2.50	20	3	6	4	0	0	1	1	2	2	0	6	5	6	20	23	99
2.51- 3.50	45	27	14	4	2	1	2	0	2	7	4	4	7	16	29	53	217
3.51- 4.50	73	54	6	9	3	2	1	0	0	2	2	1	5	4	14	40	216
4.51- 5.50	55	31	7	4	1	0	1	0	0	0	0	0	0	2	6	12	119
5.51- 6.50	16	18	3	0	0	0	0	0	0	0	0	0	1	0	1	5	44
6.51- 8.50	7	14	5	1	0	0	0	0	0	0	0	0	0	0	1	1	29
8.51-11.50	2	5	3	4	0	0	0	0	0	0	0	0	0	0	0	0	14
11.51-14.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14.51-20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	220	153	44	26	7	3	6	1	4	13	6	11	18	29	73	137	752

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	6
0.76- 1.50	5	3	0	0	2	1	1	1	0	3	0	0	2	5	5	4	32
1.51- 2.50	38	12	14	9	10	6	13	8	12	14	6	18	14	20	40	37	271
2.51- 3.50	66	56	30	10	10	12	14	9	19	23	28	20	19	34	59	84	493
3.51- 4.50	101	75	23	28	12	10	4	9	11	20	19	11	18	19	36	65	461
4.51- 5.50	74	45	19	20	3	3	5	11	10	12	8	8	7	8	15	27	275
5.51- 6.50	26	34	19	19	1	4	5	5	6	5	10	3	3	6	8	11	165
6.51- 8.50	8	20	24	22	6	10	17	6	2	6	12	8	9	12	8	6	176
8.51-11.50	3	7	12	32	9	11	6	4	7	5	8	10	9	19	12	3	157
11.51-14.50	0	3	2	14	11	4	1	0	3	4	5	2	8	13	8	4	82
14.51-20.50	0	0	0	14	26	0	0	1	1	1	1	0	8	11	3	5	71
>20.50	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	6
TOTAL	321	255	143	168	96	61	66	54	71	93	97	80	97	147	194	246	2195

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR 4TH QUARTER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 10/ 1/87 - 12/31/87

*** 4TH QTR 1987 ***

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 2208

TOTAL NUMBER OF VALID OBSERVATIONS: 2195

TOTAL NUMBER OF MISSING OBSERVATIONS: 13

PERCENT DATA RECOVERY FOR THIS PERIOD: 99.4 %

MEAN WIND SPEED FOR THIS PERIOD: 5.3 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.23	1.64	3.51	28.93	16.08	15.35	34.26

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	2	2	0	0	0	0	1	0	0	0	0	0	0	0
B	0	0	0	4	9	4	1	0	2	3	1	0	4	4	2	2	0
C	2	0	2	15	11	3	6	6	6	4	4	2	6	8	1	1	0
D	20	36	51	89	39	26	37	36	38	52	46	33	35	36	34	27	0
E	22	28	18	24	22	15	10	8	16	17	21	11	19	45	44	30	3
F	57	38	28	8	6	10	6	3	5	3	19	23	15	25	40	49	2
G	220	153	44	26	7	3	6	1	4	13	6	11	18	29	73	137	1
TOTAL	321	255	143	168	96	61	66	54	71	93	97	80	97	147	194	246	6

Table B3

JFDs of 35-Foot Wind Versus Delta T

July - December 1987

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR JULY - DECEMBER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 7/ 1/87 - 12/31/87

*** JUL - DEC 1987 ***

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.51- 4.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4.51- 5.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.51- 6.50	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2
6.51- 8.50	1	0	0	0	2	3	0	0	1	3	1	2	1	0	1	0	15
8.51-11.50	1	1	1	2	7	1	0	4	13	20	16	3	2	1	0	0	72
11.51-14.50	0	0	1	2	4	0	0	1	6	12	18	2	0	0	0	0	46
14.51-20.50	0	0	1	1	0	0	0	0	2	16	6	0	0	0	0	0	26
>20.50	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	3
TOTAL	2	1	4	5	15	4	0	6	22	52	41	7	3	1	1	0	164

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.51- 4.50	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2
4.51- 5.50	0	0	0	1	1	0	3	0	0	0	0	0	0	0	0	0	5
5.51- 6.50	0	0	0	1	1	5	2	2	2	8	5	1	1	0	1	0	29
6.51- 8.50	0	1	1	3	3	3	2	4	4	17	13	0	2	0	0	1	54
8.51-11.50	1	0	0	5	8	3	0	2	5	11	14	8	2	1	0	0	60
11.51-14.50	0	0	0	0	9	2	2	0	5	6	4	0	0	2	2	1	33
14.51-20.50	0	0	0	4	6	0	0	0	0	3	0	0	4	2	0	1	20
>20.50	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	2
TOTAL	1	1	1	14	29	13	9	8	17	46	36	9	10	5	3	3	205

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR JULY - DECEMBER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 7/ 1/87 - 12/31/87

*** JUL - DEC 1987 ***

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
3.51- 4.50	0	0	0	0	2	1	2	1	5	1	0	2	0	0	0	0	14
4.51- 5.50	3	0	1	2	2	1	5	5	12	8	4	2	0	2	0	1	48
5.51- 6.50	1	0	1	2	3	4	2	16	17	16	12	2	4	1	2	2	85
6.51- 8.50	0	0	2	8	1	6	6	10	12	8	13	5	4	1	0	0	76
8.51-11.50	0	0	0	4	9	1	7	0	6	3	7	3	4	7	1	1	53
11.51-14.50	0	0	0	4	6	0	0	0	2	5	4	3	1	0	0	0	25
14.51-20.50	0	0	1	5	4	0	0	0	0	0	2	0	2	1	0	1	16
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	0	5	25	27	13	22	32	54	42	42	17	15	12	3	5	318

