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Technical Specification 5.6.3

Palo Verde
Nuclear Generating Station
PO Box 52034
Phoenix, Arizona 85072-2034
Mail Station 7636

102-06874 TNW/DHK/TMJ
April 30, 2014

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sirs:

Subject: **Palo Verde Nuclear Generating Station (PVNGS)**
Units 1, 2, 3 and Independent Spent Fuel Storage Installation (ISFSI)
Docket Nos. STN 50-528/529/530 and 72-44
Annual Radioactive Effluent Release Report 2013

In accordance with PVNGS Technical Specification (TS) 5.6.3, enclosed please find the Annual Radioactive Effluent Release Report for 2013.

No new commitments are being made to the NRC by this letter. Should you need further information regarding this submittal, please contact David Kelsey, Licensing Section Leader, at (623) 393-5730.

Sincerely,

Thomas N. Weber
Department Leader, Regulatory Affairs

TNW/DHK/TMJ/hsc

Enclosure

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ENCLOSURE

2013 ANNUAL RADIOACTIVE

EFFLUENT RELEASE REPORT

PALO VERDE NUCLEAR GENERATING STATION
UNITS 1, 2 AND 3

2013

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

USNRC Docket No. STN 50-528/529/530
RCTSAI 1566

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INTRODUCTION

This report summarizes effluent and waste disposal source term data, meteorological data and doses from radioactive effluents for the Palo Verde Nuclear Generating Station (PVNGS) for the period of January through December 2013. The data presented meets the reporting requirements of Regulatory Guide 1.21 (Revision 1, June 1974) of the U.S. Nuclear Regulatory Commission and the PVNGS Technical Specifications.

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Offsite Dose Calculation Manual Palo Verde Nuclear Generating Station Units 1, 2 and 3, Rev. 26.

NEI 07-07, Nuclear Energy Institute, Industry Ground Water Protection Initiative – Final Guidance Document, August 2007.

Calculation 13-NC-CH-0200, Rev 7,FSAR - Primary Coolant Activities (PCA)

APPENDIX A

SOURCE TERMS
AND
EFFLUENT AND WASTE DISPOSAL REPORTS

Supplemental Information

1.0 REGULATORY LIMITS

1.1 Liquid Releases

1.1.1 PVNGS ODCM Requirement 3.2

The concentration of radioactive material discharged from secondary system liquid waste to the circulating water system shall be limited to:

5.0E-07 µCi/ml for the principal gamma emitters (except Ce-144)

3.0E-06 µCi/ml for Ce-144

1.0E-06 µCi/ml for I-131.

1.0E-03 µCi/ml for H-3

The concentration of radioactive material discharged from secondary system liquid waste to the onsite evaporation ponds shall be limited to:

2.0E-06 µCi/ml for Cs-134

2.0E-06 µCi/ml for Cs-137

The concentrations specified in 10 CFR Part 20.1001-20.2402, Appendix B, Table 2, Column 2, for all other isotopes

1.1.2 PVNGS ODCM Requirement 4.4

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:

a. 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

b. 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

1.2.1 PVNGS ODCM Requirement 3.1

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

a. 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

b. 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.

1.2.2 PVNGS ODCM Requirement 4.1

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:

a. 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,

b. 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.

1.2.3 PVNGS ODCM Requirement 4.2

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:

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

1.2.4 PVNGS ODCM Requirement 4.3

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

1.3.1 PVNGS ODCM Requirement 5.1

The annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC due to releases of radioactivity and to direct 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 section 1.2.1 of this report.

3.0 AVERAGE ENERGY

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

4.0 MEASUREMENTS AND APPROXIMATIONS OF TOTAL RADIOACTIVITY IN GASEOUS EFFLUENTS

For continuous releases, sampling is in accordance with PVNGS ODCM Table 3-1. Particulate and iodine radionuclides are sampled continuously at the Plant Vent and Fuel Building exhaust points. The particulate filters and charcoal cartridges are exchanged for analysis at least 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 ODCM Table 3-1. For containment purges, the noble gas concentration may be 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.

Effective January 1, 2004, Containment Purge release permits are updated by removing the permit pre-release particulate and iodine activity. This eliminates double accounting for the Containment Purge particulate and iodine activity at the Plant Vent but allows the particulate and iodine activity to be included in the Containment Purge pre-release dose projection.

The Lower Limit of Detection (LLD) of a measurement system is defined in Table 3 - 1 of the PVNGS ODCM. An average LLD for each radionuclide is provided in Table 3.

5.0 BATCH RELEASES

5.1 Gaseous.

Batch release durations are presented in Table 2.

5.2 Liquid

None.

6.0 ABNORMAL RELEASES

None.

7.0 OFFSITE DOSE CALCULATION MANUAL AND PROCESS CONTROL PROGRAM (PCP) REVISIONS

7.1 There were no revisions to the Offsite Dose Calculation Manual (ODCM) in 2013.

7.2 There were no revisions to the Process Control Program (PCP) in 2013.

8.0 EFFLUENTS AND SOLID WASTES

8.1 Gaseous Effluents

Gaseous effluent information is presented in Table 1 through Table 41. Included in these tables are summaries of the effluents and estimated total error.

8.2 Liquid Effluents

There were no liquid effluent releases beyond the Site Boundary from PVNGS.

8.3 Solid Waste

Solid waste shipments are summarized in Table 42.

9.0 MISCELLANEOUS INFORMATION

9.1 EVAPORATION PONDS

Releases made to the Evaporation Ponds are limited to the concentrations specified in PVNGS ODCM Requirement 3.2. The Evaporation Ponds were monitored in accordance with PVNGS ODCM Requirement 6.1.

The average historical evaporation is approximately 12 inches, per pond, for each of the first and fourth quarters, and 33 inches, per pond, for each of the second and third quarters. Evaporation Pond One is constructed of three ponds (1A, 1B, 1C) totalling approximately 260 acres. This equates to 3.22E+11 cc evaporated from Pond One for each of the first and fourth quarters and 8.85E+11 cc evaporated for each of the second and third quarters. Evaporation Pond Two is constructed of three ponds (2A, 2B, 2C) totalling approximately 230 acres. The amount evaporated from Pond Two is 2.40E+11 cc for each of the first and fourth quarters and 7.97E+11 cc for each of the second and third quarters.

Evaporation Pond Three is constructed of two smaller ponds of 90 acres each (3A and 3B). The amount evaporated from each section of Pond Three is 1.11E+11 cc for each of the first and fourth quarters and 3.05E+11 cc for each of the second and third quarters.

Evaporation Pond 1C was empty for quarters one and two while pond 1A was empty for quarters one, two, and three.

Using a site boundary X/Q of 5.0E-05 sec/m^3 for the evaporation ponds and equation 4-3 from the ODCM, the dose from the evaporation ponds to a hypothetical individual at the site boundary, for all pathways, is summarized in Table 1.

9.2 RADIATION MONITORING SYSTEM SETPOINT VERIFICATION

Current effluent monitor noble gas channel alert alarm setpoints are based on an assumed one per cent failed fuel source term. The current method used for the setpoint values are more reliable than basing the setpoints upon the constantly varying values of the actual noble gas source term presented in Table 38.

9.3 RCS RADIOIODINE (TRM T5.0.600)

There were no cases where primary coolant specific activity exceeded the Technical Specification 3.4.17 limits during the reporting period.

9.4 INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)

There are no radioactive effluents from the NAC-UMS System. Direct dose at the Site Boundary is reported in the Annual Radiological Environmental Operating Report.

9.5 MAJOR CHANGES TO THE RADIOACTIVE WASTE SYSTEMS (liquid, gaseous, and solid).

None.

9.6 SAMPLES RESULTS FROM GROUNDWATER WELLS THAT ARE NOT DESCRIBED IN THE ODCM AS PART OF THE REMP (NEI 07-07, Industry Groundwater Protection Initiative, August 2007), are included in Appendix D. This initiative provides added assurance that ground water will not be adversely affected by PVNGS operations.

There were no NEI 07-07, reportable leaks or spills.

There were no positive sample results.

9.7 REPORT ADDENDUM

None.

10.0 DISCUSSION

10.1 Unit One

Unit One operated with a refueling outage (1R17) from March 30, 2013 to April 28, 2013.

Maintenance outages:
None.

Estimated number of fuel defects (source: INPO, CDE)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	0	0	0	0	0	0	0	0

10.2 Unit Two

Unit Two operated without a refueling outage.

Maintenance outages:
2M18A December 2, 2013 to December 13, 2013

Estimated number of fuel defects (source: INPO, CDE)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	0	0	0	0	0	0	0	0

10.3 Unit Three

Unit Three operated with a refueling outage (3R17) from October 5, 2013 to November 26, 2013.

Maintenance outages:
None.

Estimated number of fuel defects (source: INPO, CDE)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	0	0	0	0	0	0	0	0

10.4 Carbon-14

Carbon-14 is formed naturally in the upper atmosphere and also is formed in operating nuclear reactors.

Carbon-14 is not a new power plant emission. Because the overall quantity of radioactive releases has steadily decreased due to improvements in power plant operations, carbon-14 may now qualify as a "principal radionuclide" under revised federal regulatory guidance. The levels of other releases have declined, so carbon-14 releases, expressed as a percentage of total releases, have the potential to achieve "principal radionuclide" status (anything greater than one percent of overall radioactivity in effluents) per updated federal regulatory guidance.

The radiation dose to the public from carbon-14 is much lower than regulatory limits and has been a very small contributor to the total radiation dose that Americans receive each year from natural and manmade sources.

Studies by the United Nations Scientific Committee on the Effects of Atomic Radiation, the National Research Council's BEIR VII study group and the National Council on Radiation Protection and Measurements all show that the risk associated with low-dose radiation from natural and man-made sources, including nuclear power plants, is negligible.

Radiation is measured in units called millirem. The average American is exposed to 620 millirem of radiation every year. Approximately 311 millirem of this comes from natural sources. The majority of the remaining dose (approximately 300 millirem) comes from medical procedures such as CAT scans.Less than one-tenth of a percent of all radiation exposure is from nuclear facilities. Reference: NCRP Report No. 160, Table 1.1.

Starting with the 2010 Annual Radioactive Effluent Release Report, PVNGS will include the estimated exposure from carbon-14 in the Appendix C, dose calculations. The PVNGS calculated production of carbon-14 is 18.5 Curies per cycle (500 days) or 13.5 curies per year. Based on published literature, twenty percent (20%) of the carbon-14 released is assumed to be in an inorganic form (CO_2). PVNGS will use an estimated value of 2.7 curies of carbon-14 released, per reactor, per year. The 2.7 curies will be divided equally between each quarter (0.68 curies per reactor, per quarter). Appendix C, dose calculations include this estimated carbon-14 dose. Appendix C also includes the dose excluding carbon-14 for comparision with historical reports.

10.5 Tritium

PVNGS does not have a liquid release pathway. Removal of tritium is performed by operation of the Boric Acid Concentrator (BAC) in the release mode. Comparison of PVNGS annual tritium curies released to other utilities should be made only after summing both liquid and gaseous tritium curies released.

10.6 Dose Summary

Dose for 2013 was primarily due to the release of tritium. Tritium production is estimated to be 1000 curies per Reactor Unit per year. In order to control plant tritium concentrations, tritium releases should match tritium production. For 2013, PVNGS released a total of 1950 curies of tritium (see Table 39).

Total dose due to releases from all three Units for 2013 were lower than 2012, primarily due to lower releases of tritium.

Table 1: Evaporation Pond Data					
Evaporation Pond 1(1A, 1B, 1C)	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year
Historical volume of water evaporated (ml)	3.22E+11	8.85E+11	8.85E+11	3.22E+11	
Tritium Concentration (uCi/cc)	4.21E-07	1.00E-06	1.94E-06	2.54E-06	
Tritium Curies	4.02E-02	2.63E-01	4.21E-01	2.04E-01	9.28E-01
Evaporation Pond 2 (2A and 2B)	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year
Historical volume of water evaporated (ml)	2.40E+11	7.97E+11	7.97E+11	2.90E+11	
Tritium Concentration (uCi/cc)	1.92E-06	2.44E-06	1.95E-06	2.00E-06	
Tritium curies	2.26E-01	8.02E-01	6.52E-01	2.41E-01	1.92E+00
Evaporation Pond 3 (3A and 3B)	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year
Historical volume of water evaporated (ml)	2.22E+11	3.05E+11	3.05E+11	1.11E+11	
3B Tritium Concentration (uCi/cc)	1.00E-06	2.06E-06	1.49E-06	1.76E-06	
3B Tritium curies	1.11E-01	6.27E-01	4.55E-01	1.96E-01	1.39E+00
Dose (mRem)	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year
Pond 1	5.58E-04	3.65E-03	3.24E-03	1.71E-03	9.16E-03
Pond 2	3.14E-03	1.11E-02	9.05E-03	3.34E-03	2.66E-02
Pond 3	1.54E-03	8.70E-03	6.32E-03	2.71E-03	1.93E-02
Total	5.24E-03	2.35E-02	1.86E-02	7.77E-03	5.51E-02

Table 2: Batch Release Data			
All times are in hours	Unit 1	Unit 2	Unit 3
January - June			
Number of batch releases	34	23	40
Total time period for batch releases	1330.94	161.60	1252.22
Maximum time period for a batch release	168.33	100.92	167.67
Average time period for a batch release	39.15	7.03	31.31
Minimum time period for a batch release	0.22	0.33	0.05
July - December			
Number of batch releases	22	26	27
Total time period for batch releases	256.89	156.59	521.82
Maximum time period for a batch release	129.97	105.92	123.20
Average time period for a batch release	11.68	6.02	19.33
Minimum time period for a batch release	0.28	0.36	0.02
January - December			
Number of batch releases	56	49	67
Total time period for batch releases	1587.83	318.19	1774.04
Maximum time period for a batch release	168.33	105.92	167.67
Average time period for a batch release	28.35	6.49	26.48
Minimum time period for a batch release	0.22	0.33	0.02

Table 3:
Units 1, 2 & 3
Gaseous Effluents Average Lower Limit Of Detection

μCi/cc

Nuclide	Continuous	Batch	Nuclide	Continuous	Batch
Antimony-122	2.20E-13	1.90E-11	Argon-41	4.50E-08	4.50E-08
Antimony-124	8.40E-14	1.70E-11	Krypton-85	7.40E-06	7.40E-06
Barium-140	3.40E-13	5.70E-11	Krypton-85m	2.20E-08	2.20E-08
Bromine-82	3.30E-13	1.40E-11	Krypton-87	5.70E-08	5.70E-08
Cerium-141	8.70E-14	3.10E-11	Krypton-88	7.40E-08	7.40E-08
Cerium-144	3.60E-13	6.50E-11	Xenon-125	2.20E-08	2.20E-08
Cesium-134	1.00E-13	2.60E-11	Xenon-127	2.10E-08	2.10E-08
Cesium-137	8.10E-14	1.70E-11	Xenon-131m	9.10E-07	9.10E-07
Cesium-138	5.20E-10	7.30E-10	Xenon-133	6.30E-08	6.30E-08
Chromium-51	6.90E-13	1.40E-10	Xenon-133m	1.90E-07	1.90E-07
Cobalt-58	8.50E-14	1.70E-11	Xenon-135	2.00E-08	2.00E-08
Cobalt-60	1.00E-13	1.90E-11	Xenon-135m	8.90E-08	8.90E-08
Iron-59	1.70E-13	3.20E-11	Xenon-138	2.00E-07	2.00E-07
Lanthanum-140	2.80E-13	2.10E-11	Iodine-131	8.00E-14	7.00E-12
Manganese-54	8.30E-14	1.70E-11	Iodine-132	6.60E-12	1.90E-11
Molybdenum-99	2.40E-13	2.80E-11	Iodine-133	4.70E-13	1.10E-11
Niobium-95	8.70E-14	1.80E-11	Iodine-134	5.90E-11	8.20E-11
Rubidium-88	1.90E-08	1.90E-08	Iodine-135	7.00E-12	5.50E-11
Ruthenium-103	7.40E-14	1.50E-11			
Strontium-89	2.15E-15	(1)			
Strontium-90	5.60E-16	(1)			
Tellurium-123m	6.60E-14	1.50E-11			
Tritium	3.80E-07	3.80E-07			
Zinc-65	1.90E-13	3.80E-11			
Zirconium-95	1.80E-13	4.10E-11			
Gross Alpha	3.60E-15	(1)			
(1) Not required for batch releases.					