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	3
1.51- 2.50	4	5	4	5	5	5	8	8	8	11	5	3	5	6	8	7	97
2.51- 3.50	7	16	8	6	9	9	14	17	19	16	16	11	10	8	15	12	193
3.51- 4.50	7	13	17	21	12	8	6	25	24	22	17	11	5	5	4	8	205
4.51- 5.50	3	4	10	10	4	4	8	24	19	20	11	4	5	3	0	2	131
5.51- 6.50	5	7	14	12	3	4	4	11	14	7	10	9	7	1	3	1	112
6.51- 8.50	1	3	9	19	5	7	24	3	7	9	14	13	8	5	1	4	132
8.51-11.50	0	3	3	21	8	14	5	4	1	11	17	15	6	8	6	1	123
11.51-14.50	0	0	3	11	11	1	6	3	8	7	9	1	2	6	2	2	72
14.51-20.50	0	0	2	9	15	2	2	2	2	11	6	0	2	4	2	2	61
>20.50	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	5
TOTAL	28	51	70	114	76	55	77	97	102	115	105	67	50	46	42	39	1134

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR JULY - DECEMBER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 7/ 1/87 - 12/31/87

*** JUL - DEC 1987 ***

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.76- 1.50	1	1	0	0	0	0	0	2	0	0	1	0	2	1	1	0	9
1.51- 2.50	7	5	4	1	3	2	3	2	2	2	4	4	3	7	10	5	64
2.51- 3.50	10	7	7	5	2	5	3	1	3	4	7	4	5	10	9	10	92
3.51- 4.50	5	7	2	2	1	1	0	2	5	11	10	4	9	5	11	6	81
4.51- 5.50	6	7	4	6	2	0	2	3	7	14	4	8	2	5	4	7	81
5.51- 6.50	4	8	4	9	1	2	2	0	4	9	9	4	1	3	5	4	69
6.51- 8.50	0	7	10	11	5	5	7	3	6	18	31	10	5	7	2	2	129
8.51-11.50	2	6	10	26	7	11	12	6	10	30	19	10	6	7	8	4	174
11.51-14.50	0	4	0	6	18	4	1	2	7	6	6	1	5	5	4	3	72
14.51-20.50	0	4	2	2	28	0	0	2	4	5	1	0	0	4	1	2	55
>20.50	0	0	1	1	4	0	0	0	0	0	0	0	0	0	0	0	6
TOTAL	35	56	44	69	71	30	30	23	48	99	92	45	38	54	55	43	835

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.76- 1.50	3	2	1	0	1	1	0	0	1	0	0	0	2	3	3	1	18
1.51- 2.50	15	8	4	2	6	3	6	1	1	1	2	8	3	8	10	5	83
2.51- 3.50	20	17	9	0	1	3	2	1	2	3	14	10	8	9	22	25	146
3.51- 4.50	22	8	6	2	0	0	1	3	2	5	5	8	7	9	11	18	107
4.51- 5.50	14	11	6	2	2	1	0	2	4	7	8	6	5	3	9	11	91
5.51- 6.50	5	10	4	2	0	0	0	2	1	1	13	5	3	3	2	2	53
6.51- 8.50	1	4	13	0	1	2	1	4	4	9	32	12	10	2	4	2	101
8.51-11.50	1	0	3	6	0	1	1	1	0	3	11	10	1	0	0	2	40
11.51-14.50	0	0	0	2	0	1	1	0	0	1	0	1	1	0	0	0	7
14.51-20.50	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	2	5
>20.50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	81	60	47	17	12	12	12	14	15	30	85	60	40	37	62	68	655

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR JULY - DECEMBER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 7/ 1/87 - 12/31/87

*** JUL - DEC 1987 ***

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.76- 1.50	3	1	0	0	1	0	1	0	0	3	1	0	0	1	4	3	18
1.51- 2.50	24	7	6	5	0	0	1	2	2	2	1	8	8	10	26	27	129
2.51- 3.50	66	41	20	6	2	4	3	0	2	10	8	8	10	21	39	73	313
3.51- 4.50	116	81	8	12	3	2	1	1	1	3	2	2	8	10	20	53	323
4.51- 5.50	70	51	12	4	1	1	1	0	1	2	2	2	0	3	11	14	175
5.51- 6.50	22	30	5	0	0	0	0	0	0	0	0	3	2	0	1	8	71
6.51- 8.50	9	18	6	1	1	0	0	0	0	0	0	0	2	0	1	1	39
8.51-11.50	2	7	3	4	0	0	0	0	0	1	2	1	0	0	0	0	20
11.51-14.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14.51-20.50	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	312	237	60	32	8	7	7	3	6	21	16	24	30	45	102	179	1092

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	9
0.76- 1.50	8	4	1	0	2	1	1	2	1	4	2	0	4	5	9	4	48
1.51- 2.50	50	25	18	13	14	10	18	13	13	16	12	23	19	31	54	44	373
2.51- 3.50	103	81	44	17	14	21	22	19	26	34	45	33	33	48	85	120	745
3.51- 4.50	150	109	33	37	18	12	10	32	38	42	34	27	30	29	46	85	732
4.51- 5.50	96	73	33	25	12	7	19	34	43	51	29	22	12	16	24	35	531
5.51- 6.50	37	55	28	26	9	15	10	32	38	41	49	24	18	8	14	17	421
6.51- 8.50	12	33	41	42	18	26	40	24	34	64	104	42	32	15	9	10	546
8.51-11.50	7	17	20	68	39	31	25	17	35	79	86	50	21	24	15	8	542
11.51-14.50	0	4	4	25	48	8	10	6	28	37	41	8	9	13	8	6	255
14.51-20.50	0	5	7	22	53	2	2	4	8	35	15	0	8	11	4	8	184
>20.50	0	0	2	1	11	1	0	0	0	2	0	0	0	0	0	0	17
TOTAL	463	406	231	276	238	134	157	183	264	405	417	229	186	200	268	337	4403

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR JULY - DECEMBER 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 7/ 1/87 - 12/31/87

*** JUL - DEC 1987 ***

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 4416

TOTAL NUMBER OF VALID OBSERVATIONS: 4403

TOTAL NUMBER OF MISSING OBSERVATIONS: 13

PERCENT DATA RECOVERY FOR THIS PERIOD: 99.7 %

MEAN WIND SPEED FOR THIS PERIOD: 6.2 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
3.72	4.66	7.22	25.76	18.96	14.88	24.80

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	2	1	4	5	15	4	0	6	22	52	41	7	3	1	1	0	0
B	1	1	1	14	29	13	9	8	17	46	36	9	10	5	3	3	0
C	4	0	5	25	27	13	22	32	54	42	42	17	15	12	3	5	0
D	28	51	70	114	76	55	77	97	102	115	105	67	50	46	42	39	0
E	35	56	44	69	71	30	30	23	48	99	92	45	38	54	55	43	3
F	81	60	47	17	12	12	12	14	15	30	85	60	40	37	62	68	3
G	312	237	60	32	8	7	7	3	6	21	16	24	30	45	102	179	3
TOTAL	463	406	231	276	238	134	157	183	264	405	417	229	186	200	268	337	9

Table B4

JFDs of 35-Foot Wind Versus Delta T

January - December 1987

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR THE ANNUAL PERIOD 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 1/ 1/87 - 12/31/87

*** ANNUAL ***

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
3.51- 4.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4.51- 5.50	1	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	4
5.51- 6.50	0	0	0	1	2	0	0	1	0	0	2	1	0	0	0	0	7
6.51- 8.50	1	2	0	0	4	5	1	1	3	9	6	6	2	0	2	0	42
8.51-11.50	1	2	1	6	15	5	2	4	15	42	44	15	3	4	1	0	160
11.51-14.50	3	0	2	3	8	4	0	2	9	19	40	5	5	1	3	1	105
14.51-20.50	2	0	1	3	10	1	1	0	2	23	26	1	1	10	7	8	96
>20.50	0	0	1	0	1	0	0	0	0	1	6	4	0	0	0	0	13
TOTAL	8	4	5	13	40	16	5	8	30	94	124	32	11	15	14	9	428

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.51- 4.50	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	3
4.51- 5.50	1	0	0	3	1	0	6	2	0	1	0	1	0	0	0	0	15
5.51- 6.50	1	0	0	3	2	10	3	6	7	11	10	4	1	0	1	3	62
6.51- 8.50	1	2	4	4	7	7	4	11	23	34	33	9	8	1	2	3	153
8.51-11.50	1	1	1	7	17	10	4	5	12	28	29	14	4	1	2	1	137
11.51-14.50	0	1	2	1	19	7	2	0	5	7	14	3	2	2	2	1	68
14.51-20.50	0	1	2	5	15	3	0	0	0	4	5	2	5	3	0	2	47
>20.50	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	3
TOTAL	4	5	9	23	62	37	19	24	48	86	92	33	21	7	8	10	488

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR THE ANNUAL PERIOD 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 1/ 1/87 - 12/31/87

*** ANNUAL ***

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	0	0	0	0	0	1	0	2	0	1	0	0	0	0	0	0	4
3.51- 4.50	0	2	1	0	3	1	2	3	6	3	1	2	0	0	0	0	24
4.51- 5.50	5	2	2	4	3	2	9	14	28	23	9	4	0	5	2	2	114
5.51- 6.50	2	1	4	3	4	6	6	27	32	31	21	11	5	1	4	3	161
6.51- 8.50	2	0	3	10	7	17	22	16	21	21	29	14	7	2	1	1	173
8.51-11.50	0	1	2	4	17	3	10	2	6	7	16	9	7	9	3	3	99
11.51-14.50	0	1	1	5	13	1	0	1	2	8	9	4	4	3	0	1	53
14.51-20.50	0	0	2	5	16	1	0	0	0	0	2	2	2	3	2	2	37
>20.50	0	0	0	0	5	0	0	0	0	1	0	0	1	0	0	0	7
TOTAL	9	7	15	31	68	32	49	65	95	95	87	46	26	23	12	12	672

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.76- 1.50	2	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	5
1.51- 2.50	9	7	7	6	8	10	9	12	10	17	9	6	8	8	10	7	143
2.51- 3.50	14	22	16	21	16	22	27	30	35	34	31	15	16	11	17	19	346
3.51- 4.50	14	19	26	33	22	24	19	47	47	45	29	18	11	12	6	12	384
4.51- 5.50	9	5	14	20	17	17	17	38	48	38	18	14	12	11	2	5	285
5.51- 6.50	7	11	18	16	11	8	8	19	23	15	18	12	14	3	5	3	191
6.51- 8.50	3	7	15	25	23	11	30	9	8	15	27	20	12	10	6	7	228
8.51-11.50	1	7	4	23	18	22	10	7	3	14	36	33	15	9	11	3	216
11.51-14.50	1	3	5	20	42	5	9	5	9	13	21	10	4	11	4	3	165
14.51-20.50	0	1	4	13	47	3	3	2	6	17	22	11	7	9	5	5	155
>20.50	0	0	0	0	7	1	0	0	4	2	2	2	0	0	1	0	19
TOTAL	60	82	109	177	211	123	132	169	193	212	213	141	99	84	68	64	2137

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR THE ANNUAL PERIOD 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 1/ 1/87 - 12/31/87

*** ANNUAL ***

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.76- 1.50	1	2	0	1	0	0	0	2	0	0	1	0	2	1	1	0	11
1.51- 2.50	11	11	7	4	4	4	8	7	4	3	6	7	5	9	15	8	113
2.51- 3.50	12	14	13	9	3	8	9	4	9	7	13	7	9	14	12	13	156
3.51- 4.50	10	12	10	7	2	5	4	4	13	16	16	8	13	8	13	10	151
4.51- 5.50	10	11	10	8	3	2	8	6	7	19	12	13	8	8	6	15	146
5.51- 6.50	8	12	7	12	2	3	6	1	7	20	19	12	7	4	6	5	131
6.51- 8.50	4	12	15	16	7	9	10	4	12	27	63	32	18	12	6	5	252
8.51-11.50	5	10	13	42	13	15	16	10	17	48	71	50	20	10	15	7	362
11.51-14.50	0	6	2	18	29	6	3	3	7	22	25	26	11	10	6	7	181
14.51-20.50	0	4	3	3	41	0	0	2	7	11	8	4	4	12	4	2	105
>20.50	0	0	1	1	4	0	0	0	0	0	0	0	0	0	0	0	6
TOTAL	61	94	81	121	108	52	64	43	83	173	234	159	97	88	84	72	1617