Table 4: Unit 1 Gaseous Effluents - Summation Of All Releases							
	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total For Year	Est. Total Error % (1)
A. Fission & activation gases							
1. Total release	Ci	2.68E+00	2.66E-02	4.55E-02	5.03E-02	2.80E+00	3.54E+01
2. Average release rate for period	µCi/sec	3.45E-01	3.38E-03	5.72E-03	6.33E-03	8.88E-02	
3. Percent of ODCM Requirement limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
B. Iodine 131							
1. Total Iodine 131	Ci	5.35E-06	5.61E-05	< LLD	< LLD	6.14E-05	3.32E+01
2. Average release rate for period	µCi/sec	6.88E-07	7.14E-06	< LLD	< LLD	1.95E-06	
3. Percent of ODCM Requirement limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
C. Particulates							
1. Particulates with half- lives > 8 days	Ci	4.92E-05	4.92E-04	2.65E-06	< LLD	5.45E-04	3.43E+01
2. Average release rate for period	µCi/sec	6.33E-06	6.26E-05	3.33E-07	< LLD	1.73E-05	
3. Percent of ODCM Requirement limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
4. Gross Alpha radioactivity	Ci	< LLD	< LLD	< LLD	< LLD	< LLD	
D. Tritium							
1. Total release	Ci	3.89E+02	2.55E+02	5.17E+01	1.15E+02	8.11E+02	3.85E+01
2. Average release rate for period	µCi/sec	5.00E+01	3.24E+01	6.50E+00	1.45E+01	2.57E+01	
3. Percent of ODCM Requirement limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
(1) Estimated total error methodology is presented in Table 40.							
(2) See Table 11 for percent of ODCM Requirement limits.							

Table 5: Unit 1 Gaseous Effluents - Ground Level Releases - Continuous - Fission Gases and Iodines						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
1. Fission gases						
Ar-41	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
2. Iodines						
I-131	Ci	5.35E-06	5.51E-05	< LLD	< LLD	6.04E-05
I-132	Ci	1.39E-04	4.14E-04	< LLD	< LLD	5.53E-04
I-133	Ci	6.29E-06	< LLD	< LLD	< LLD	6.29E-06
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	1.51E-04	4.69E-04	< LLD	< LLD	6.20E-04

Table 6: Unit 1 Gaseous Effluents - Ground Level Releases - Continuous - Particulates						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
3.Particulates						
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	1.72E-05	1.31E-04	< LLD	< LLD	1.48E-04
Co-60	Ci	3.27E-07	3.04E-05	< LLD	< LLD	3.07E-05
Cr-51	Ci	3.03E-05	2.93E-04	< LLD	< LLD	3.23E-04
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	< LLD	2.27E-06	< LLD	< LLD	2.27E-06
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	3.15E-06	< LLD	< LLD	3.15E-06
Mo-99	Ci	6.06E-07	< LLD	< LLD	< LLD	6.06E-07
Nb-95	Ci	< LLD	8.48E-06	< LLD	< LLD	8.48E-06
Os-191	Ci	< LLD	7.06E-06	< LLD	< LLD	7.06E-06
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	< LLD	3.67E-07	< LLD	< LLD	3.67E-07
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-90	Ci	3.40E-09	2.25E-07	2.65E-06	9.76E-07	3.85E-06
Tc-99m	Ci	6.17E-07	< LLD	< LLD	< LLD	6.17E-07
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	6.03E-06	< LLD	< LLD	6.03E-06
Total	Ci	4.91E-05	4.82E-04	2.65E-06	9.76E-07	5.35E-04
4.Tritium						
H-3	Ci	1.73E+01	6.25E+01	1.87E+01	1.85E+01	1.17E+02

Table 7: Unit 1 Gaseous Effluents - Ground Level Releases - Batch - Fission Gases and Iodines						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
1. Fission gases						
Ar-41	Ci	1.94E+00	2.62E-02	4.55E-02	5.03E-02	2.07E+00
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	3.20E-08	< LLD	< LLD	< LLD	3.20E-08
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	6.08E-01	4.45E-04	< LLD	< LLD	6.09E-01
Xe-133m	Ci	4.53E-07	< LLD	< LLD	< LLD	4.53E-07
Xe-135	Ci	1.29E-01	< LLD	< LLD	< LLD	1.29E-01
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	2.68E+00	2.66E-02	4.55E-02	5.03E-02	2.80E+00
2. Iodines						
I-131	Ci	< LLD	9.92E-07	< LLD	< LLD	9.92E-07
I-132	Ci	< LLD	1.50E-05	< LLD	< LLD	1.50E-05
I-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	1.60E-05	< LLD	< LLD	1.60E-05

Table 8: Unit 1 Gaseous Effluents - Ground Level Releases - Batch - Particulates						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
3. Particulates						
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	4.19E-06	< LLD	< LLD	< LLD	4.19E-06
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	< LLD	3.19E-06	< LLD	< LLD	3.19E-06
Co-60	Ci	1.37E-06	1.81E-07	< LLD	< LLD	1.55E-06
Cr-51	Ci	< LLD	5.64E-06	< LLD	< LLD	5.64E-06
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	7.50E-08	< LLD	< LLD	7.50E-08
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	< LLD	5.39E-07	< LLD	< LLD	5.39E-07
Os-191	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	Note 1	Note 1	Note 1	Note 1	Note 1
Sr-90	Ci	Note 1	Note 1	Note 1	Note 1	Note 1
Tc-99m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	4.66E-07	< LLD	< LLD	4.66E-07
Total	Ci	5.56E-06	1.01E-05	< LLD	< LLD	1.56E-05
4.Tritium						
H-3	Ci	3.72E+02	1.93E+02	3.30E+01	9.66E+01	6.94E+02
Note 1 - Not required for batch releases						

Table 9: Unit 1 Gaseous Effluents - Continuous and Batch - Fission Gases and Iodines						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
1. Fission gases						
Ar-41	Ci	1.94E+00	2.62E-02	4.55E-02	5.03E-02	2.07E+00
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	3.20E-08	< LLD	< LLD	< LLD	3.20E-08
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	6.08E-01	4.45E-04	< LLD	< LLD	6.09E-01
Xe-133m	Ci	4.53E-07	< LLD	< LLD	< LLD	4.53E-07
Xe-135	Ci	1.29E-01	< LLD	< LLD	< LLD	1.29E-01
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	2.68E+00	2.66E-02	4.55E-02	5.03E-02	2.80E+00
2. Iodines						
I-131	Ci	5.35E-06	5.61E-05	< LLD	< LLD	6.14E-05
I-132	Ci	1.39E-04	4.29E-04	< LLD	< LLD	5.68E-04
I-133	Ci	6.29E-06	< LLD	< LLD	< LLD	6.29E-06
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	1.51E-04	4.85E-04	< LLD	< LLD	6.36E-04

Table 10: Unit 1 Gaseous Effluents - Continuous and Batch - Particulates						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
3. Particulates						
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	4.19E-06	< LLD	< LLD	< LLD	4.19E-06
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	1.72E-05	1.34E-04	< LLD	< LLD	1.52E-04
Co-60	Ci	1.69E-06	3.06E-05	< LLD	< LLD	3.23E-05
Cr-51	Ci	3.03E-05	2.99E-04	< LLD	< LLD	3.29E-04
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	< LLD	2.27E-06	< LLD	< LLD	2.27E-06
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	3.23E-06	< LLD	< LLD	3.23E-06
Mo-99	Ci	6.06E-07	< LLD	< LLD	< LLD	6.06E-07
Nb-95	Ci	< LLD	9.02E-06	< LLD	< LLD	9.02E-06
Os-191	Ci	< LLD	7.06E-06	< LLD	< LLD	7.06E-06
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	< LLD	3.67E-07	< LLD	< LLD	3.67E-07
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-90	Ci	3.40E-09	2.25E-07	2.65E-06	9.76E-07	3.85E-06
Tc-99m	Ci	6.17E-07	< LLD	< LLD	< LLD	6.17E-07
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	6.49E-06	< LLD	< LLD	6.49E-06
Total	Ci	5.47E-05	4.92E-04	2.65E-06	9.76E-07	5.51E-04
Total > 8 days	Ci	4.92E-05	4.92E-04	2.65E-06	9.76E-07	5.45E-04
4.Tritium						
H-3	Ci	3.89E+02	2.55E+02	5.17E+01	1.15E+02	8.11E+02

Table 11: Unit 1 Radiation Doses At And Beyond The Site Boundary						
	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
Gamma Air Dose	mrad	5.24E-03	6.89E-05	1.20E-04	1.32E-04	5.56E-03
ODCM Req 4.1 Limit	mrad	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
% ODCM Limit	%	1.05E-01	1.38E-03	2.40E-03	2.64E-03	5.56E-02
Beta Air Dose	mrad	2.07E-03	2.44E-05	4.22E-05	4.66E-05	2.18E-03
ODCM Req 4.1 Limit	mrad	1.00E+01	1.00E+01	1.00E+01	1.00E+01	2.00E+01
% ODCM Limit	%	2.07E-02	2.44E-04	4.22E-04	4.66E-04	1.09E-02
Maximum Organ Dose (excluding skin)	mrem	1.40E-01	9.23E-02	1.86E-02	4.13E-02	2.92E-01
Age		Teen	Teen	Teen	Teen	Teen
Organ		Thyroid	Thyroid	Thyroid	Thyroid	Thyroid
ODCM Req. 4.2 Limit	mrem	7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01
% ODCM Limit	%	1.87E+00	1.23E+00	2.48E-01	5.51E-01	1.95E+00

Calculations are based on parameters and methodologies of the ODCM using historical meteorology. Dose is calculated to a hypothetical individual. In contrast, Appendix C dose calculations are based on concurrent meteorology, a real individual, and only the actual pathways present.

Table 12: Unit 2 Gaseous Effluents - Summation Of All Releases							
	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total For Year	Est. Total Error % (1)
A. Fission & activation gases							
1. Total release	Ci	8.73E-02	2.72E-01	1.41E-01	1.05E-01	6.05E-01	3.54E+01
2. Average release rate for period	µCi/sec	1.12E-02	3.46E-02	1.77E-02	1.32E-02	1.92E-02	
3. Percent of ODCM Requirement limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
B. Iodine 131							
1. Total Iodine 131	Ci	< LLD	< LLD	< LLD	< LLD	< LLD	3.32E+01
2. Average release rate for period	µCi/sec	< LLD	< LLD	< LLD	< LLD	< LLD	
3. Percent of ODCM Requirement limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
C. Particulates							
1. Particulates with half- lives > 8 days	Ci	6.04E-08	1.66E-08	2.02E-07	< LLD	2.79E-07	3.43E+01
2. Average release rate for period	µCi/sec	7.77E-09	2.11E-09	2.54E-08	< LLD	8.85E-09	
3. Percent of ODCM Requirement limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
4. Gross Alpha radioactivity	Ci	< LLD	2.34E-15	< LLD	< LLD	< LLD	
D. Tritium							
1. Total release	Ci	1.78E+01	2.33E+01	1.44E+02	2.20E+01	2.08E+02	3.85E+01
2. Average release rate for period	µCi/sec	2.29E+00	2.96E+00	1.81E+01	2.77E+00	6.60E+00	
3. Percent of ODCM Requirement limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
(1) Estimated total error methodology is presented in Table 40.							
(2) See Table 19 for percent of ODCM Requirement limits.							

Table 13: Unit 2 Gaseous Effluents - Ground Level Releases - Continuous - Fission Gases and Iodines						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
1. Fission gases						
Ar-41	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
2. Iodines						
I-131	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-132	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	< LLD	< LLD	< LLD	< LLD

Table 14: Unit 2 Gaseous Effluents - Ground Level Releases - Continuous - Particulates						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
3. Particulates						
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-60	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cr-51	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Os-191	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-90	Ci	6.04E-08	1.66E-08	2.02E-07	1.30E-08	2.92E-07
Tc-99m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	6.04E-08	1.66E-08	2.02E-07	1.30E-08	2.92E-07
4. Tritium						
H-3	Ci	1.78E+01	2.32E+01	1.99E+01	2.17E+01	8.25E+01

Table 15: Unit 2 Gaseous Effluents - Ground Level Releases - Batch - Fission Gases and Iodines						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
1. Fission gases						
Ar-41	Ci	8.03E-02	2.45E-01	1.27E-01	7.87E-02	5.31E-01
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	7.03E-03	2.73E-02	1.36E-02	2.58E-02	7.37E-02
Xe-133m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	8.73E-02	2.72E-01	1.41E-01	1.05E-01	6.05E-01
2. Iodines						
I-131	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-132	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	< LLD	< LLD	< LLD	< LLD

Table 16: Unit 2 Gaseous Effluents - Ground Level Releases - Batch - Particulates						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
3. Particulates						
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-60	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cr-51	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Os-191	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	Note 1	Note 1	Note 1	Note 1	Note 1
Sr-90	Ci	Note 1	Note 1	Note 1	Note 1	Note 1
Tc-99m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
4. Tritium						
H-3	Ci	1.78E+01	2.33E+01	1.44E+02	2.20E+01	2.08E+02
Note 1 - Not required for batch releases						

Table 17: Unit 2 Gaseous Effluents - Continuous and Batch - Fission Gases and Iodines						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
1. Fission gases						
Ar-41	Ci	8.03E-02	2.45E-01	1.27E-01	7.87E-02	5.31E-01
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	7.03E-03	2.73E-02	1.36E-02	2.58E-02	7.37E-02
Xe-133m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	8.73E-02	2.72E-01	1.41E-01	1.05E-01	6.05E-01
2. Iodines						
I-131	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-132	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	< LLD	< LLD	< LLD	< LLD

Table 18: Unit 2 Gaseous Effluents - Continuous and Batch - Particulates						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
3. Particulates						
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-60	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cr-51	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Os-191	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-90	Ci	6.04E-08	1.66E-08	2.02E-07	1.30E-08	2.92E-07
Tc-99m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	6.04E-08	1.66E-08	2.02E-07	1.30E-08	2.92E-07
Total > 8 days	Ci	6.04E-08	1.66E-08	2.02E-07	1.30E-08	2.92E-07
4. Tritium						
H-3	Ci	1.78E+01	2.33E+01	1.44E+02	2.20E+01	2.08E+02

Table 19: Unit 2 Radiation Doses At And Beyond The Site Boundary						
	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
Unit 2		Q1	Q2	Q3	Q4	year
Gamma Air Dose	mrad	2.12E-04	6.46E-04	3.36E-04	2.09E-04	1.40E-03
ODCM Req 4.1 Limit	mrad	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
% ODCM Limit	%	4.24E-03	1.29E-02	6.72E-03	4.18E-03	1.40E-02
Beta Air Dose	mrad	7.65E-05	2.35E-04	1.22E-04	8.06E-05	5.14E-04
ODCM Req 4.1 Limit	mrad	1.00E+01	1.00E+01	1.00E+01	1.00E+01	2.00E+01
% ODCM Limit	%	7.65E-04	2.35E-03	1.22E-03	8.06E-04	2.57E-03
Maximum Organ Dose (excluding skin)	mrem	6.40E-03	8.36E-03	5.18E-02	7.88E-03	7.44E-02
Age		Teen	Teen	Teen	Teen	Teen
Organ		Note 1	Note 1	Note 1	Note 1	Note 1
ODCM Req. 4.2 Limit	%	7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01

Calculations are based on parameters and methodologies of the ODCM using historical meteorology. Dose is calculated to a hypothetical individual. In contrast, Appendix C dose calculations are based on concurrent meteorology, a real individual, and only the actual pathways present.

Note 1 - All organs except Bone.

Table 20: Unit 3 Gaseous Effluents - Summation Of All Releases							
	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total For Year	Est. Total Error % (1)
A. Fission & activation gases							
1. Total release	Ci	5.83E-02	6.98E-02	2.05E-01	3.19E+02	3.19E+02	3.54E+01
2. Average release rate for period	µCi/sec	7.50E-03	8.88E-03	2.58E-02	4.01E+01	1.01E+01	
3. Percent of ODCM Requirement limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
B. Iodine 131							
1. Total Iodine 131	Ci	< LLD	< LLD	< LLD	6.58E-06	6.58E-06	3.32E+01
2. Average release rate for period	µCi/sec	< LLD	< LLD	< LLD	8.28E-07	2.09E-07	
3. Percent of ODCM Requirement limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
C. Particulates							
1. Particulates with half- lives > 8 days	Ci	1.51E-06	1.27E-06	2.72E-06	3.50E-04	3.55E-04	3.43E+01
2. Average release rate for period	µCi/sec	1.95E-07	1.61E-07	3.42E-07	4.40E-05	1.13E-05	
3. Percent of ODCM Requirement limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
4. Gross Alpha radioactivity	Ci	< LLD	< LLD	< LLD	< LLD	< LLD	
D. Tritium							
1. Total release	Ci	7.03E+01	1.35E+02	5.17E+02	2.13E+02	9.36E+02	3.85E+01
2. Average release rate for period	µCi/sec	9.04E+00	1.72E+01	6.50E+01	2.68E+01	2.97E+01	
3. Percent of ODCM Requirement limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
(1) Estimated total error methodology is presented in Table 40.							
(2) See Table 27 for percent of ODCM Requirement limits.							

Table 21: Unit 3 Gaseous Effluents - Ground Level Releases - Continuous - Fission Gases and Iodines						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
1. Fission gases						
Ar-41	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
2. Iodines						
I-131	Ci	< LLD	< LLD	< LLD	6.58E-06	6.58E-06
I-132	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	< LLD	< LLD	6.58E-06	6.58E-06

Table 22: Unit 3 Gaseous Effluents - Ground Level Releases - Continuous - Particulates						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
3. Particulates						
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	< LLD	7.41E-07	< LLD	1.22E-04	1.23E-04
Co-60	Ci	< LLD	4.08E-07	3.92E-07	1.35E-05	1.43E-05
Cr-51	Ci	< LLD	< LLD	< LLD	1.11E-04	1.11E-04
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	< LLD	< LLD	2.53E-06	2.53E-06
Mo-99	Ci	< LLD	1.81E-07	< LLD	< LLD	1.81E-07
Nb-95	Ci	< LLD	< LLD	< LLD	5.95E-06	5.95E-06
Os-191	Ci	< LLD	< LLD	< LLD	9.18E-06	9.18E-06
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	1.47E-06	1.17E-07	2.33E-06	< LLD	3.92E-06
Sr-90	Ci	4.33E-08	< LLD	< LLD	2.68E-07	3.11E-07
Tc-99m	Ci	< LLD	1.84E-07	< LLD	< LLD	1.84E-07
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	< LLD	< LLD	1.95E-06	1.95E-06
Total	Ci	1.51E-06	1.63E-06	2.73E-06	2.67E-04	2.72E-04
4. Tritium						
H-3	Ci	1.49E+01	1.31E+01	1.73E+01	1.47E+02	1.92E+02

Table 23: Unit 3 Gaseous Effluents - Ground Level Releases - Batch - Fission Gases and Iodines						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
1. Fission gases						
Ar-41	Ci	5.21E-02	6.17E-02	1.84E-01	4.93E-01	7.90E-01
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	< LLD	< LLD	3.95E-08	< LLD	3.95E-08
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	6.25E-03	8.00E-03	2.15E-02	2.95E+02	2.95E+02
Xe-133m	Ci	< LLD	< LLD	3.41E-07	8.13E+00	8.13E+00
Xe-135	Ci	< LLD	5.03E-05	1.67E-06	1.49E+01	1.49E+01
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	5.83E-02	6.98E-02	2.05E-01	3.19E+02	3.19E+02
2. Iodines						
I-131	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-132	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	< LLD	< LLD	< LLD	< LLD

Table 24: Unit 3 Gaseous Effluents - Ground Level Releases - Batch - Particulates						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
3. Particulates						
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	< LLD	< LLD	< LLD	4.15E-05	4.15E-05
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	< LLD	< LLD	< LLD	2.49E-05	2.49E-05
Co-60	Ci	< LLD	< LLD	< LLD	1.69E-05	1.69E-05
Cr-51	Ci	< LLD	< LLD	< LLD	3.18E-05	3.18E-05
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	< LLD	< LLD	< LLD	9.61E-06	9.61E-06
Os-191	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	Note 1	Note 1	Note 1	Note 1	Note 1
Sr-90	Ci	Note 1	Note 1	Note 1	Note 1	Note 1
Tc-99m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	< LLD	< LLD	1.25E-04	1.25E-04
4. Tritium						
H-3	Ci	5.54E+01	1.22E+02	5.00E+02	6.62E+01	7.43E+02
Note 1 - Not required for batch releases						

Table 25: Unit 3 Gaseous Effluents - Continuous and Batch - Fission Gases and Iodines						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
1. Fission gases						
Ar-41	Ci	5.21E-02	6.17E-02	1.84E-01	4.93E-01	7.90E-01
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	< LLD	< LLD	3.95E-08	< LLD	3.95E-08
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	6.25E-03	8.00E-03	2.15E-02	2.95E+02	2.95E+02
Xe-133m	Ci	< LLD	< LLD	3.41E-07	8.13E+00	8.13E+00
Xe-135	Ci	< LLD	5.03E-05	1.67E-06	1.49E+01	1.49E+01
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	5.83E-02	6.98E-02	2.05E-01	3.19E+02	3.19E+02
2. Iodines						
I-131	Ci	< LLD	< LLD	< LLD	6.58E-06	6.58E-06
I-132	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	< LLD	< LLD	6.58E-06	6.58E-06

Table 26: Unit 3 Gaseous Effluents - Continuous and Batch - Particulates						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
3. Particulates						
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	< LLD	< LLD	< LLD	4.15E-05	4.15E-05
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	< LLD	7.41E-07	< LLD	1.47E-04	1.48E-04
Co-60	Ci	< LLD	4.08E-07	3.92E-07	3.04E-05	3.12E-05
Cr-51	Ci	< LLD	< LLD	< LLD	1.43E-04	1.43E-04
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	< LLD	< LLD	2.53E-06	2.53E-06
Mo-99	Ci	< LLD	1.81E-07	< LLD	< LLD	1.81E-07
Nb-95	Ci	< LLD	< LLD	< LLD	1.56E-05	1.56E-05
Os-191	Ci	< LLD	< LLD	< LLD	9.18E-06	9.18E-06
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	1.47E-06	1.17E-07	2.33E-06	< LLD	3.92E-06
Sr-90	Ci	4.33E-08	< LLD	< LLD	2.68E-07	3.11E-07
Tc-99m	Ci	< LLD	1.84E-07	< LLD	< LLD	1.84E-07
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	< LLD	< LLD	1.95E-06	1.95E-06
Total	Ci	1.51E-06	1.63E-06	2.73E-06	3.91E-04	3.97E-04
Total > 8 days	Ci	1.51E-06	1.27E-06	2.73E-06	3.50E-04	3.55E-04
4. Tritium						
H-3	Ci	7.03E+01	1.35E+02	5.17E+02	2.13E+02	9.36E+02

Table 27: Unit 3 Radiation Doses At And Beyond The Site Boundary						
	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
Gamma Air Dose	mrad	1.37E-04	1.63E-04	4.84E-04	3.95E-02	4.03E-02
ODCM Req 4.1 Limit	mrad	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
% ODCM Limit	%	2.74E-03	3.26E-03	9.68E-03	7.90E-01	4.03E-01
Beta Air Dose	mrad	5.01E-05	5.96E-05	1.76E-04	1.02E-01	1.02E-01
ODCM Req 4.1 Limit	mrad	1.00E+01	1.00E+01	1.00E+01	1.00E+01	2.00E+01
% ODCM Limit	%	5.01E-04	5.96E-04	1.76E-03	1.02E+00	5.10E-01
Maximum Organ Dose (excluding skin)	mrem	2.52E-02	4.86E-02	1.85E-01	7.67E-02	3.36E-01
Age		Teen	Teen	Teen	Teen	Teen
Organ		Lung	Lung	Lung	Lung	Lung
ODCM Req. 4.2 Limit	mrem	7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01
% ODCM Limit	%	3.36E-01	6.48E-01	2.47E+00	1.02E+00	2.24E+00

Calculations are based on parameters and methodologies of the ODCM using historical meteorology. Dose is calculated to a hypothetical individual. In contrast, Appendix C dose calculations are based on concurrent meteorology, a real individual, and only the actual pathways present.

Table 28: Units 1, 2, and 3 Gaseous Effluents - Continuous - Fission Gases and Iodines - Total By Quarter						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
1. Fission gases						
Ar-41	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
2. Iodines						
I-131	Ci	5.35E-06	5.51E-05	< LLD	6.58E-06	6.70E-05
I-132	Ci	1.39E-04	4.14E-04	< LLD	< LLD	5.53E-04
I-133	Ci	6.29E-06	< LLD	< LLD	< LLD	6.29E-06
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	1.51E-04	4.69E-04	< LLD	6.58E-06	6.26E-04

Table 29: Units 1, 2, and 3 Gaseous Effluents - Continuous - Particulates - Total By Quarter						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
3. Particulates						
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	1.72E-05	1.32E-04	< LLD	1.22E-04	2.71E-04
Co-60	Ci	3.27E-07	3.08E-05	3.92E-07	1.35E-05	4.51E-05
Cr-51	Ci	3.03E-05	2.93E-04	< LLD	1.11E-04	4.34E-04
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	< LLD	2.27E-06	< LLD	< LLD	2.27E-06
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	3.15E-06	< LLD	2.53E-06	5.69E-06
Mo-99	Ci	6.06E-07	1.81E-07	< LLD	< LLD	7.87E-07
Nb-95	Ci	< LLD	8.48E-06	< LLD	5.95E-06	1.44E-05
Os-191	Ci	< LLD	7.06E-06	< LLD	9.18E-06	1.62E-05
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	< LLD	3.67E-07	< LLD	< LLD	3.67E-07
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	1.47E-06	1.17E-07	2.33E-06	< LLD	3.92E-06
Sr-90	Ci	1.07E-07	2.41E-07	2.85E-06	1.26E-06	4.46E-06
Tc-99m	Ci	6.17E-07	1.84E-07	< LLD	< LLD	8.01E-07
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	6.03E-06	< LLD	1.95E-06	7.98E-06
Total	Ci	5.07E-05	4.84E-04	5.58E-06	2.68E-04	8.08E-04
4. Tritium						
H-3	Ci	5.00E+01	9.88E+01	5.58E+01	1.87E+02	3.92E+02

Table 30: Units 1, 2, and 3 Gaseous Effluents - Batch - Fission Gases and Iodines - Total By Quarter						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
1. Fission gases						
Ar-41	Ci	2.08E+00	3.33E-01	3.56E-01	6.22E-01	3.39E+00
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	3.20E-08	< LLD	3.95E-08	< LLD	7.15E-08
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	6.21E-01	3.57E-02	3.52E-02	2.95E+02	2.96E+02
Xe-133m	Ci	4.53E-07	< LLD	3.41E-07	8.13E+00	8.13E+00
Xe-135	Ci	1.29E-01	5.03E-05	1.67E-06	1.49E+01	1.51E+01
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	2.83E+00	3.68E-01	3.92E-01	3.19E+02	3.22E+02
2. Iodines						
I-131	Ci	< LLD	9.92E-07	< LLD	< LLD	9.92E-07
I-132	Ci	< LLD	1.50E-05	< LLD	< LLD	1.50E-05
I-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	1.60E-05	< LLD	< LLD	1.60E-05

Table 31: Units 1, 2, and 3 Gaseous Effluents - Batch - Particulates - Total By Quarter						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
3. Particulates						
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	4.19E-06	< LLD	< LLD	4.15E-05	4.57E-05
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	< LLD	3.19E-06	< LLD	2.49E-05	2.81E-05
Co-60	Ci	1.37E-06	1.81E-07	< LLD	1.69E-05	1.84E-05
Cr-51	Ci	< LLD	5.64E-06	< LLD	3.18E-05	3.74E-05
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	7.50E-08	< LLD	< LLD	7.50E-08
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	< LLD	5.39E-07	< LLD	9.61E-06	1.01E-05
Os-191	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	Note 1	Note 1	Note 1	Note 1	Note 1
Sr-90	Ci	Note 1	Note 1	Note 1	Note 1	Note 1
Tc-99m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	4.66E-07	< LLD	< LLD	4.66E-07
Total	Ci	5.56E-06	1.01E-05	< LLD	1.25E-04	1.40E-04
4. Tritium						
H-3	Ci	4.27E+02	3.15E+02	6.57E+02	1.63E+02	1.56E+03
Note 1 - Not required for batch releases						

Table 32: Units 1, 2, and 3 Gaseous Effluents - Continuous and Batch - Fission Gases and Iodines - Total By Quarter						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
1. Fission gases						
Ar-41	Ci	2.08E+00	3.33E-01	3.56E-01	6.22E-01	3.39E+00
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	3.20E-08	< LLD	3.95E-08	< LLD	7.15E-08
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	6.21E-01	3.57E-02	3.52E-02	2.95E+02	2.96E+02
Xe-133m	Ci	4.53E-07	< LLD	3.41E-07	8.13E+00	8.13E+00
Xe-135	Ci	1.29E-01	5.03E-05	1.67E-06	1.49E+01	1.51E+01
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	2.83E+00	3.68E-01	3.92E-01	3.19E+02	3.22E+02
2. Iodines						
I-131	Ci	5.35E-06	5.61E-05	< LLD	6.58E-06	6.80E-05
I-132	Ci	1.39E-04	4.29E-04	< LLD	< LLD	5.68E-04
I-133	Ci	6.29E-06	< LLD	< LLD	< LLD	6.29E-06
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	1.51E-04	4.85E-04	< LLD	6.58E-06	6.42E-04

Table 33: Units 1, 2, and 3 Gaseous Effluents - Continuous and Batch - Particulates - Total By Quarter						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
3. Particulates						
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	4.19E-06	< LLD	< LLD	4.15E-05	4.57E-05
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	1.72E-05	1.35E-04	< LLD	1.47E-04	2.99E-04
Co-60	Ci	1.69E-06	3.10E-05	3.92E-07	3.04E-05	6.35E-05
Cr-51	Ci	3.03E-05	2.99E-04	< LLD	1.43E-04	4.72E-04
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	< LLD	2.27E-06	< LLD	< LLD	2.27E-06
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	3.23E-06	< LLD	2.53E-06	5.76E-06
Mo-99	Ci	6.06E-07	1.81E-07	< LLD	< LLD	7.87E-07
Nb-95	Ci	< LLD	9.02E-06	< LLD	1.56E-05	2.46E-05
Os-191	Ci	< LLD	7.06E-06	< LLD	9.18E-06	1.62E-05
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	< LLD	3.67E-07	< LLD	< LLD	3.67E-07
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	1.47E-06	1.17E-07	2.33E-06	< LLD	3.92E-06
Sr-90	Ci	1.07E-07	2.41E-07	2.85E-06	1.26E-06	4.46E-06
Tc-99m	Ci	6.17E-07	1.84E-07	< LLD	< LLD	8.01E-07
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	6.49E-06	< LLD	1.95E-06	8.44E-06
Total	Ci	5.62E-05	4.94E-04	5.58E-06	3.92E-04	9.48E-04
Total > 8 days	Ci	5.08E-05	4.94E-04	5.58E-06	3.51E-04	9.01E-04
4. Tritium						
H-3	Ci	4.77E+02	4.14E+02	7.13E+02	3.50E+02	1.95E+03

Table 34: Units 1, 2 and 3 Gaseous Effluents- Continuous - Fission Gases and Iodine - Total By Unit					
Nuclides Released	Unit	Unit 1	Unit 2	Unit 3	Total Units 1, 2 and 3
1. Fission gases					
Ar-41	Ci	< LLD	< LLD	< LLD	< LLD
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	< LLD	< LLD	< LLD	< LLD
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	< LLD	< LLD	< LLD	< LLD
Xe-133m	Ci	< LLD	< LLD	< LLD	< LLD
Xe-135	Ci	< LLD	< LLD	< LLD	< LLD
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD
Total	Ci	< LLD	< LLD	< LLD	< LLD
2. Iodines					
I-131	Ci	6.04E-05	< LLD	6.58E-06	6.70E-05
I-132	Ci	5.53E-04	< LLD	< LLD	5.53E-04
I-133	Ci	6.29E-06	< LLD	< LLD	6.29E-06
I-134	Ci	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD
Total	Ci	6.20E-04	< LLD	6.58E-06	6.26E-04