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.76- 1.50	3	3	1	1	1	2	0	0	1	0	0	0	2	4	3	2	23
1.51- 2.50	30	15	6	4	11	4	9	7	5	2	5	13	11	14	16	14	166
2.51- 3.50	41	28	21	5	4	6	9	3	7	12	18	19	15	16	36	41	281
3.51- 4.50	40	13	11	4	4	2	3	3	5	11	13	14	19	19	18	29	208
4.51- 5.50	26	20	10	5	4	2	1	3	8	14	19	15	14	10	15	23	189
5.51- 6.50	12	15	8	4	1	1	0	4	1	5	22	15	13	6	6	12	125
6.51- 8.50	4	10	17	4	2	2	1	6	4	17	56	20	28	10	7	13	201
8.51-11.50	6	3	6	6	1	1	1	2	0	7	22	19	5	1	2	13	95
11.51-14.50	1	1	1	3	0	2	1	0	0	2	0	1	2	0	0	2	16
14.51-20.50	0	0	2	1	0	0	0	0	0	0	0	0	0	0	1	2	6
>20.50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	163	108	83	37	29	22	25	28	31	70	155	116	109	80	104	151	1314

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR THE ANNUAL PERIOD 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 1/ 1/87 - 12/31/87

*** ANNUAL ***

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.76- 1.50	7	3	2	1	1	0	1	0	1	3	1	0	1	3	8	4	36
1.51- 2.50	49	21	19	9	3	1	5	8	6	5	3	12	20	23	41	58	283
2.51- 3.50	144	96	55	13	7	8	9	5	5	15	13	16	21	31	68	116	622
3.51- 4.50	173	140	42	18	5	4	4	3	6	3	4	9	10	20	46	74	561
4.51- 5.50	118	102	30	7	2	2	1	0	4	2	2	4	3	5	14	21	317
5.51- 6.50	41	54	17	0	0	0	0	0	0	0	0	5	3	0	3	19	142
6.51- 8.50	18	30	19	2	1	0	0	0	0	1	1	0	2	0	2	7	83
8.51-11.50	2	13	5	6	0	0	1	1	0	1	6	1	0	0	0	3	39
11.51-14.50	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	4
14.51-20.50	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	552	462	190	57	19	15	21	17	22	30	30	47	60	82	182	302	2091

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	9
0.76- 1.50	13	8	3	3	2	2	1	2	2	5	2	0	5	8	13	6	75
1.51- 2.50	99	54	39	23	26	19	31	34	25	27	23	38	44	54	82	87	705
2.51- 3.50	211	160	105	48	30	45	54	44	56	69	75	57	61	72	134	189	1410
3.51- 4.50	237	186	90	62	36	36	32	60	78	78	63	51	54	59	84	125	1331
4.51- 5.50	170	140	66	47	30	26	43	63	96	97	60	51	37	39	39	66	1070
5.51- 6.50	71	93	54	39	22	28	23	58	70	82	92	60	43	14	25	45	819
6.51- 8.50	33	63	73	61	51	51	68	47	71	124	215	101	77	35	26	36	1132
8.51-11.50	16	37	32	94	81	56	44	31	53	147	224	141	54	34	34	30	1108
11.51-14.50	5	14	14	51	111	25	15	11	32	71	109	49	28	27	15	15	592
14.51-20.50	2	7	14	30	129	8	4	4	15	55	63	20	19	37	19	21	447
>20.50	0	0	2	1	19	1	0	0	4	5	9	6	1	0	1	0	49
TOTAL	857	762	492	459	537	297	315	354	502	760	935	574	423	379	472	620	8747

PVNGS JFD: 35FT WIND VS DELTA T (200'-35') FOR THE ANNUAL PERIOD 1987
SITE IDENTIFIER: PVNGS
DATA PERIOD EXAMINED: 1/ 1/87 - 12/31/87

*** ANNUAL ***

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 8760

TOTAL NUMBER OF VALID OBSERVATIONS: 8747

TOTAL NUMBER OF MISSING OBSERVATIONS: 13

PERCENT DATA RECOVERY FOR THIS PERIOD: 99.9 %

MEAN WIND SPEED FOR THIS PERIOD: 6.5 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
4.89	5.58	7.68	24.43	18.49	15.02	23.91

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	8	4	5	13	40	16	5	8	30	94	124	32	11	15	14	9	0
B	4	5	9	23	62	37	19	24	48	86	92	33	21	7	8	10	0
C	9	7	15	31	68	32	49	65	95	95	87	46	26	23	12	12	0
D	60	82	109	177	211	123	132	169	193	212	213	141	99	84	68	64	0
E	61	94	81	121	108	52	64	43	83	173	234	159	97	88	84	72	3
F	163	108	83	37	29	22	25	28	31	70	155	116	109	80	104	151	3
G	552	462	190	57	19	15	21	17	22	30	30	47	60	82	182	302	3
TOTAL	857	762	492	459	537	297	315	354	502	760	935	574	423	379	472	620	9

APPENDIX C

DOSE CALCULATIONS

GASEOUS EFFLUENT* DOSE CALCULATION

Doses to the maximum individual and the surrounding population resulting from the release of radioactive material in gaseous effluents from the Palo Verde Nuclear Generating Station were calculated using the GASPAR computer program. Gaseous effluents were released from Units 1 and 2 during the third and fourth quarters, and from Unit 3 in the fourth quarter. The radionuclides considered in the dose calculations were Tritium, Iodine-131, Iodine-132, Iodine-133, Iodine-135, all noble gases, and particulates having a half-life greater than eight days and for which dose factors are contained in NUREG-0172. Strontium-89 and Strontium-90 were considered for the third quarter only since the fourth quarter results were not available. Locations selected for individual dose calculations included for each sector, the site boundary, and within five miles, if present, the nearest residence, the nearest garden and the nearest milk animal. GASPAR implements the radiological dose models of Regulatory Guide 1.109 to determine the radiation exposure to man from four principal atmospheric exposure pathways: plume, ground deposition, inhalation, and ingestion. The ingestion pathways considered were cow milk, goat milk, meat, and vegetables. Doses to the maximum individual and the population were calculated as a function of age group and pathway for significant body organs. Assumptions and data sources used for input to the GASPAR code are described on page C8.