Table 35: Units 1, 2 and 3 Gaseous Effluents- Continuous - Particulates - Total By Unit					
Nuclides Released	Unit	Unit 1	Unit 2	Unit 3	Total Units 1, 2 and 3
3. Particulates					
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	< LLD	< LLD	< LLD	< LLD
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	1.48E-04	< LLD	1.23E-04	2.71E-04
Co-60	Ci	3.07E-05	< LLD	1.43E-05	4.51E-05
Cr-51	Ci	3.23E-04	< LLD	1.11E-04	4.34E-04
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	2.27E-06	< LLD	< LLD	2.27E-06
La-140	Ci	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	3.15E-06	< LLD	2.53E-06	5.69E-06
Mo-99	Ci	6.06E-07	< LLD	1.81E-07	7.87E-07
Nb-95	Ci	8.48E-06	< LLD	5.95E-06	1.44E-05
Os-191	Ci	7.06E-06	< LLD	9.18E-06	1.62E-05
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	3.67E-07	< LLD	< LLD	3.67E-07
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	< LLD	< LLD	3.92E-06	3.92E-06
Sr-90	Ci	3.85E-06	2.92E-07	3.11E-07	4.46E-06
Tc-99m	Ci	6.17E-07	< LLD	1.84E-07	8.01E-07
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	6.03E-06	< LLD	1.95E-06	7.98E-06
Total	Ci	5.35E-04	2.92E-07	2.72E-04	8.08E-04
4. Tritium					
H-3	Ci	1.17E+02	8.25E+01	1.92E+02	3.92E+02

Table 36: Units 1, 2 and 3 Gaseous Effluents- Batch - Fission Gases and Iodine - Total By Unit					
Nuclides Released	Unit	Unit 1	Unit 2	Unit 3	Total Units 1, 2 and 3
1. Fission gases					
Ar-41	Ci	2.07E+00	5.31E-01	7.90E-01	3.39E+00
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	3.20E-08	< LLD	3.95E-08	7.15E-08
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	6.09E-01	7.37E-02	2.95E+02	2.96E+02
Xe-133m	Ci	4.53E-07	< LLD	8.13E+00	8.13E+00
Xe-135	Ci	1.29E-01	< LLD	1.49E+01	1.51E+01
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD
Xe-138		< LLD	< LLD	< LLD	< LLD
Total	Ci	2.80E+00	6.05E-01	3.19E+02	3.22E+02
2. Iodines					
I-131	Ci	9.92E-07	< LLD	< LLD	9.92E-07
I-132	Ci	1.50E-05	< LLD	< LLD	1.50E-05
I-133	Ci	< LLD	< LLD	< LLD	< LLD
I-134	Ci	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD
Total	Ci	9.92E-07	< LLD	< LLD	9.92E-07

Table 37: Units 1, 2 and 3 Gaseous Effluents- Batch - Particulates - Total By Unit					
Nuclides Released	Unit	Unit 1	Unit 2	Unit 3	Total Units 1,2 and 3
3. Particulates					
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	4.19E-06	< LLD	4.15E-05	4.57E-05
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	3.19E-06	< LLD	2.49E-05	2.81E-05
Co-60	Ci	1.55E-06	< LLD	1.69E-05	1.84E-05
Cr-51	Ci	5.64E-06	< LLD	3.18E-05	3.74E-05
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	< LLD	< LLD	< LLD	< LLD
La-140	Ci	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	7.50E-08	< LLD	< LLD	7.50E-08
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	5.39E-07	< LLD	9.61E-06	1.01E-05
Os-191	Ci	< LLD	< LLD	< LLD	< LLD
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	< LLD	< LLD	< LLD	< LLD
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	Note 1	Note 1	Note 1	Note 1
Sr-90	Ci	Note 1	Note 1	Note 1	Note 1
Tc-99m	Ci	< LLD	< LLD	< LLD	< LLD
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	4.66E-07	< LLD	< LLD	4.66E-07
Total	Ci	1.56E-05	< LLD	1.25E-04	1.40E-04
4. Tritium					
H-3	Ci	6.94E+02	1.25E+02	7.43E+02	1.56E+03
Note 1 - Not required for batch releases					

Table 38: Units 1, 2 and 3 Gaseous Effluents- Continuous and Batch - Fission Gases and Iodine - Total By Unit					
Nuclides Released	Unit	Unit 1	Unit 2	Unit 3	Total Units 1, 2 and 3
1. Fission gases					
Ar-41	Ci	2.07E+00	5.31E-01	7.90E-01	3.39E+00
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	3.20E-08	< LLD	3.95E-08	7.15E-08
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD
Kr-89	Ci	< LLD	< LLD	< LLD	< LLD
Kr-90	Ci	< LLD	< LLD	< LLD	< LLD
Xe-131m	Ci	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	6.09E-01	7.37E-02	2.95E+02	2.96E+02
Xe-133m	Ci	4.53E-07	< LLD	8.13E+00	8.13E+00
Xe-135	Ci	1.29E-01	< LLD	1.49E+01	1.51E+01
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD
Total	Ci	2.80E+00	6.05E-01	3.19E+02	3.22E+02
2. Iodines					
I-131	Ci	6.14E-05	< LLD	6.58E-06	6.80E-05
I-132	Ci	5.68E-04	< LLD	< LLD	5.68E-04
I-133	Ci	6.29E-06	< LLD	< LLD	6.29E-06
I-134	Ci	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD
Total	Ci	6.36E-04	< LLD	6.58E-06	6.42E-04

Table 39: Units 1, 2 and 3 Gaseous Effluents - Continuous and Batch - Particulates - Total By Unit					
Nuclides Released	Unit	Unit 1	Unit 2	Unit 3	Total Units 1, 2 and 3
3. Particulates					
Ag-110m	Ci	< LLD	< LLD	< LLD	< LLD
Ba-140	Ci	< LLD	< LLD	< LLD	< LLD
Br-82	Ci	4.19E-06	< LLD	4.15E-05	4.57E-05
Ce-141	Ci	< LLD	< LLD	< LLD	< LLD
Ce-144	Ci	< LLD	< LLD	< LLD	< LLD
Co-57	Ci	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	1.52E-04	< LLD	1.48E-04	2.99E-04
Co-60	Ci	3.23E-05	< LLD	3.12E-05	6.35E-05
Cr-51	Ci	3.29E-04	< LLD	1.43E-04	4.72E-04
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD
Cs-136	Ci	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD
Cs-138	Ci	< LLD	< LLD	< LLD	< LLD
Fe-59	Ci	2.27E-06	< LLD	< LLD	2.27E-06
La-140	Ci	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	3.23E-06	< LLD	2.53E-06	5.76E-06
Mo-99	Ci	6.06E-07	< LLD	1.81E-07	7.87E-07
Nb-95	Ci	9.02E-06	< LLD	1.56E-05	2.46E-05
Os-191	Ci	7.06E-06	< LLD	9.18E-06	1.62E-05
Rb-88	Ci	< LLD	< LLD	< LLD	< LLD
Ru-103	Ci	< LLD	< LLD	< LLD	< LLD
Ru-106	Ci	< LLD	< LLD	< LLD	< LLD
Sb-122	Ci	< LLD	< LLD	< LLD	< LLD
Sb-124	Ci	3.67E-07	< LLD	< LLD	3.67E-07
Sb-125	Ci	< LLD	< LLD	< LLD	< LLD
Se-75	Ci	< LLD	< LLD	< LLD	< LLD
Sn-113m	Ci	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	< LLD	< LLD	3.92E-06	3.92E-06
Sr-90	Ci	3.85E-06	2.92E-07	3.11E-07	4.46E-06
Tc-99m	Ci	6.17E-07	< LLD	1.84E-07	8.01E-07
Te-123m	Ci	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	6.49E-06	< LLD	1.95E-06	8.44E-06
Total	Ci	5.51E-04	2.92E-07	3.97E-04	9.48E-04
Total > 8 days	Ci	5.45E-04	2.92E-07	3.55E-04	9.01E-04
4. Tritium					
H-3	Ci	8.11E+02	2.08E+02	9.36E+02	1.95E+03

Table 40:
Estimation of Total Percent Error

The estimated total error is calculated as follows:

Total Percent Error = $(E_1^2 + E_2^2 + E_3^2 + ... + E_n^2)^{1/2}$

Where E_n = Percent error associated with each contributing parameter.

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

The following values (%) were used for error calculations.

Fission & Act gases	I-131	Particulates	Tritium	
25	25	25	25	Sample counting error
10	10	10	10	Counting system calibration error
5	5	5	5	Counting system source error
20	N/A	N/A	N/A	Temperature/volume correction error
10	10	10	10	Process flow measuring device (1)
N/A	15	15	15	Sample flow measuring device
N/A	5	N/A	N/A	Iodine collection efficiency error
N/A	N/A	10	N/A	Plateout error
N/A	N/A	N/A	20	Bubbler collection efficiency error
N/A	N/A	N/A	2	Sample volume transfer error (pipette)
N/A	N/A	N/A	2	Sample volume error (graduate)
Note 1 - % of full scale				

Table 41: Effluent Monitoring Instrumentation Out Of Service Greater Than 30 Days				
Unit	Instrument	Date span of inoperability	Cause of inoperability	Explanation
NONE				

Table 42:
Solid Waste Summary

A. Solid Waste Shipped Offsite For Burial Or Disposal (not irradiated fuel)

1.0 Type of Waste	Unit	Jan-Dec	estimated total error %
1.a. Spent resin, filters, sludges, evaporator bottoms, etc.	m^3	0.00E+00	N/A
	Ci	0.00E+00	2.50E+01
1.b. Dry compressible waste, contaminated equipment, etc.	m^3	9.55E+02	N/A
	Ci	3.42E+00	2.50E+01
1.c. Irradiated components, control rods, etc.	m^3	5.72E+00	N/A
	Ci	7.36E+00	2.50E+01
1.d. Other	m^3	0.00E+00	N/A
	Ci	0.00E+00	2.50E+01

2.0 Principal Radionuclides

2.a Estimate of major nuclide concentrations for spent resins, filters, sludges, evaporator bottoms, etc.

NONE.

2.b Estimate of major nuclide concentrations for dry compressible waste, contaminated equipment, etc.

Waste Class	Nuclide Name	Percent Abundance	Curies
A	**Fe-55**	4.68E+01	1.60E+00
A	**Co-60**	1.59E+01	5.43E-01
A	**Co-58**	1.16E+01	3.97E-01
A	**Ni-63**	1.14E+01	3.89E-01
A	**Cs-137**	4.84E+00	1.65E-01
A	**Cr-51**	4.39E+00	1.50E-01
A	**Zr-95**	1.38E+00	4.72E-02
A	**Mn-54**	1.06E+00	3.63E-02
A	**Nb-95**	8.75E-01	2.99E-02
A	**C-14**	5.04E-01	1.72E-02
A	**Sb-125**	2.92E-01	9.96E-03
A	**H-3**	2.34E-01	8.00E-03
A	**Ni-59**	2.08E-01	7.09E-03
A	**Fe-59**	1.59E-01	5.43E-03
A	**Co-57**	8.93E-02	3.05E-03
A	**Sn-113**	5.98E-02	2.04E-03
A	**Ce-144**	5.61E-02	1.92E-03
A	**Te-123m**	4.25E-02	1.45E-03
A	**Zn-65**	3.59E-02	1.23E-03
A	**Pu-241**	1.94E-02	6.61E-04
A	**Sr-90**	1.56E-02	5.31E-04
A	**Sb-124**	1.54E-02	5.27E-04
A	**Hf-181**	9.11E-03	3.11E-04
A	**Cs-134**	8.77E-03	2.99E-04
A	**Am-241**	2.90E-03	9.91E-05
A	**Pu-239**	9.84E-04	3.36E-05
A	**Sr-89**	8.64E-04	2.95E-05

2.b Estimate of major nuclide concentrations for dry compressible waste, contaminated equipment, etc.			
Waste Class	Nuclide Name	Percent Abundance	Curies
A	**Pu-238**	6.98E-04	2.39E-05
A	**Cm-243**	6.27E-04	2.14E-05
A	**Cm-242**	1.10E-04	3.77E-06
A	**Tc-99**	2.56E-06	8.73E-08
A	**Ce-141**	3.42E-14	1.17E-15
A		Total	3.42E+00

2.c Estimate of major nuclide concentrations for irradiated components, control rods, etc.			
Waste Class	Nuclide Name	Percent Abundance	Curies
A	**Co-60**	6.09E+01	4.48E+00
A	**Fe-55**	3.40E+01	2.50E+00
A	**Ni-63**	5.07E+00	3.73E-01
A	**Ni-59**	3.14E-02	2.31E-03
A	**C-14**	2.26E-02	1.66E-03
A	**H-3**	1.43E-02	1.05E-03
A	**Pu-241**	1.96E-03	1.44E-04
A	**Am-241**	4.16E-04	3.06E-05
A	**Nb-94**	3.71E-04	2.73E-05
A	**Pu-239**	3.63E-04	2.67E-05
A	**Cs-137**	1.79E-04	1.32E-05
A	**Sr-90**	6.86E-05	5.05E-06
A	**Pu-238**	6.03E-05	4.44E-06
A	**Cm-243**	4.92E-05	3.62E-06
A	**Tc-99**	3.25E-05	2.39E-06
A	**I-129**	1.96E-05	1.44E-06
A	**Ce-144**	4.88E-06	3.59E-07
A	**Cm-242**	3.75E-08	2.76E-09
A		Total	7.36E+00

2.d Other

2.d.1

NONE.

3.0 Solid Waste Disposition

3.a

Shipments	Mode Of Transportation	Destination
26	Truck	EnergySolutions, UT (Bulk Waste Facility)
12	Truck	EnergySolutions, TN

3.b Irradiated Fuel Shipments: None

3.c Supplemental Information:

Number of Containers	Container Volume ft^3	Type of Waste	Container Type	Solidification Agent
10	1360	Limited Quantity	20' Intermodal	None
24	1360	Low Specific Activity	20' Intermodal	None
16	various	Surface Contaminated Object	Metal Boxes	None
11	various	Type A	Type A cask	None
1	various	Type A	Type A cask	None

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 the period of January - December 2013. 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, semiannual 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 year were considered as "long term," since the batch releases are sufficiently random in both time of day and duration. Consequently, the JFDs for the batch releases for all quarters are the same as for the continuous releases.

Discussion

A summary of 2013 Joint Frequency Distribution (JFD) shows a somewhat typical, but variable year. Of the 8760 hours available, 337 hours of data were lost due to communication failures and calibrations for an effective 96.2% data recovery.

The average 35 foot wind speed was 6.5 mph. Distribution of wind directions was spread over the compass. The predominant direction (3 sectors of 22.5 degrees each) was centered on southwest (34.3%). The secondary maximum of three sectors was centered on the north contained 27.3% of the total. Southwesterly flow winds averaged higher speeds with the most frequent speed at 10 mph. With the northerly directions, the highest frequency occurred at 4.0 mph.

Stability class summary:

Stability class E, F, G, (stable categories) 58.0%.
Stability class G, (extremely stable) 26.0%.
Stability class A, B, C, (unstable categories) 21.2%.
Stability class D, (neutral category) 20.8%.

Overall stable conditions (E,F,G) existed for the year.

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2013 TO 3/31/2013

*** 1ST QRTR ***

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.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	1	1
6.51- 8.50	0	0	0	0	0	0	1	2	1	0	0	1	0	0	0	0	5
8.51-11.50	0	0	0	0	0	0	0	0	1	3	5	2	1	1	0	1	14
11.51-14.50	1	0	0	0	0	0	0	0	0	1	2	5	3	0	0	1	13
14.51-20.50	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	3	6
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
TOTAL	1	0	0	0	0	0	1	2	2	5	7	9	5	1	0	11	44

STABILITY CLASS B

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	4
5.51- 6.50	0	0	0	1	0	1	0	0	2	1	0	1	0	0	0	0	6
6.51- 8.50	0	0	2	1	1	1	0	1	1	4	2	2	1	1	1	1	19
8.51-11.50	0	3	1	1	0	2	0	0	0	3	9	1	1	1	1	1	24
11.51-14.50	0	0	0	0	0	0	0	0	0	1	1	1	4	1	1	1	10
14.51-20.50	0	0	0	1	0	0	0	0	0	0	1	0	0	2	0	1	5
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	3	3	4	1	4	0	1	3	9	13	5	6	5	5	5	68

STABILITY CLASS C

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
3.51- 4.50	3	0	0	0	0	0	0	0	0	1	2	2	1	0	0	1	10
4.51- 5.50	1	3	0	0	0	1	2	5	2	3	3	4	1	1	3	0	29
5.51- 6.50	0	2	3	0	1	1	0	0	9	8	4	0	1	0	2	2	33
6.51- 8.50	0	4	6	1	0	1	0	2	4	7	4	2	3	0	2	0	36
8.51-11.50	0	1	1	2	5	0	0	0	0	1	5	3	3	1	0	0	22
11.51-14.50	0	0	0	1	1	0	0	0	0	1	2	2	2	1	0	0	10
14.51-20.50	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
TOTAL	5	10	10	4	7	3	2	7	15	21	20	14	12	3	8	4	145

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2013 TO 3/31/2013

*** 1ST QRTR ***

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	2	1	1	0	1	0	0	3	1	2	2	4	2	2	2	4	27
2.51- 3.50	6	5	2	9	1	4	2	5	3	9	15	9	8	9	8	7	102
3.51- 4.50	2	10	9	3	2	1	0	3	14	16	14	4	3	4	8	9	102
4.51- 5.50	4	9	8	3	3	0	3	0	6	15	7	6	4	1	2	3	74
5.51- 6.50	1	8	9	5	2	0	2	2	6	9	0	4	1	1	2	3	55
6.51- 8.50	1	7	7	1	2	2	3	1	3	5	11	2	2	0	2	1	50
8.51-11.50	1	4	1	8	7	3	1	0	0	7	9	3	5	3	1	2	55
11.51-14.50	0	0	0	0	4	0	0	0	0	7	4	2	3	4	1	0	25
14.51-20.50	0	0	0	0	0	0	0	0	0	2	3	0	1	1	0	1	8
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
TOTAL	17	44	37	29	22	10	11	14	33	72	65	34	29	25	26	31	499

STABILITY CLASS E

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	3
1.51- 2.50	2	2	1	1	0	0	1	0	1	0	3	4	2	3	1	3	24
2.51- 3.50	5	1	3	0	2	2	1	1	1	5	5	5	8	6	11	4	60
3.51- 4.50	4	3	2	1	1	1	0	1	2	1	8	4	4	1	5	2	40
4.51- 5.50	2	1	2	1	0	0	0	0	3	4	1	3	1	2	1	0	21
5.51- 6.50	2	5	2	0	0	0	0	2	1	2	7	1	0	1	2	1	26
6.51- 8.50	2	4	2	0	0	1	1	0	4	8	11	7	2	2	2	1	47
8.51-11.50	1	0	0	1	4	0	2	1	1	1	18	5	9	12	6	1	62
11.51-14.50	0	0	0	2	0	0	0	0	2	2	0	0	4	8	2	1	21
14.51-20.50	1	0	0	0	0	0	0	0	1	0	1	0	4	1	1	0	9
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	19	16	12	6	7	4	5	5	16	23	55	30	34	36	31	14	313

STABILITY CLASS F

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
1.51- 2.50	6	0	2	1	1	0	1	1	1	2	1	2	3	5	1	2	29
2.51- 3.50	10	4	2	2	0	3	1	0	1	3	1	3	3	5	6	5	49
3.51- 4.50	8	6	1	0	0	0	1	0	1	4	5	5	4	8	10	8	61
4.51- 5.50	6	5	2	0	0	0	1	0	3	1	5	4	2	5	7	5	46
5.51- 6.50	1	0	0	1	0	0	0	0	0	2	6	7	0	4	7	5	33
6.51- 8.50	3	4	1	0	0	0	0	0	0	3	12	6	4	9	4	8	54
8.51-11.50	4	3	0	0	0	0	0	0	0	0	1	2	0	3	8	3	24
11.51-14.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
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	38	22	8	4	1	3	4	1	6	15	31	29	17	39	43	37	298

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2013 TO 3/31/2013

*** 1ST QRTR ***

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	7	3	2	2	0	0	1	0	0	2	0	2	6	10	9	12	56
2.51- 3.50	35	10	8	5	2	0	0	0	1	8	4	4	10	17	41	38	183
3.51- 4.50	80	28	5	3	2	0	0	0	0	1	4	3	5	8	27	60	226
4.51- 5.50	60	22	6	2	1	0	0	0	0	1	3	2	1	1	11	34	144
5.51- 6.50	18	20	2	0	0	0	0	0	0	0	1	1	0	2	8	16	68
6.51- 8.50	29	20	1	0	0	0	0	0	0	0	1	0	0	4	0	13	68
8.51-11.50	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	14	32
11.51-14.50	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
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	238	113	24	12	5	0	1	0	1	12	13	12	22	42	96	187	778

STABILITY CLASS ALL

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	4
1.51- 2.50	17	6	6	4	2	0	3	4	3	6	6	12	13	20	13	21	136
2.51- 3.50	57	20	15	16	5	9	4	6	6	25	25	21	29	37	67	54	396
3.51- 4.50	97	47	17	7	5	2	1	4	17	23	33	18	17	21	50	80	439
4.51- 5.50	74	40	18	6	4	1	6	5	14	24	19	19	9	10	26	43	318
5.51- 6.50	22	35	16	7	3	2	2	4	18	22	18	14	2	8	21	28	222
6.51- 8.50	35	39	19	3	3	5	5	6	13	27	41	20	12	16	11	24	279
8.51-11.50	15	20	3	12	16	5	3	1	2	15	47	16	19	21	16	22	233
11.51-14.50	1	1	0	3	5	0	0	0	2	12	9	10	16	14	4	4	81
14.51-20.50	1	0	0	1	0	0	0	0	1	3	5	2	7	4	1	5	30
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7
TOTAL	319	208	94	59	43	24	24	30	76	157	204	133	125	151	209	289	2145

TOTAL NUMBER OF OBSERVATIONS: 2160
TOTAL NUMBER OF VALID OBSERVATIONS: 2145
TOTAL NUMBER OF MISSING OBSERVATIONS: 15
PERCENT DATA RECOVERY FOR THIS PERIOD: 99.3 %
MEAN WIND SPEED FOR THIS PERIOD: 5.7 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
2.05	3.17	6.76	23.26	14.59	13.89	36.27

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	1	0	0	0	0	0	1	2	2	5	7	9	5	1	0	11	0
B	1	3	3	4	1	4	0	1	3	9	13	5	6	5	5	5	0
C	5	10	10	4	7	3	2	7	15	21	20	14	12	3	8	4	0
D	17	44	37	29	22	10	11	14	33	72	65	34	29	25	26	31	0
E	19	16	12	6	7	4	5	5	16	23	55	30	34	36	31	14	0
F	38	22	8	4	1	3	4	1	6	15	31	29	17	39	43	37	0
G	238	113	24	12	5	0	1	0	1	12	13	12	22	42	96	187	0
TOTAL	319	208	94	59	43	24	24	30	76	157	204	133	125	151	209	289	0

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 4/01/2013 TO 6/30/2013

*** 2ND QRTR ***

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.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	1	0	1
4.51- 5.50	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	1	4
5.51- 6.50	3	0	0	0	0	1	0	1	2	1	4	4	0	0	0	1	17
6.51- 8.50	2	2	0	0	1	0	3	3	7	24	23	8	0	0	2	1	76
8.51-11.50	1	1	0	0	2	1	0	1	14	39	41	19	8	0	0	2	129
11.51-14.50	0	0	0	1	0	1	0	0	5	14	38	10	3	3	2	0	77
14.51-20.50	0	0	0	0	0	0	0	0	0	12	27	10	2	15	0	0	66
>20.50	0	0	0	0	0	0	0	0	0	1	6	1	1	0	0	0	9
TOTAL	6	3	0	1	3	3	3	6	30	91	139	52	14	18	5	5	382

STABILITY CLASS B

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
.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	1	0	0	0	1	3
4.51- 5.50	1	0	1	0	1	1	1	1	0	4	3	3	0	0	1	0	17
5.51- 6.50	1	0	0	1	2	1	0	3	4	6	7	5	0	0	0	2	32
6.51- 8.50	2	0	0	2	2	0	4	3	21	13	12	11	2	2	0	2	76
8.51-11.50	1	1	0	1	1	0	0	0	1	5	9	10	2	0	0	0	31
11.51-14.50	0	0	0	0	1	1	0	0	0	5	11	2	0	0	0	0	20
14.51-20.50	1	0	0	0	0	0	0	0	0	2	5	4	0	3	0	0	15
>20.50	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
TOTAL	6	1	1	4	7	3	5	7	27	36	47	36	4	5	1	5	196

STABILITY CLASS C

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
.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	1	0	0	0	0	1	2	0	0	1	3	1	0	1	10
4.51- 5.50	0	0	0	1	2	2	1	3	11	3	5	3	0	3	0	0	34
5.51- 6.50	2	0	0	0	1	0	0	8	12	7	4	3	0	0	0	0	37
6.51- 8.50	0	1	0	0	0	0	1	5	10	5	5	4	3	0	1	0	35
8.51-11.50	0	0	0	0	0	0	1	0	0	2	8	4	1	0	0	0	16
11.51-14.50	1	0	0	0	0	0	0	0	0	0	2	1	0	2	0	0	6
14.51-20.50	0	0	0	0	1	0	0	0	0	3	4	0	1	1	0	0	10
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	1	1	1	4	2	3	17	35	20	28	16	8	7	1	1	149

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 4/01/2013 TO 6/30/2013

*** 2ND QRTR ***

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.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	1	2	0	1	0	1	0	0	0	1	1	0	1	0	1	9
2.51- 3.50	2	1	1	2	1	0	2	3	1	2	4	3	4	1	1	2	30
3.51- 4.50	0	3	1	2	0	2	0	7	7	3	3	1	0	1	0	1	31
4.51- 5.50	0	0	3	1	1	0	0	6	9	11	4	1	1	0	1	0	38
5.51- 6.50	0	0	1	1	0	0	0	1	8	1	3	1	0	0	0	0	16
6.51- 8.50	0	0	0	1	0	1	0	0	3	4	7	4	4	1	1	0	26
8.51-11.50	0	0	0	1	2	4	0	1	3	3	22	9	4	2	1	0	52
11.51-14.50	0	0	0	1	1	0	0	0	0	5	7	2	3	1	2	1	23
14.51-20.50	1	0	0	0	1	0	0	0	1	11	19	2	1	4	3	1	44
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
TOTAL	3	5	8	9	7	7	3	18	32	40	70	24	17	11	10	6	270

STABILITY CLASS E

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	0	7
2.51- 3.50	4	1	3	0	0	0	2	0	1	3	2	4	2	4	0	4	30
3.51- 4.50	2	2	1	1	0	0	0	0	0	1	3	4	6	0	2	1	23
4.51- 5.50	0	2	1	0	0	1	0	0	0	5	11	4	1	0	1	0	26
5.51- 6.50	0	1	1	0	0	0	0	0	5	9	11	6	1	1	3	0	38
6.51- 8.50	1	1	1	1	0	1	0	0	3	15	23	7	5	4	2	0	64
8.51-11.50	1	0	1	0	0	0	1	0	0	25	56	24	9	6	0	0	123
11.51-14.50	0	0	0	0	1	0	0	0	1	10	27	8	3	5	3	3	61
14.51-20.50	1	0	0	0	0	0	0	0	1	4	17	2	0	1	1	0	27
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	9	7	8	2	1	2	3	0	11	72	151	60	29	23	14	8	400

STABILITY CLASS F

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2
1.51- 2.50	2	1	0	0	0	0	0	0	1	1	0	3	1	3	1	1	14
2.51- 3.50	0	0	4	1	0	0	0	0	2	2	3	9	6	5	5	1	38
3.51- 4.50	3	5	2	1	0	0	2	0	2	6	7	8	10	4	2	6	58
4.51- 5.50	2	0	1	0	0	0	0	0	3	7	12	9	5	3	4	0	46
5.51- 6.50	2	0	0	0	0	0	0	1	1	8	14	5	2	2	0	1	36
6.51- 8.50	1	0	0	0	2	0	0	0	2	19	36	18	4	4	3	3	92
8.51-11.50	1	0	0	0	0	0	0	0	0	10	35	7	0	1	0	7	61
11.51-14.50	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	4
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	11	6	8	2	2	0	2	1	11	54	108	59	28	22	15	22	351

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 4/01/2013 TO 6/30/2013

*** 2ND QRTR ***

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
1.51- 2.50	2	3	1	0	0	0	1	0	0	0	1	1	3	1	8	5	26
2.51- 3.50	12	4	2	2	0	0	0	0	0	0	2	5	3	12	4	9	55
3.51- 4.50	32	11	3	0	2	0	0	0	0	0	2	3	4	4	9	20	90
4.51- 5.50	18	22	1	0	0	0	0	0	0	2	1	2	2	2	5	8	63
5.51- 6.50	17	9	3	1	0	1	0	0	2	1	7	1	0	0	1	3	46
6.51- 8.50	2	4	5	2	0	0	0	0	0	0	7	1	1	0	0	0	22
8.51-11.50	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3
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	84	54	15	5	2	1	1	0	2	3	21	14	13	19	27	45	306

STABILITY CLASS ALL

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	5
.76- 1.50	0	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	4
1.51- 2.50	4	5	3	0	1	0	2	0	1	1	2	6	6	7	11	7	56
2.51- 3.50	18	6	10	5	1	0	4	3	4	7	11	21	15	22	10	16	153
3.51- 4.50	37	21	8	4	2	2	2	8	12	10	15	18	23	10	14	30	216
4.51- 5.50	21	24	7	2	4	4	2	11	25	32	36	22	9	8	12	9	228
5.51- 6.50	25	10	5	3	3	3	0	14	34	33	50	25	3	3	4	7	222
6.51- 8.50	8	8	6	6	5	2	8	11	46	80	113	53	19	11	9	6	391
8.51-11.50	5	3	1	2	5	5	2	2	18	84	172	73	24	9	1	9	415
11.51-14.50	1	0	0	2	3	2	0	0	6	34	86	23	9	11	7	7	191
14.51-20.50	3	0	0	0	2	0	0	0	2	32	72	18	4	24	4	1	162
>20.50	0	0	0	0	0	0	0	0	0	2	6	1	1	0	1	0	11
TOTAL	122	77	41	24	26	18	20	49	148	316	564	261	113	105	73	92	2054

TOTAL NUMBER OF OBSERVATIONS: 2184
TOTAL NUMBER OF VALID OBSERVATIONS: 2054
TOTAL NUMBER OF MISSING OBSERVATIONS: 130
PERCENT DATA RECOVERY FOR THIS PERIOD: 94.0 %
MEAN WIND SPEED FOR THIS PERIOD: 8.0 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
18.60	9.54	7.25	13.15	19.47	17.09	14.90

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	6	3	0	1	3	3	3	6	30	91	139	52	14	18	5	5	3
B	6	1	1	4	7	3	5	7	27	36	47	36	4	5	1	5	1
C	3	1	1	1	4	2	3	17	35	20	28	16	8	7	1	1	1
D	3	5	8	9	7	7	3	18	32	40	70	24	17	11	10	6	0
E	9	7	8	2	1	2	3	0	11	72	151	60	29	23	14	8	0
F	11	6	8	2	2	0	2	1	11	54	108	59	28	22	15	22	0
G	84	54	15	5	2	1	1	0	2	3	21	14	13	19	27	45	0
TOTAL	122	77	41	24	26	18	20	49	148	316	564	261	113	105	73	92	5