Table C1 presents the doses on a quarterly and semi-annual basis for the highest exposed location on the site boundary, the maximum individual in the general public and the Visitors Center. The site boundary and residence** locations for which data are presented represent the highest annual doses. An occupancy factor of 1.0 (implying continuous occupancy over the entire year) was considered for the Visitor Center and the exposure pathways considered to calculate its doses were plume, ground deposition, and inhalation. Table C1 also presents the total dose as defined in Technical Specification 3.11.4.

Table C2 presents the population doses for the year 1987. Table C3 summarizes the individual doses and compares the result to PVNGS Technical Specification limits.

Based on results obtained by placing TLDs on the site boundary in each sector, the net annual dose from direct-radiation, plume and ground deposition from all three units was determined to be zero.

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*There were no liquid effluents associated with the operation of this facility

**Based on December 1987 land-use census.

TABLE C1

DOSES TO SPECIAL LOCATIONS FOR JANUARY-DECEMBER 1987

SITE BOUNDARY 1.40 MILES SSW FROM UNIT 1, 1.14 MILES SSW FROM UNIT 2 AND 1.10 MILES SSW FROM UNIT 3*

	BETA	GAMMA
AIR DOSES(MRAD)		
1ST QUARTER	8.13E-01	2.85E-01
2ND QUARTER	1.64E-01	6.65E-02
1ST SEMI-ANNUAL	9.77E-01	3.51E-01
3RD QUARTER	3.15E-01	1.36E-01
4TH QUARTER	4.39E-01	1.63E-01
2ND SEMI-ANNUAL	7.54E-01	2.98E-01
ANNUAL	1.73E+00	6.50E-01

	T. BODY	SKIN
MAXIMUM INDIVIDUAL(MREM)		
1ST QUARTER	1.68E-01	4.82E-01
2ND QUARTER	4.01E-02	1.07E-01
1ST SEMI-ANNUAL	2.08E-01	5.89E-01
3RD QUARTER	8.39E-02	2.36E-01
4TH QUARTER	9.70E-02	2.77E-01
2ND SEMI-ANNUAL	1.81E-01	5.13E-01
ANNUAL	3.89E-01	1.10E+00

MAXIMUM INDIVIDUAL IN GENERAL PUBLIC LOCATED AT A RESIDENCE 2.96 MILES SOUTH OF UNIT 1, 2.80 MILES SOUTH OF UNIT 2 AND 2.64 MILES SOUTH OF UNIT 3*

(MREM)	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
1ST QUARTER								
ADULT	1.30E-01	1.30E-01	8.54E-02	1.30E-01	1.30E-01	1.45E-01	1.30E-01	2.90E-01
TEEN	1.30E-01	1.30E-01	8.55E-02	1.30E-01	1.30E-01	1.48E-01	1.30E-01	2.90E-01
CHILD	1.25E-01	1.25E-01	8.55E-02	1.25E-01	1.25E-01	1.45E-01	1.25E-01	2.85E-01
INFANT	1.08E-01	1.08E-01	8.55E-02	1.08E-01	1.08E-01	1.27E-01	1.08E-01	2.68E-01
2ND QUARTER								
ADULT	5.35E-02	5.35E-02	3.66E-02	5.35E-02	5.36E-02	6.96E-02	5.35E-02	1.15E-01
TEEN	5.36E-02	5.36E-02	3.66E-02	5.37E-02	5.37E-02	7.36E-02	5.37E-02	1.16E-01
CHILD	5.17E-02	5.16E-02	3.66E-02	5.17E-02	5.17E-02	7.40E-02	5.17E-02	1.14E-01
INFANT	4.52E-02	4.52E-02	3.66E-02	4.53E-02	4.53E-02	6.58E-02	4.53E-02	1.07E-01
1ST SEMI-ANNUAL								
ADULT	1.83E-01	1.83E-01	1.22E-01	1.83E-01	1.84E-01	2.14E-01	1.83E-01	4.05E-01
TEEN	1.84E-01	1.84E-01	1.22E-01	1.84E-01	1.84E-01	2.22E-01	1.84E-01	4.06E-01
CHILD	1.77E-01	1.77E-01	1.22E-01	1.77E-01	1.77E-01	2.19E-01	1.77E-01	3.98E-01
INFANT	1.53E-01	1.53E-01	1.22E-01	1.54E-01	1.54E-01	1.93E-01	1.53E-01	3.75E-01
3RD QUARTER								
ADULT	6.30E-02	6.30E-02	5.07E-02	6.30E-02	6.30E-02	7.95E-02	6.30E-02	1.56E-01
TEEN	6.31E-02	6.30E-02	5.07E-02	6.31E-02	6.31E-02	8.35E-02	6.30E-02	1.56E-01
CHILD	6.16E-02	6.16E-02	5.07E-02	6.17E-02	6.17E-02	8.45E-02	6.16E-02	1.54E-01
INFANT	5.70E-02	5.70E-02	5.07E-02	5.70E-02	5.70E-02	7.80E-02	5.70E-02	1.50E-01
4TH QUARTER								
ADULT	1.29E-01	1.29E-01	7.55E-02	1.30E-01	1.30E-01	1.99E-01	1.30E-01	2.69E-01
TEEN	1.30E-01	1.30E-01	7.56E-02	1.30E-01	1.30E-01	2.15E-01	1.30E-01	2.69E-01
CHILD	1.24E-01	1.23E-01	7.57E-02	1.24E-01	1.24E-01	2.18E-01	1.24E-01	2.63E-01
INFANT	1.03E-01	1.03E-01	7.56E-02	1.03E-01	1.03E-01	1.89E-01	1.03E-01	2.43E-01
2ND SEMI-ANNUAL								
ADULT	1.92E-01	1.92E-01	1.26E-01	1.93E-01	1.93E-01	2.78E-01	1.93E-01	4.25E-01
TEEN	1.93E-01	1.93E-01	1.26E-01	1.93E-01	1.93E-01	2.98E-01	1.93E-01	4.25E-01
CHILD	1.85E-01	1.85E-01	1.26E-01	1.85E-01	1.86E-01	3.02E-01	1.85E-01	4.17E-01
INFANT	1.60E-01	1.60E-01	1.26E-01	1.60E-01	1.60E-01	2.67E-01	1.60E-01	3.92E-01
ANNUAL								
ADULT	3.76E-01	3.76E-01	2.48E-01	3.76E-01	3.76E-01	4.92E-01	3.76E-01	8.30E-01
TEEN	3.77E-01	3.77E-01	2.48E-01	3.77E-01	3.77E-01	5.20E-01	3.77E-01	8.31E-01
CHILD	3.62E-01	3.62E-01	2.49E-01	3.62E-01	3.62E-01	5.22E-01	3.62E-01	8.16E-01
INFANT	3.14E-01	3.13E-01	2.48E-01	3.14E-01	3.14E-01	4.60E-01	3.14E-01	7.68E-01