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2013 TO 6/30/2013

*** 1ST SEMI ***

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.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	1	0	1
4.51- 5.50	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	1	4
5.51- 6.50	3	0	0	0	0	1	0	1	2	1	4	4	0	0	0	2	18
6.51- 8.50	2	2	0	0	1	0	4	5	8	24	23	9	0	0	2	1	81
8.51-11.50	1	1	0	0	2	1	0	1	15	42	46	21	9	1	0	3	143
11.51-14.50	1	0	0	1	0	1	0	0	5	15	40	15	6	3	2	1	90
14.51-20.50	0	0	0	0	0	0	0	0	0	13	27	11	3	15	0	3	72
>20.50	0	0	0	0	0	0	0	0	0	1	6	1	1	0	0	5	14
TOTAL	7	3	0	1	3	3	4	8	32	96	146	61	19	19	5	16	426

STABILITY CLASS B

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
.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	1	0	0	0	1	3
4.51- 5.50	2	0	1	0	1	1	1	1	0	4	3	3	0	0	3	1	21
5.51- 6.50	1	0	0	2	2	2	0	3	6	7	7	6	0	0	0	2	38
6.51- 8.50	2	0	2	3	3	1	4	4	22	17	14	13	3	3	1	3	95
8.51-11.50	1	4	1	2	1	2	0	0	1	8	18	11	3	1	1	1	55
11.51-14.50	0	0	0	0	1	1	0	0	0	6	12	3	4	1	1	1	30
14.51-20.50	1	0	0	1	0	0	0	0	0	2	6	4	0	5	0	1	20
>20.50	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
TOTAL	7	4	4	8	8	7	5	8	30	45	60	41	10	10	6	10	264

STABILITY CLASS C

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
.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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
3.51- 4.50	3	0	1	0	0	0	0	1	2	1	2	3	4	1	0	2	20
4.51- 5.50	1	3	0	1	2	3	3	8	13	6	8	7	1	4	3	0	63
5.51- 6.50	2	2	3	0	2	1	0	8	21	15	8	3	1	0	2	2	70
6.51- 8.50	0	5	6	1	0	1	1	7	14	12	9	6	6	0	3	0	71
8.51-11.50	0	1	1	2	5	0	1	0	0	3	13	7	4	1	0	0	38
11.51-14.50	1	0	0	1	1	0	0	0	0	1	4	3	2	3	0	0	16
14.51-20.50	0	0	0	0	1	0	0	0	0	3	4	1	2	1	0	0	12
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
TOTAL	8	11	11	5	11	5	5	24	50	41	48	30	20	10	9	5	294

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2013 TO 6/30/2013

*** 1ST SEMI ***

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	2	2	3	0	2	0	1	3	1	2	3	5	2	3	2	5	36
2.51- 3.50	8	6	3	11	2	4	4	8	4	11	19	12	12	10	9	9	132
3.51- 4.50	2	13	10	5	2	3	0	10	21	19	17	5	3	5	8	10	133
4.51- 5.50	4	9	11	4	4	0	3	6	15	26	11	7	5	1	3	3	112
5.51- 6.50	1	8	10	6	2	0	2	3	14	10	3	5	1	1	2	3	71
6.51- 8.50	1	7	7	2	2	3	3	1	6	9	18	6	6	1	3	1	76
8.51-11.50	1	4	1	9	9	7	1	1	3	10	31	12	9	5	2	2	107
11.51-14.50	0	0	0	1	5	0	0	0	0	12	11	4	6	5	3	1	48
14.51-20.50	1	0	0	0	1	0	0	0	1	13	22	2	2	5	3	2	52
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
TOTAL	20	49	45	38	29	17	14	32	65	112	135	58	46	36	36	37	769

STABILITY CLASS E

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	1	4
1.51- 2.50	2	2	1	1	0	0	1	0	1	0	3	5	4	5	3	3	31
2.51- 3.50	9	2	6	0	2	2	3	1	2	8	7	9	10	10	11	8	90
3.51- 4.50	6	5	3	2	1	1	0	1	2	2	11	8	10	1	7	3	63
4.51- 5.50	2	3	3	1	0	1	0	0	3	9	12	7	2	2	2	0	47
5.51- 6.50	2	6	3	0	0	0	0	2	6	11	18	7	1	2	5	1	64
6.51- 8.50	3	5	3	1	0	2	1	0	7	23	34	14	7	6	4	1	111
8.51-11.50	2	0	1	1	4	0	3	1	1	26	74	29	18	18	6	1	185
11.51-14.50	0	0	0	2	1	0	0	0	3	12	27	8	7	13	5	4	82
14.51-20.50	2	0	0	0	0	0	0	0	2	4	18	2	4	2	2	0	36
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	28	23	20	8	8	6	8	5	27	95	206	90	63	59	45	22	713

STABILITY CLASS F

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	3
1.51- 2.50	8	1	2	1	1	0	1	1	2	3	1	5	4	8	2	3	43
2.51- 3.50	10	4	6	3	0	3	1	0	3	5	4	12	9	10	11	6	87
3.51- 4.50	11	11	3	1	0	0	3	0	3	10	12	13	14	12	12	14	119
4.51- 5.50	8	5	3	0	0	0	1	0	6	8	17	13	7	8	11	5	92
5.51- 6.50	3	0	0	1	0	0	0	1	1	10	20	12	2	6	7	6	69
6.51- 8.50	4	4	1	0	2	0	0	0	2	22	48	24	8	13	7	11	146
8.51-11.50	5	3	0	0	0	0	0	0	0	10	36	9	0	4	8	10	85
11.51-14.50	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	5
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	49	28	16	6	3	3	6	2	17	69	139	88	45	61	58	59	649

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2013 TO 6/30/2013

*** 1ST SEMI ***

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
1.51- 2.50	9	6	3	2	0	0	2	0	0	2	1	3	9	11	17	17	82
2.51- 3.50	47	14	10	7	2	0	0	0	1	8	6	9	13	29	45	47	238
3.51- 4.50	112	39	8	3	4	0	0	0	0	1	6	6	9	12	36	80	316
4.51- 5.50	78	44	7	2	1	0	0	0	0	3	4	4	3	3	16	42	207
5.51- 6.50	35	29	5	1	0	1	0	0	2	1	8	2	0	2	9	19	114
6.51- 8.50	31	24	6	2	0	0	0	0	0	0	8	1	1	4	0	13	90
8.51-11.50	10	10	0	0	0	0	0	0	0	0	1	0	0	0	0	14	35
11.51-14.50	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
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	322	167	39	17	7	1	2	0	3	15	34	26	35	61	123	232	1084

STABILITY CLASS ALL

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	5
.76- 1.50	0	0	1	0	0	0	0	0	0	1	2	2	1	0	0	1	8
1.51- 2.50	21	11	9	4	3	0	5	4	4	7	8	18	19	27	24	28	192
2.51- 3.50	75	26	25	21	6	9	8	9	10	32	36	42	44	59	77	70	549
3.51- 4.50	134	68	25	11	7	4	3	12	29	33	48	36	40	31	64	110	655
4.51- 5.50	95	64	25	8	8	5	8	16	39	56	55	41	18	18	38	52	546
5.51- 6.50	47	45	21	10	6	5	2	18	52	55	68	39	5	11	25	35	444
6.51- 8.50	43	47	25	9	8	7	13	17	59	107	154	73	31	27	20	30	670
8.51-11.50	20	23	4	14	21	10	5	3	20	99	219	89	43	30	17	31	648
11.51-14.50	2	1	0	5	8	2	0	0	8	46	95	33	25	25	11	11	272
14.51-20.50	4	0	0	1	2	0	0	0	3	35	77	20	11	28	5	6	192
>20.50	0	0	0	0	0	0	0	0	0	2	6	1	1	0	1	7	18
TOTAL	441	285	135	83	69	42	44	79	224	473	768	394	238	256	282	381	4199

TOTAL NUMBER OF OBSERVATIONS: 4344
TOTAL NUMBER OF VALID OBSERVATIONS: 4199
TOTAL NUMBER OF MISSING OBSERVATIONS: 145
PERCENT DATA RECOVERY FOR THIS PERIOD: 96.7 %
MEAN WIND SPEED FOR THIS PERIOD: 6.8 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
10.15	6.29	7.00	18.31	16.98	15.46	25.82

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	7	3	0	1	3	3	4	8	32	96	146	61	19	19	5	16	3
B	7	4	4	8	8	7	5	8	30	45	60	41	10	10	6	10	1
C	8	11	11	5	11	5	5	24	50	41	48	30	20	10	9	5	1
D	20	49	45	38	29	17	14	32	65	112	135	58	46	36	36	37	0
E	28	23	20	8	8	6	8	5	27	95	206	90	63	59	45	22	0
F	49	28	16	6	3	3	6	2	17	69	139	88	45	61	58	59	0
G	322	167	39	17	7	1	2	0	3	15	34	26	35	61	123	232	0
TOTAL	441	285	135	83	69	42	44	79	224	473	768	394	238	256	282	381	5

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2013 TO 9/30/2013

*** 3RD QRTR ***

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.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	2	1	0	0	3
4.51- 5.50	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	4
5.51- 6.50	0	0	1	0	2	1	0	1	0	1	4	0	1	1	0	1	13
6.51- 8.50	1	1	1	2	4	5	3	3	7	6	12	8	2	0	2	1	58
8.51-11.50	0	1	0	0	2	2	1	1	3	15	39	14	9	1	2	1	91
11.51-14.50	0	2	1	1	1	0	0	0	1	2	11	5	3	0	1	0	28
14.51-20.50	0	0	0	1	0	0	0	0	0	1	4	2	1	1	1	0	11
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	4	3	4	9	8	4	5	11	26	70	30	19	5	6	3	208

STABILITY CLASS B

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	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	1	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	0	0	1	1	0	0	0	2	3	1	3	4	1	1	2	0	19
5.51- 6.50	0	1	4	1	1	1	0	4	13	5	5	5	2	1	0	1	44
6.51- 8.50	0	0	0	2	5	3	0	11	23	10	11	7	1	0	2	1	76
8.51-11.50	0	1	0	2	3	3	1	1	2	7	15	6	1	0	0	0	42
11.51-14.50	0	0	0	0	5	1	0	0	0	1	7	0	0	0	0	0	14
14.51-20.50	0	0	0	0	1	0	0	0	0	1	4	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	0	2	5	6	15	8	1	18	41	25	45	22	5	2	4	3	202

STABILITY CLASS C

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	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	1	0	0	0	0	0	1	0	1	3	0	1	0	1	0	0	8
4.51- 5.50	0	1	1	2	1	0	2	0	6	7	7	6	3	0	1	0	37
5.51- 6.50	2	0	3	0	2	2	2	1	13	12	10	5	1	1	0	1	55
6.51- 8.50	0	3	3	4	5	1	8	2	8	7	10	9	3	0	0	0	63
8.51-11.50	0	0	1	1	6	3	1	1	1	1	8	2	2	0	0	0	27
11.51-14.50	0	1	0	0	4	0	0	0	0	1	0	2	0	0	0	0	8
14.51-20.50	0	1	0	0	1	0	0	0	0	0	3	1	0	1	2	0	9
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	6	8	7	19	6	14	4	29	31	38	26	9	3	4	1	208

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2013 TO 9/30/2013

*** 3RD QRTR ***

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.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	1	0	0	0	0	4	3	0	1	3	2	2	0	16
2.51- 3.50	5	2	3	2	0	2	2	4	4	5	7	11	8	2	4	4	65
3.51- 4.50	6	5	1	2	2	3	1	1	12	7	6	3	3	5	3	0	60
4.51- 5.50	0	4	2	4	2	0	2	1	12	7	6	7	3	3	2	2	57
5.51- 6.50	2	3	7	3	1	1	1	1	2	8	8	6	4	1	3	0	51
6.51- 8.50	3	2	6	3	3	9	3	1	5	4	19	10	5	2	2	1	78
8.51-11.50	2	4	1	3	10	6	3	0	0	7	15	17	1	0	2	0	71
11.51-14.50	1	2	0	1	5	0	1	0	3	4	26	4	0	1	1	0	49
14.51-20.50	0	0	0	0	21	1	1	0	3	3	22	1	3	0	1	0	56
>20.50	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	4
TOTAL	19	22	20	19	46	22	14	8	45	48	111	60	30	16	20	7	507

STABILITY CLASS E

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
1.51- 2.50	2	4	2	2	0	0	1	1	0	1	0	6	4	4	3	4	34
2.51- 3.50	4	8	4	4	0	1	2	1	2	4	9	2	10	9	9	4	73
3.51- 4.50	5	1	1	1	0	1	1	1	2	3	12	5	3	4	3	7	50
4.51- 5.50	4	0	2	4	1	0	0	2	3	4	8	7	3	2	2	5	47
5.51- 6.50	2	4	4	1	0	1	1	1	4	7	12	11	6	5	3	2	64
6.51- 8.50	6	2	6	4	2	4	1	3	4	9	27	12	5	3	2	1	91
8.51-11.50	4	1	0	3	8	5	3	2	1	16	32	19	11	3	4	2	114
11.51-14.50	0	2	3	4	10	7	3	0	0	2	12	3	0	2	3	1	52
14.51-20.50	1	0	0	3	7	0	0	0	1	0	1	1	0	0	0	0	14
>20.50	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	28	22	23	26	28	19	12	11	17	46	114	66	43	32	29	26	542

STABILITY CLASS F

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	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	3	0	1	0	0	0	1	0	0	2	4	4	6	2	10	3	36
2.51- 3.50	7	3	1	0	0	1	0	0	0	4	3	2	3	3	5	12	44
3.51- 4.50	13	4	0	1	0	0	0	0	0	3	2	4	5	7	12	9	60
4.51- 5.50	9	3	1	1	0	0	0	0	1	2	5	6	6	0	5	8	47
5.51- 6.50	5	7	1	0	0	0	0	0	0	3	9	9	3	2	0	6	45
6.51- 8.50	0	3	1	0	1	0	0	0	1	2	15	3	2	2	2	3	35
8.51-11.50	0	2	1	0	0	1	1	0	0	2	4	3	0	1	0	0	15
11.51-14.50	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	3
14.51-20.50	0	0	0	0	0	0	0	0	0	0	0	1	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	37	22	6	3	1	2	2	0	2	19	42	32	26	17	34	41	286

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2013 TO 9/30/2013

*** 3RD QRTR ***

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	6	2	0	1	0	0	0	0	1	0	0	0	1	3	6	3	23
2.51- 3.50	16	5	5	0	0	0	0	0	1	0	1	3	5	5	9	12	62
3.51- 4.50	21	7	4	0	0	0	0	0	0	0	0	2	1	1	8	15	59
4.51- 5.50	19	8	5	0	0	0	0	0	0	0	0	0	5	2	3	15	57
5.51- 6.50	11	12	2	0	0	0	0	0	0	0	1	0	0	0	3	4	33
6.51- 8.50	6	5	3	0	0	0	0	0	0	1	1	0	0	0	2	1	19
8.51-11.50	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	2
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	79	39	20	1	0	0	0	0	2	1	3	6	12	11	31	50	255

STABILITY CLASS ALL

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
1.51- 2.50	11	6	3	4	0	0	2	1	5	6	4	11	14	11	21	10	109
2.51- 3.50	32	18	13	6	0	4	4	5	7	13	20	18	26	19	28	33	246
3.51- 4.50	46	17	6	4	2	4	3	2	15	16	20	15	14	19	26	31	240
4.51- 5.50	32	16	12	12	4	0	4	5	25	22	29	31	22	9	15	30	268
5.51- 6.50	22	27	22	5	6	6	4	8	32	36	49	36	17	11	9	15	305
6.51- 8.50	16	16	20	15	20	22	15	20	48	39	95	49	18	7	12	8	420
8.51-11.50	6	9	4	9	29	20	10	5	7	48	113	62	24	5	8	3	362
11.51-14.50	1	7	4	7	25	8	4	0	4	11	56	14	4	3	5	1	154
14.51-20.50	1	1	0	4	30	1	1	0	4	5	34	6	4	2	4	0	97
>20.50	0	0	1	0	2	0	0	0	0	0	2	0	0	0	0	0	5
TOTAL	167	117	85	66	118	65	47	46	147	196	423	242	144	86	128	131	2208

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: 7.0 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
9.42	9.15	9.42	22.96	24.55	12.95	11.55

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	1	4	3	4	9	8	4	5	11	26	70	30	19	5	6	3	0
B	0	2	5	6	15	8	1	18	41	25	45	22	5	2	4	3	0
C	3	6	8	7	19	6	14	4	29	31	38	26	9	3	4	1	0
D	19	22	20	19	46	22	14	8	45	48	111	60	30	16	20	7	0
E	28	22	23	26	28	19	12	11	17	46	114	66	43	32	29	26	0
F	37	22	6	3	1	2	2	0	2	19	42	32	26	17	34	41	0
G	79	39	20	1	0	0	0	0	2	1	3	6	12	11	31	50	0
TOTAL	167	117	85	66	118	65	47	46	147	196	423	242	144	86	128	131	0

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 10/01/2013 TO 12/31/2013

*** 4TH QRTR ***

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.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	1	0	0	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	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	0	0	0	0	0	0	0	3	0	0	0	3	2	8
11.51-14.50	0	0	0	0	0	0	0	0	0	1	2	0	0	1	0	0	4
14.51-20.50	0	0	0	0	0	0	0	0	0	2	7	0	0	0	0	0	9
>20.50	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
TOTAL	0	0	0	0	0	0	0	0	0	3	13	0	1	1	3	2	23

STABILITY CLASS B

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	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	1	0	0	0	1	0	0	0	0	0	2
4.51- 5.50	0	0	1	1	0	4	2	0	1	0	0	0	0	0	0	0	9
5.51- 6.50	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	3
6.51- 8.50	1	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	6
8.51-11.50	0	2	0	0	0	2	1	0	0	4	3	0	0	0	0	2	14
11.51-14.50	0	0	0	0	0	0	0	0	0	1	3	0	0	2	0	0	6
14.51-20.50	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	3
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	4	2	2	0	7	4	1	2	6	9	0	1	2	0	2	43

STABILITY CLASS C

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	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	1	2	0	1	0	0	2	1	1	0	8
3.51- 4.50	0	0	0	2	1	1	4	0	1	0	0	0	1	1	0	1	12
4.51- 5.50	1	0	0	0	0	4	1	3	2	0	0	3	1	1	0	1	17
5.51- 6.50	0	1	3	0	2	0	0	2	5	0	0	0	1	0	1	0	15
6.51- 8.50	0	1	2	0	1	1	1	3	4	4	8	3	1	0	1	1	31
8.51-11.50	0	0	1	0	5	2	0	0	0	2	4	1	0	1	0	0	16
11.51-14.50	0	0	0	1	4	0	0	0	1	1	2	2	1	0	1	0	13
14.51-20.50	0	0	0	1	1	0	0	0	0	1	1	0	0	1	0	0	5
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	2	6	4	14	8	7	10	13	9	15	9	7	5	4	3	117

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 10/01/2013 TO 12/31/2013

*** 4TH QRTR ***

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.76- 1.50	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	2
1.51- 2.50	0	1	0	2	2	0	2	3	1	7	7	4	2	2	2	3	38
2.51- 3.50	7	5	6	2	1	4	11	6	16	14	13	16	11	5	3	5	125
3.51- 4.50	5	8	8	2	1	2	5	5	13	11	7	6	3	3	6	6	91
4.51- 5.50	2	6	8	3	2	2	2	8	15	4	1	4	4	1	4	1	67
5.51- 6.50	4	2	2	3	2	2	1	0	0	4	4	4	2	0	3	1	34
6.51- 8.50	2	3	3	3	5	2	2	0	0	3	5	4	3	3	2	5	45
8.51-11.50	0	2	2	5	5	0	0	1	1	2	3	2	5	1	1	2	32
11.51-14.50	1	0	0	5	8	2	0	0	0	1	0	2	1	2	0	0	22
14.51-20.50	0	0	0	4	7	0	0	0	0	2	3	1	1	1	0	0	19
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	21	27	29	30	33	14	23	23	46	49	43	43	32	18	21	23	475

STABILITY CLASS E

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	3
1.51- 2.50	2	0	0	0	0	0	0	2	1	7	2	2	6	3	3	5	33
2.51- 3.50	2	2	2	0	1	2	1	2	4	3	2	2	6	3	3	5	40
3.51- 4.50	1	1	1	0	0	0	0	1	3	1	6	2	1	2	0	4	23
4.51- 5.50	3	3	0	1	0	2	0	1	0	4	3	4	2	2	1	1	27
5.51- 6.50	1	2	0	1	0	0	0	0	2	6	2	3	2	2	1	1	23
6.51- 8.50	1	1	2	0	1	0	1	1	2	6	9	5	1	4	3	0	37
8.51-11.50	0	0	0	2	2	0	1	0	4	10	7	6	0	7	3	0	42
11.51-14.50	0	0	0	2	5	1	0	0	0	2	0	0	1	1	2	0	14
14.51-20.50	0	0	0	6	6	0	0	0	1	1	0	0	0	0	0	0	14
>20.50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	10	9	5	12	16	5	3	7	17	40	32	25	19	24	16	17	257

STABILITY CLASS F

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
1.51- 2.50	6	4	1	0	1	2	2	1	0	2	2	1	6	0	7	5	40
2.51- 3.50	3	4	3	0	1	1	1	0	1	0	1	3	7	7	8	9	49
3.51- 4.50	9	4	4	0	1	0	0	2	2	1	1	0	1	3	9	11	48
4.51- 5.50	4	1	1	5	0	0	0	1	0	1	3	4	3	3	2	4	32
5.51- 6.50	2	0	3	2	0	0	0	0	0	2	2	0	4	0	2	7	24
6.51- 8.50	2	0	1	1	0	0	0	0	1	4	9	2	3	2	3	2	30
8.51-11.50	0	0	0	4	0	0	0	0	1	4	6	1	0	0	0	3	19
11.51-14.50	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	2
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	27	13	13	13	3	3	4	4	5	15	24	11	24	15	32	41	247

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 10/01/2013 TO 12/31/2013

*** 4TH QRTR ***

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.76- 1.50	2	0	0	1	0	0	1	1	1	0	0	1	1	3	1	2	14
1.51- 2.50	29	10	3	3	0	2	1	0	4	2	5	3	10	12	17	19	120
2.51- 3.50	58	14	10	3	0	4	1	2	0	4	2	9	15	23	24	54	223
3.51- 4.50	78	33	3	5	1	0	1	0	0	2	6	5	3	8	28	55	228
4.51- 5.50	56	17	5	2	0	0	0	0	0	0	1	1	1	1	10	27	121
5.51- 6.50	28	15	2	0	0	0	0	0	0	0	1	0	0	3	1	11	61
6.51- 8.50	30	10	3	0	0	0	0	0	0	0	2	0	0	0	2	11	58
8.51-11.50	4	9	6	0	0	0	0	0	0	0	1	0	0	0	0	8	28
11.51-14.50	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
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	285	108	33	14	1	6	4	3	5	8	18	19	30	50	83	187	854

STABILITY CLASS ALL

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	3	0	0	2	0	0	1	1	1	2	1	2	1	3	1	3	21
1.51- 2.50	37	15	4	5	3	4	5	6	6	18	16	10	24	17	29	32	231
2.51- 3.50	70	25	21	5	3	11	15	12	21	22	18	30	42	39	39	73	446
3.51- 4.50	93	46	16	9	4	3	11	8	19	15	21	13	9	17	43	77	404
4.51- 5.50	66	27	15	12	2	12	5	13	18	9	8	16	11	8	17	34	273
5.51- 6.50	35	20	10	6	4	2	1	3	8	12	9	7	10	5	8	20	160
6.51- 8.50	36	17	12	5	7	4	4	4	7	17	33	14	8	9	11	19	207
8.51-11.50	4	13	9	11	12	4	2	1	6	22	27	10	5	9	7	17	159
11.51-14.50	1	0	1	8	17	3	1	0	1	6	7	4	3	6	4	0	62
14.51-20.50	0	0	0	12	14	0	0	0	1	7	13	1	1	2	0	0	51
>20.50	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2
TOTAL	345	163	88	75	67	43	45	48	88	130	154	107	114	115	159	275	2016

TOTAL NUMBER OF OBSERVATIONS: 2208
TOTAL NUMBER OF VALID OBSERVATIONS: 2016
TOTAL NUMBER OF MISSING OBSERVATIONS: 192
PERCENT DATA RECOVERY FOR THIS PERIOD: 91.3 %
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
1.14	2.13	5.80	23.56	12.75	12.25	42.36

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	0	0	0	0	0	0	3	13	0	1	1	3	2	0
B	1	4	2	2	0	7	4	1	2	6	9	0	1	2	0	2	0
C	1	2	6	4	14	8	7	10	13	9	15	9	7	5	4	3	0
D	21	27	29	30	33	14	23	23	46	49	43	43	32	18	21	23	0
E	10	9	5	12	16	5	3	7	17	40	32	25	19	24	16	17	0
F	27	13	13	13	3	3	4	4	5	15	24	11	24	15	32	41	0
G	285	108	33	14	1	6	4	3	5	8	18	19	30	50	83	187	0
TOTAL	345	163	88	75	67	43	45	48	88	130	154	107	114	115	159	275	0

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2013 TO 12/31/2013

*** 2ND SEMI ***

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.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	1	0	0	0	1
3.51- 4.50	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3
4.51- 5.50	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	4
5.51- 6.50	0	0	1	0	2	1	0	1	0	1	4	0	1	1	0	1	13
6.51- 8.50	1	1	1	2	4	5	3	3	7	6	12	8	2	0	2	1	58
8.51-11.50	0	1	0	0	2	2	1	1	3	15	42	14	9	1	5	3	99
11.51-14.50	0	2	1	1	1	0	0	0	1	3	13	5	3	1	1	0	32
14.51-20.50	0	0	0	1	0	0	0	0	0	3	11	2	1	1	1	0	20
>20.50	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
TOTAL	1	4	3	4	9	8	4	5	11	29	83	30	20	6	9	5	231

STABILITY CLASS B

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	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	1	1
3.51- 4.50	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
4.51- 5.50	0	0	2	2	0	4	2	2	4	1	3	4	1	1	2	0	28
5.51- 6.50	0	1	4	1	1	1	0	5	14	5	5	5	3	1	0	1	47
6.51- 8.50	1	2	1	3	5	4	0	11	23	10	11	7	1	0	2	1	82
8.51-11.50	0	3	0	2	3	5	2	1	2	11	18	6	1	0	0	2	56
11.51-14.50	0	0	0	0	5	1	0	0	0	2	10	0	0	2	0	0	20
14.51-20.50	0	0	0	0	1	0	0	0	0	2	6	0	0	0	0	0	9
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	6	7	8	15	15	5	19	43	31	54	22	6	4	4	5	245

STABILITY CLASS C

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	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	1	2	0	1	0	0	2	1	2	0	9
3.51- 4.50	1	0	0	2	1	1	5	0	2	3	0	1	1	2	0	1	20
4.51- 5.50	1	1	1	2	1	4	3	3	8	7	7	9	4	1	1	1	54
5.51- 6.50	2	1	6	0	4	2	2	3	18	12	10	5	2	1	1	1	70
6.51- 8.50	0	4	5	4	6	2	9	5	12	11	18	12	4	0	1	1	94
8.51-11.50	0	0	2	1	11	5	1	1	1	3	12	3	2	1	0	0	43
11.51-14.50	0	1	0	1	8	0	0	0	1	2	2	4	1	0	1	0	21
14.51-20.50	0	1	0	1	2	0	0	0	0	1	4	1	0	2	2	0	14
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	8	14	11	33	14	21	14	42	40	53	35	16	8	8	4	325

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2013 TO 12/31/2013

*** 2ND SEMI ***

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.76- 1.50	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	2
1.51- 2.50	0	1	0	3	2	0	2	3	5	10	7	5	5	4	4	3	54
2.51- 3.50	12	7	9	4	1	6	13	10	20	19	20	27	19	7	7	9	190
3.51- 4.50	11	13	9	4	3	5	6	6	25	18	13	9	6	8	9	6	151
4.51- 5.50	2	10	10	7	4	2	4	9	27	11	7	11	7	4	6	3	124
5.51- 6.50	6	5	9	6	3	3	2	1	2	12	12	10	6	1	6	1	85
6.51- 8.50	5	5	9	6	8	11	5	1	5	7	24	14	8	5	4	6	123
8.51-11.50	2	6	3	8	15	6	3	1	1	9	18	19	6	1	3	2	103
11.51-14.50	2	2	0	6	13	2	1	0	3	5	26	6	1	3	1	0	71
14.51-20.50	0	0	0	4	28	1	1	0	3	5	25	2	4	1	1	0	75
>20.50	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	4
TOTAL	40	49	49	49	79	36	37	31	91	97	154	103	62	34	41	30	982

STABILITY CLASS E

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	1	5
1.51- 2.50	4	4	2	2	0	0	1	3	1	8	2	8	10	7	6	9	67
2.51- 3.50	6	10	6	4	1	3	3	3	6	7	11	4	16	12	12	9	113
3.51- 4.50	6	2	2	1	0	1	1	2	5	4	18	7	4	6	3	11	73
4.51- 5.50	7	3	2	5	1	2	0	3	3	8	11	11	5	4	3	6	74
5.51- 6.50	3	6	4	2	0	1	1	1	6	13	14	14	8	7	4	3	87
6.51- 8.50	7	3	8	4	3	4	2	4	6	15	36	17	6	7	5	1	128
8.51-11.50	4	1	0	5	10	5	4	2	5	26	39	25	11	10	7	2	156
11.51-14.50	0	2	3	6	15	8	3	0	0	4	12	3	1	3	5	1	66
14.51-20.50	1	0	0	9	13	0	0	0	2	1	1	1	0	0	0	0	28
>20.50	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2
TOTAL	38	31	28	38	44	24	15	18	34	86	146	91	62	56	45	43	799

STABILITY CLASS F

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
1.51- 2.50	9	4	2	0	1	2	3	1	0	4	6	5	12	2	17	8	76
2.51- 3.50	10	7	4	0	1	2	1	0	1	4	4	5	10	10	13	21	93
3.51- 4.50	22	8	4	1	1	0	0	2	2	4	3	4	6	10	21	20	108
4.51- 5.50	13	4	2	6	0	0	0	1	1	3	8	10	9	3	7	12	79
5.51- 6.50	7	7	4	2	0	0	0	0	0	5	11	9	7	2	2	13	69
6.51- 8.50	2	3	2	1	1	0	0	0	2	6	24	5	5	4	5	5	65
8.51-11.50	0	2	1	4	0	1	1	0	1	6	10	4	0	1	0	3	34
11.51-14.50	0	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	5
14.51-20.50	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	64	35	19	16	4	5	6	4	7	34	66	43	50	32	66	82	533

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2013 TO 12/31/2013

*** 2ND SEMI ***

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.76- 1.50	2	0	0	1	0	0	1	1	1	0	0	1	1	3	1	2	14
1.51- 2.50	35	12	3	4	0	2	1	0	5	2	5	3	11	15	23	22	143
2.51- 3.50	74	19	15	3	0	4	1	2	1	4	3	12	20	28	33	66	285
3.51- 4.50	99	40	7	5	1	0	1	0	0	2	6	7	4	9	36	70	287
4.51- 5.50	75	25	10	2	0	0	0	0	0	0	1	1	6	3	13	42	178
5.51- 6.50	39	27	4	0	0	0	0	0	0	0	2	0	0	3	4	15	94
6.51- 8.50	36	15	6	0	0	0	0	0	0	1	3	0	0	0	4	12	77
8.51-11.50	4	9	7	0	0	0	0	0	0	0	1	1	0	0	0	8	30
11.51-14.50	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
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	364	147	53	15	1	6	4	3	7	9	21	25	42	61	114	237	1109

STABILITY CLASS ALL

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	3	0	0	2	0	0	1	1	1	2	2	2	2	3	1	3	23
1.51- 2.50	48	21	7	9	3	4	7	7	11	24	20	21	38	28	50	42	340
2.51- 3.50	102	43	34	11	3	15	19	17	28	35	38	48	68	58	67	106	692
3.51- 4.50	139	63	22	13	6	7	14	10	34	31	41	28	23	36	69	108	644
4.51- 5.50	98	43	27	24	6	12	9	18	43	31	37	47	33	17	32	64	541
5.51- 6.50	57	47	32	11	10	8	5	11	40	48	58	43	27	16	17	35	465
6.51- 8.50	52	33	32	20	27	26	19	24	55	56	128	63	26	16	23	27	627
8.51-11.50	10	22	13	20	41	24	12	6	13	70	140	72	29	14	15	20	521
11.51-14.50	2	7	5	15	42	11	5	0	5	17	63	18	7	9	9	1	216
14.51-20.50	1	1	0	16	44	1	1	0	5	12	47	7	5	4	4	0	148
>20.50	0	0	1	0	3	0	0	0	0	0	3	0	0	0	0	0	7
TOTAL	512	280	173	141	185	108	92	94	235	326	577	349	258	201	287	406	4224