* Unit 3 achieved initial criticality on October 25, 1987

TABLE C1 (CONTINUED)

VISITOR'S CENTER LOCATED ONSITE 0.45 MILES WNW OF UNIT 1, 0.42 MILES NW OF UNIT 2 AND 0.58 MILES NW OF UNIT 3*

(MREM)	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
1ST QUARTER								
ADULT	8.67E-02	8.67E-02	5.97E-02	8.67E-02	8.67E-02	9.70E-02	8.67E-02	1.97E-01
TEEN	8.69E-02	8.69E-02	5.97E-02	8.69E-02	8.69E-02	9.95E-02	8.69E-02	1.98E-01
CHILD	8.37E-02	8.37E-02	5.97E-02	8.37E-02	8.37E-02	9.78E-02	8.38E-02	1.94E-01
INFANT	7.35E-02	7.35E-02	5.97E-02	7.35E-02	7.35E-02	8.64E-02	7.35E-02	1.84E-01
2ND QUARTER								
ADULT	2.79E-02	2.79E-02	2.04E-02	2.79E-02	2.79E-02	3.44E-02	2.79E-02	6.09E-02
TEEN	2.79E-02	2.79E-02	2.04E-02	2.79E-02	2.80E-02	3.60E-02	2.79E-02	6.09E-02
CHILD	2.71E-02	2.70E-02	2.05E-02	2.71E-02	2.71E-02	3.61E-02	2.71E-02	6.01E-02
INFANT	2.42E-02	2.42E-02	2.05E-02	2.43E-02	2.43E-02	3.25E-02	2.43E-02	5.73E-02
1ST SEMI-ANNUAL								
ADULT	1.15E-01	1.15E-01	8.01E-02	1.15E-01	1.15E-01	1.31E-01	1.15E-01	2.58E-01
TEEN	1.15E-01	1.15E-01	8.01E-02	1.15E-01	1.15E-01	1.36E-01	1.15E-01	2.59E-01
CHILD	1.11E-01	1.11E-01	8.01E-02	1.11E-01	1.11E-01	1.34E-01	1.11E-01	2.54E-01
INFANT	9.78E-02	9.77E-02	8.01E-02	9.78E-02	9.78E-02	1.19E-01	9.78E-02	2.41E-01
3RD QUARTER								
ADULT	3.56E-02	3.56E-02	2.89E-02	3.56E-02	3.56E-02	4.45E-02	3.56E-02	8.79E-02
TEEN	3.56E-02	3.56E-02	2.89E-02	3.56E-02	3.57E-02	4.66E-02	3.56E-02	8.79E-02
CHILD	3.48E-02	3.48E-02	2.89E-02	3.49E-02	3.49E-02	4.72E-02	3.48E-02	8.71E-02
INFANT	3.23E-02	3.23E-02	2.89E-02	3.23E-02	3.23E-02	4.36E-02	3.23E-02	8.46E-02
4TH QUARTER								
ADULT	5.18E-02	5.17E-02	3.08E-02	5.18E-02	5.18E-02	7.57E-02	5.18E-02	1.07E-01
TEEN	5.19E-02	5.19E-02	3.08E-02	5.19E-02	5.20E-02	8.12E-02	5.20E-02	1.07E-01
CHILD	4.95E-02	4.94E-02	3.08E-02	4.95E-02	4.96E-02	8.20E-02	4.95E-02	1.05E-01
INFANT	4.15E-02	4.15E-02	3.08E-02	4.16E-02	4.16E-02	7.13E-02	4.16E-02	9.68E-02
2ND SEMI-ANNUAL								
ADULT	8.73E-02	8.73E-02	5.97E-02	8.74E-02	8.74E-02	1.20E-01	8.74E-02	1.95E-01
TEEN	8.75E-02	8.75E-02	5.97E-02	8.76E-02	8.77E-02	1.28E-01	8.76E-02	1.95E-01
CHILD	8.43E-02	8.42E-02	5.98E-02	8.44E-02	8.44E-02	1.29E-01	8.44E-02	1.92E-01
INFANT	7.38E-02	7.38E-02	5.97E-02	7.39E-02	7.39E-02	1.15E-01	7.39E-02	1.81E-01
ANNUAL								
ADULT	2.02E-01	2.02E-01	1.40E-01	2.02E-01	2.02E-01	2.52E-01	2.02E-01	4.53E-01
TEEN	2.02E-01	2.02E-01	1.40E-01	2.02E-01	2.03E-01	2.63E-01	2.02E-01	4.54E-01
CHILD	1.95E-01	1.95E-01	1.40E-01	1.95E-01	1.95E-01	2.63E-01	1.95E-01	4.46E-01
INFANT	1.72E-01	1.72E-01	1.40E-01	1.72E-01	1.72E-01	2.34E-01	1.72E-01	4.23E-01

* Unit 3 achieved initial criticality on October 25, 1987

TABLE C2

INTEGRATED POPULATION DOSES FOR JANUARY - DECEMBER 1987

PERSONREM

JANUARY 1 - JUNE 30 1987

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	7.78E-01	7.78E-01	7.78E-01	7.78E-01	7.78E-01	7.78E-01	7.78E-01	2.73E+00
GROUND	6.15E-04	6.15E-04	6.15E-04	6.15E-04	6.15E-04	6.15E-04	6.15E-04	7.24E-04
INHAL	6.79E-01	6.79E-01	8.98E-04	6.80E-01	6.81E-01	1.05E+00	6.80E-01	6.79E-01
VEGET	2.21E+00	2.21E+00	1.55E-03	2.21E+00	2.21E+00	2.80E+00	2.21E+00	2.21E+00
COW MILK	2.81E-01	2.81E-01	2.43E-04	2.82E-01	2.82E-01	3.73E-01	2.81E-01	2.81E-01
MEAT	8.27E-02	8.27E-02	5.47E-07	8.27E-02	8.27E-02	8.28E-02	8.27E-02	8.27E-02
TOTAL	4.03E+00	4.03E+00	7.81E-01	4.03E+00	4.03E+00	5.08E+00	4.03E+00	5.97E+00
PER CAPITA DOSE (REM) (a)	2.24E-06	2.24E-06	4.35E-07	2.24E-06	2.24E-06	2.83E-06	2.24E-06	3.32E-06

JULY 1 - SEPTEMBER 30 1987

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	1.07E+00
GROUND	6.51E-05	6.51E-05	6.51E-05	6.51E-05	6.51E-05	6.51E-05	6.51E-05	7.73E-05
INHAL	1.47E-01	1.46E-01	4.27E-04	1.47E-01	1.47E-01	3.22E-01	1.46E-01	1.46E-01
VEGET	4.13E-01	4.13E-01	8.73E-04	4.14E-01	4.14E-01	7.39E-01	4.12E-01	4.12E-01
COW MILK	5.89E-02	5.88E-02	1.20E-04	5.89E-02	5.90E-02	1.01E-01	5.88E-02	5.88E-02
MEAT	1.52E-02	1.52E-02	5.48E-07	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02
TOTAL	9.33E-01	9.32E-01	3.01E-01	9.34E-01	9.35E-01	1.48E+00	9.32E-01	1.70E+00
PER CAPITA DOSE (REM) (a)	5.19E-07	5.19E-07	1.68E-07	5.20E-07	5.21E-07	8.24E-07	5.19E-07	9.47E-07

OCTOBER 1 - DECEMBER 31 1987

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	2.96E-01	2.96E-01	2.96E-01	2.96E-01	2.96E-01	2.96E-01	2.96E-01	1.07E+00
GROUND	7.18E-04	7.18E-04	7.18E-04	7.18E-04	7.18E-04	7.18E-04	7.18E-04	8.46E-04
INHAL	3.78E-01	3.77E-01	1.04E-03	3.78E-01	3.79E-01	8.16E-01	3.78E-01	3.77E-01
VEGET	1.61E+00	1.61E+00	1.95E-03	1.61E+00	1.61E+00	2.36E+00	1.61E+00	1.61E+00
COW MILK	1.53E-01	1.53E-01	2.13E-04	1.53E-01	1.54E-01	2.32E-01	1.53E-01	1.53E-01
MEAT	7.31E-02	7.31E-02	1.15E-06	7.31E-02	7.31E-02	7.32E-02	7.31E-02	7.31E-02
TOTAL	2.51E+00	2.51E+00	3.00E-01	2.51E+00	2.52E+00	3.77E+00	2.51E+00	3.28E+00
PER CAPITA DOSE (REM) (a)	1.40E-06	1.40E-06	1.67E-07	1.40E-06	1.40E-06	2.10E-06	1.40E-06	1.83E-06

(a) Personrem divided by 50-mile population of 1,796,000

TABLE C2 (CONTINUED)

PERSONREM

JULY 1 - DECEMBER 31 1987

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	5.95E-01	5.95E-01	5.95E-01	5.95E-01	5.95E-01	5.95E-01	5.95E-01	2.13E+00
GROUND	7.83E-04	7.83E-04	7.83E-04	7.83E-04	7.83E-04	7.83E-04	7.83E-04	9.23E-04
INHAL	5.24E-01	5.23E-01	1.47E-03	5.25E-01	5.26E-01	1.14E+00	5.25E-01	5.23E-01
VEGET	2.02E+00	2.02E+00	2.82E-03	2.03E+00	2.03E+00	3.09E+00	2.02E+00	2.02E+00
COW MILK	2.12E-01	2.12E-01	3.33E-04	2.12E-01	2.13E-01	3.33E-01	2.12E-01	2.12E-01
MEAT	8.82E-02	8.83E-02	1.70E-06	8.82E-02	8.82E-02	8.84E-02	8.82E-02	8.82E-02
TOTAL	3.44E+00	3.44E+00	6.00E-01	3.45E+00	3.45E+00	5.25E+00	3.44E+00	4.98E+00
(a) PER CAPITA DOSE (REM)	1.92E-06	1.92E-06	3.34E-07	1.92E-06	1.92E-06	2.92E-06	1.92E-06	2.77E-06

JANUARY 1 - DECEMBER 31 1987

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.37E+00	1.37E+00	1.37E+00	1.37E+00	1.37E+00	1.37E+00	1.37E+00	4.86E+00
GROUND	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.65E-03
INHAL	1.20E+00	1.20E+00	2.36E-03	1.20E+00	1.21E+00	2.18E+00	1.20E+00	1.20E+00
VEGET	4.23E+00	4.23E+00	4.36E-03	4.23E+00	4.24E+00	5.89E+00	4.23E+00	4.23E+00
COW MILK	4.94E-01	4.93E-01	5.76E-04	4.94E-01	4.94E-01	7.06E-01	4.93E-01	4.93E-01
MEAT	1.71E-01	1.71E-01	2.24E-06	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01
TOTAL	7.47E+00	7.47E+00	1.38E+00	7.48E+00	7.48E+00	1.03E+01	7.47E+00	1.10E+01
(a) PER CAPITA DOSE (REM)	4.16E-06	4.16E-06	7.68E-07	4.16E-06	4.16E-06	5.73E-06	4.16E-06	6.12E-06

(a) Personrem divided by 50-mile population of 1,796,000

Table C3
SUMMARY OF INDIVIDUAL DOSES FOR JANUARY - DECEMBER 1987*

	Unit	Quarter #1	Quarter #2
Gamma Air Dose	mrad	2.85E-01	6.65E-02
T.S. 3.11.2.2 Limit	mrad	5.00E+00	5.00E+00
% T.S. Limit	%	5.70E+00	1.33E+00
Beta Air Dose	mrad	8.13E-01	1.64E-01
T.S. 3.11.2.2 Limit	mrad	1.00E+01	1.00E+01
% T.S. Limit	%	8.13E+00	1.64E+00
Maximum Organ Dose (neglecting skin)	mrem	1.45E-01**	7.40E-02**
T.S. 3.11.2.3 Limit	mrem	7.50E+00	7.50E+00
% T.S. Limit	%	1.93E+00	9.87E-01

	Unit	Quarter #3	Quarter #4	Year to Date
Gamma Air Dose	mrad	1.36E-01	1.63E-01	6.50E-01
T.S. 3.11.2.2 Limit	mrad	5.00E+00	5.00E+00	1.00E+01
% T.S. Limit	%	2.72E+00	3.26E+00	6.50E+00
Beta Air Dose	mrad	3.15E-01	4.39E-01	1.73E+00
T.S. 3.11.2.2 Limit	mrad	1.00E+01	1.00E+01	2.00E+01
% T.S. Limit	%	3.15E+00	4.39E+00	8.65E+00
Maximum Organ Dose (neglecting skin)	mrem	8.45E-02**	2.18E-01**	5.22E-01**
T.S. 3.11.2.3 Limit	mrem	7.50E+00	7.50E+00	1.50E+01
% T.S. Limit	%	1.13E+00	2.91E+00	3.48E+00

*From Table C1.

**These control location doses are imparted via three principal atmospheric pathways: plume, ground exposure and inhalation. The hypothetical site boundary location doses presented in Tables A4, A7 and A10 of Appendix A, are based on the ODCM, and also include vegetable, milk and meat ingestion contributions. The highest organ dose is to the child's thyroid resulting from exposure in the South Sector at 2.96, 2.80 and 2.64 miles from Units 1, 2, and 3, respectively. Technical Specification 3.11.4 has higher limits than Technical Specification 3.11.2.3 and therefore the percent of limits are more conservative based on Technical Specification 3.11.2.3 than on Technical Specification 3.11.4.

DOSE CALCULATION MODELS

The GASPAR computer code was used to evaluate the radiological consequences of the routine release of gaseous effluents. GASPAR implements the dose calculational methodologies of Regulatory Guide 1.109, Revision 1.

Source terms for each quarter are combined with station-specific demographic data and each quarter's atmospheric diffusion estimates for gaseous dose calculations.

Atmospheric diffusion estimates are generated by the XOQDOQ computer code using onsite meteorological data as input. Doses for the semi-annual period are the summation of the quarterly doses. Additional input to GASPAR includes the following site-specific data:

- 0 to 5 mile land use census conducted in December 1987. The following changes in land use were identified between December 1986 and December 1987; addition of a residence within the east-northeast sector and 2.7 miles from Unit 2 and a residence located within the south sector and 2.8 miles from Unit 2.
- 0 to 5 mile population distribution based on the land use census conducted June-August, 1984.
- 5 to 50 mile population distribution from PVNGS ER-OL Figure 2.1-6.
- The population distribution of metropolitan Phoenix greater than 50 miles from PVNGS, based on the 1980 census results, were conservatively included in the 40 to 50 mile sectors.
- Absolute humidity of 6.0 g/m^3 from PVNGS ER-OL Table 2.3-34.
- The fraction of the year that vegetables are grown (0.667) from PVNGS ER-OL Section 2.1.3.4.
- The fraction of daily feed derived from pasture while on pasture and length of grazing season for milk animals beyond 5 miles (0.35 and 0.75) from PVNGS ER-OL Section 2.1.3.4.
- The only milk animal (goat) located within 5 miles from PVNGS was fed fifty percent on stored feed and the other fifty on pasture grass during 1987, based on the land use census conducted in December 1987.
- The fraction of daily feed derived from pasture while on pasture and length of grazing season for meat animals (0.05 and 0.25) from PVNGS ER-OL Section 2.1.3.4.

Other values used for input to GASPAR are default values from Regulatory Guide 1.109 Revision 1.

Arizona Nuclear Power Project
P.O. BOX 52034 • PHOENIX, ARIZONA 85072-2034

Docket Nos. STN 50-528/529/530

161-00830-EEVB/PGN
February 26, 1988

U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Document Control Desk

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Semiannual Radioactive Effluent Release Report
File: 88-A-056-026

Pursuant to 10CFR50.36(a)(2) and in accordance with Technical Specification 6.9.1.8, attached please find the Semiannual Radioactive Effluent Release Report for the Palo Verde Nuclear Generating Station Units No. 1, 2 and 3 for the six month period ending December 31, 1987.

If you have any questions, please call Mr. A. C. Rogers at (602) 371-4041.

Very truly yours,

E. E. Van Brunt

E. E. Van Brunt, Jr.
Executive Vice President
Project Director

EEVB/PGN/cal
Attachment

cc: O. M. De Michele (all w/a)
J. B. Martin (2)
J. M. Taylor (Office of I&E)
T. J. Polich
A. C. Gehr

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