TOTAL NUMBER OF OBSERVATIONS: 4416
TOTAL NUMBER OF VALID OBSERVATIONS: 4224
TOTAL NUMBER OF MISSING OBSERVATIONS: 192
PERCENT DATA RECOVERY FOR THIS PERIOD: 95.7 %
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
5.47	5.80	7.69	23.25	18.92	12.62	26.25

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	1	4	3	4	9	8	4	5	11	29	83	30	20	6	9	5	0
B	1	6	7	8	15	15	5	19	43	31	54	22	6	4	4	5	0
C	4	8	14	11	33	14	21	14	42	40	53	35	16	8	8	4	0
D	40	49	49	49	79	36	37	31	91	97	154	103	62	34	41	30	0
E	38	31	28	38	44	24	15	18	34	86	146	91	62	56	45	43	0
F	64	35	19	16	4	5	6	4	7	34	66	43	50	32	66	82	0
G	364	147	53	15	1	6	4	3	7	9	21	25	42	61	114	237	0
TOTAL	512	280	173	141	185	108	92	94	235	326	577	349	258	201	287	406	0

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2013 TO 12/31/2013

*** 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: .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
.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	1	0	0	0	1
3.51- 4.50	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	4
4.51- 5.50	0	0	0	0	0	0	0	1	2	1	0	1	1	1	0	1	8
5.51- 6.50	3	0	1	0	2	2	0	2	2	2	8	4	1	1	0	3	31
6.51- 8.50	3	3	1	2	5	5	7	8	15	30	35	17	2	0	4	2	139
8.51-11.50	1	2	0	0	4	3	1	2	18	57	88	35	18	2	5	6	242
11.51-14.50	1	2	1	2	1	1	0	0	6	18	53	20	9	4	3	1	122
14.51-20.50	0	0	0	1	0	0	0	0	0	16	38	13	4	16	1	3	92
>20.50	0	0	0	0	0	0	0	0	0	1	7	1	1	0	0	5	15
TOTAL	8	7	3	5	12	11	8	13	43	125	229	91	39	25	14	21	657

STABILITY CLASS B

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
.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	1	1
3.51- 4.50	0	0	0	0	0	0	1	0	1	0	1	1	0	0	0	1	5
4.51- 5.50	2	0	3	2	1	5	3	3	4	5	6	7	1	1	5	1	49
5.51- 6.50	1	1	4	3	3	3	0	8	20	12	12	11	3	1	0	3	85
6.51- 8.50	3	2	3	6	8	5	4	15	45	27	25	20	4	3	3	4	177
8.51-11.50	1	7	1	4	4	7	2	1	3	19	36	17	4	1	1	3	111
11.51-14.50	0	0	0	0	6	2	0	0	0	8	22	3	4	3	1	1	50
14.51-20.50	1	0	0	1	1	0	0	0	0	4	12	4	0	5	0	1	29
>20.50	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
TOTAL	8	10	11	16	23	22	10	27	73	76	114	63	16	14	10	15	509

STABILITY CLASS C

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
.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	1	0	0	0	0	0	1	2	0	1	0	0	2	1	3	0	11
3.51- 4.50	4	0	1	2	1	1	5	1	4	4	2	4	5	3	0	3	40
4.51- 5.50	2	4	1	3	3	7	6	11	21	13	15	16	5	5	4	1	117
5.51- 6.50	4	3	9	0	6	3	2	11	39	27	18	8	3	1	3	3	140
6.51- 8.50	0	9	11	5	6	3	10	12	26	23	27	18	10	0	4	1	165
8.51-11.50	0	1	3	3	16	5	2	1	1	6	25	10	6	2	0	0	81
11.51-14.50	1	1	0	2	9	0	0	0	1	3	6	7	3	3	1	0	37
14.51-20.50	0	1	0	1	3	0	0	0	0	4	8	2	2	3	2	0	26
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
TOTAL	12	19	25	16	44	19	26	38	92	81	101	65	36	18	17	9	619

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2013 TO 12/31/2013

*** ANNUAL ***

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .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
.76- 1.50	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	2
1.51- 2.50	2	3	3	3	4	0	3	6	6	12	10	10	7	7	6	8	90
2.51- 3.50	20	13	12	15	3	10	17	18	24	30	39	39	31	17	16	18	322
3.51- 4.50	13	26	19	9	5	8	6	16	46	37	30	14	9	13	17	16	284
4.51- 5.50	6	19	21	11	8	2	7	15	42	37	18	18	12	5	9	6	236
5.51- 6.50	7	13	19	12	5	3	4	4	16	22	15	15	7	2	8	4	156
6.51- 8.50	6	12	16	8	10	14	8	2	11	16	42	20	14	6	7	7	199
8.51-11.50	3	10	4	17	24	13	4	2	4	19	49	31	15	6	5	4	210
11.51-14.50	2	2	0	7	18	2	1	0	3	17	37	10	7	8	4	1	119
14.51-20.50	1	0	0	4	29	1	1	0	4	18	47	4	6	6	4	2	127
>20.50	0	0	0	0	2	0	0	0	0	0	2	0	0	0	1	1	6
TOTAL	60	98	94	87	108	53	51	63	156	209	289	161	108	70	77	67	1751

STABILITY CLASS E

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	4	2	1	0	0	2	9
1.51- 2.50	6	6	3	3	0	0	2	3	2	8	5	13	14	12	9	12	98
2.51- 3.50	15	12	12	4	3	5	6	4	8	15	18	13	26	22	23	17	203
3.51- 4.50	12	7	5	3	1	2	1	3	7	6	29	15	14	7	10	14	136
4.51- 5.50	9	6	5	6	1	3	0	3	6	17	23	18	7	6	5	6	121
5.51- 6.50	5	12	7	2	0	1	1	3	12	24	32	21	9	9	9	4	151
6.51- 8.50	10	8	11	5	3	6	3	4	13	38	70	31	13	13	9	2	239
8.51-11.50	6	1	1	6	14	5	7	3	6	52	113	54	29	28	13	3	341
11.51-14.50	0	2	3	8	16	8	3	0	3	16	39	11	8	16	10	5	148
14.51-20.50	3	0	0	9	13	0	0	0	4	5	19	3	4	2	2	0	64
>20.50	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2
TOTAL	66	54	48	46	52	30	23	23	61	181	352	181	125	115	90	65	1512

STABILITY CLASS F

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	1	0	1	0	0	0	0	0	0	2	0	0	1	0	0	0	5
1.51- 2.50	17	5	4	1	2	2	4	2	2	7	7	10	16	10	19	11	119
2.51- 3.50	20	11	10	3	1	5	2	0	4	9	8	17	19	20	24	27	180
3.51- 4.50	33	19	7	2	1	0	3	2	5	14	15	17	20	22	33	34	227
4.51- 5.50	21	9	5	6	0	0	1	1	7	11	25	23	16	11	18	17	171
5.51- 6.50	10	7	4	3	0	0	0	1	1	15	31	21	9	8	9	19	138
6.51- 8.50	6	7	3	1	3	0	0	0	4	28	72	29	13	17	12	16	211
8.51-11.50	5	5	1	4	0	1	1	0	1	16	46	13	0	5	8	13	119
11.51-14.50	0	0	0	1	0	0	1	0	0	1	1	0	1	0	1	4	10
14.51-20.50	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	113	63	35	22	7	8	12	6	24	103	205	131	95	93	124	141	1182

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2013 TO 12/31/2013

*** 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: .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
.76- 1.50	2	0	0	1	0	0	1	1	1	0	0	2	1	3	1	2	15
1.51- 2.50	44	18	6	6	0	2	3	0	5	4	6	6	20	26	40	39	225
2.51- 3.50	121	33	25	10	2	4	1	2	2	12	9	21	33	57	78	113	523
3.51- 4.50	211	79	15	8	5	0	1	0	0	3	12	13	13	21	72	150	603
4.51- 5.50	153	69	17	4	1	0	0	0	0	3	5	5	9	6	29	84	385
5.51- 6.50	74	56	9	1	0	1	0	0	2	1	10	2	0	5	13	34	208
6.51- 8.50	67	39	12	2	0	0	0	0	0	1	11	1	1	4	4	25	167
8.51-11.50	14	19	7	0	0	0	0	0	0	0	2	1	0	0	0	22	65
11.51-14.50	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
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	686	314	92	32	8	7	6	3	10	24	55	51	77	122	237	469	2193

STABILITY CLASS ALL

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	5
.76- 1.50	3	0	1	2	0	0	1	1	1	3	4	4	3	3	1	4	31
1.51- 2.50	69	32	16	13	6	4	12	11	15	31	28	39	57	55	74	70	532
2.51- 3.50	177	69	59	32	9	24	27	26	38	67	74	90	112	117	144	176	1241
3.51- 4.50	273	131	47	24	13	11	17	22	63	64	89	64	63	67	133	218	1299
4.51- 5.50	193	107	52	32	14	17	17	34	82	87	92	88	51	35	70	116	1087
5.51- 6.50	104	92	53	21	16	13	7	29	92	103	126	82	32	27	42	70	909
6.51- 8.50	95	80	57	29	35	33	32	41	114	163	282	136	57	43	43	57	1297
8.51-11.50	30	45	17	34	62	34	17	9	33	169	359	161	72	44	32	51	1169
11.51-14.50	4	8	5	20	50	13	5	0	13	63	158	51	32	34	20	12	488
14.51-20.50	5	1	0	17	46	1	1	0	8	47	124	27	16	32	9	6	340
>20.50	0	0	1	0	3	0	0	0	0	2	9	1	1	0	1	7	25
TOTAL	953	565	308	224	254	150	136	173	459	799	1345	743	496	457	569	787	8423

TOTAL NUMBER OF OBSERVATIONS: 8760
TOTAL NUMBER OF VALID OBSERVATIONS: 8423
TOTAL NUMBER OF MISSING OBSERVATIONS: 337
PERCENT DATA RECOVERY FOR THIS PERIOD: 96.2 %
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
7.80	6.04	7.35	20.79	17.95	14.03	26.04

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	7	3	5	12	11	8	13	43	125	229	91	39	25	14	21	3
B	8	10	11	16	23	22	10	27	73	76	114	63	16	14	10	15	1
C	12	19	25	16	44	19	26	38	92	81	101	65	36	18	17	9	1
D	60	98	94	87	108	53	51	63	156	209	289	161	108	70	77	67	0
E	66	54	48	46	52	30	23	23	61	181	352	181	125	115	90	65	0
F	113	63	35	22	7	8	12	6	24	103	205	131	95	93	124	141	0
G	686	314	92	32	8	7	6	3	10	24	55	51	77	122	237	469	0
TOTAL	953	565	308	224	254	150	136	173	459	799	1345	743	496	457	569	787	5

APPENDIX C

DOSE CALCULATIONS

GASEOUS EFFLUENT DOSE CALCULATIONS

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. 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. 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. Doses to the maximum individual and the population were calculated as a function of age group and pathway for significant body organs.

Table 43 presents the doses on a quarterly, semiannual and annual basis for the Energy Information Center. An occupancy factor of 1.0 (implying continuous occupancy over the entire year) was considered for the Energy Information Center and the exposure pathways considered to calculate its doses were plume, ground deposition, and inhalation.

Table 44 presents the population dose.

Table 45 summarizes the individual doses and compares the result to PVNGS ODCM Requirement limits. The site boundary and residence locations for which data are presented represent the highest annual doses.

Based on results obtained by placing TLDs on the site boundary in each sector, the net dose for this reporting period, from direct-radiation, (plume and ground deposition) from all three units was indistinguishable from preoperational values of 8 - 14 μR/hr (17 - 30 mR/Std Qtr).

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

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. Additional input to GASPAR includes the following site-specific data:

0 to 5 mile nearest residence, milk animal and garden in each of the 16 compass sectors, based on the 2013 Land Use Census.

0 to 10 mile population from the PVNGS Emergency Plan, Rev 47.

The 10 to 50 mile population distribution from the PVNGS UFSAR, Figure 2.1-12.

The population distribution of metropolitan Phoenix greater than 50 miles from PVNGS, based on the 1980 federal census results, is conservatively included in the 40 to 50 mile sectors (NE=123; ENE=140,097; E=621,130; ESE=8,392).

Absolute humidity of 6.0 g/m^3 from the PVNGS UFSAR, Table 2.3-16.

The fraction of the year that vegetables are grown (0.667) from the PVNGS ER-OL, Section 2.1.3.4, Table 2.1-8.

The fraction of daily feed derived from pasture while on pasture (0.35) and length of grazing season for milk animals beyond 5 miles (0.75) from the PVNGS ER-OL, Section 2.1.3.4.3.

The fraction of daily feed derived from pasture while on pasture (0.05) and length of grazing season for meat animals (0.25) from the PVNGS ER-OL, Section 2.1.3.4.4.

There were three (3) sectors containing milk animal (goat or cow) locations within five (5) miles. For calculational purposes these milk animals are assumed to be fed 100% on pasture grass during the year.

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

Table 43:
Doses To Special Locations For 2013

ENERGY INFORMATION CENTER LOCATED ONSITE 0.45 MILE S FROM UNIT 1, 0.29 MILE SSE FROM UNIT 2 AND 0.20 MILE ESE FROM UNIT 3

(MREM)	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
1ST QUARTER								
ADULT	4.91E-01	4.91E-01	1.05E-02	4.91E-01	4.91E-01	4.91E-01	4.91E-01	4.98E-01
TEEN	4.94E-01	4.94E-01	1.05E-02	4.94E-01	4.94E-01	4.94E-01	4.94E-01	5.00E-01
CHILD	4.38E-01	4.38E-01	1.05E-02	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.45E-01
INFANT	2.56E-01	2.56E-01	1.05E-02	2.56E-01	2.56E-01	2.56E-01	2.56E-01	2.63E-01
2ND QUARTER								
ADULT	1.61E-01	1.61E-01	9.67E-04	1.61E-01	1.61E-01	1.61E-01	1.61E-01	1.61E-01
TEEN	1.62E-01	1.62E-01	9.68E-04	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
CHILD	1.43E-01	1.43E-01	9.68E-04	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.44E-01
INFANT	8.27E-02	8.27E-02	9.64E-04	8.27E-02	8.27E-02	8.30E-02	8.28E-02	8.31E-02
1ST SEMI-ANNUAL								
ADULT	6.52E-01	6.52E-01	1.14E-02	6.52E-01	6.52E-01	6.52E-01	6.52E-01	6.59E-01
TEEN	6.56E-01	6.56E-01	1.14E-02	6.56E-01	6.56E-01	6.56E-01	6.56E-01	6.63E-01
CHILD	5.82E-01	5.82E-01	1.14E-02	5.82E-01	5.82E-01	5.82E-01	5.82E-01	5.89E-01
INFANT	3.39E-01	3.39E-01	1.14E-02	3.39E-01	3.39E-01	3.39E-01	3.39E-01	3.46E-01
3RD QUARTER								
ADULT	2.99E-01	2.99E-01	8.60E-04	2.99E-01	2.99E-01	2.99E-01	3.00E-01	3.00E-01
TEEN	3.01E-01	3.01E-01	8.68E-04	3.01E-01	3.01E-01	3.01E-01	3.01E-01	3.02E-01
CHILD	2.67E-01	2.67E-01	8.62E-04	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01
INFANT	1.54E-01	1.54E-01	8.02E-04	1.54E-01	1.54E-01	1.54E-01	1.54E-01	1.54E-01
4TH QUARTER								
ADULT	4.04E-01	4.04E-01	5.10E-02	4.04E-01	4.04E-01	4.04E-01	4.04E-01	4.92E-01
TEEN	4.06E-01	4.06E-01	5.11E-02	4.06E-01	4.06E-01	4.06E-01	4.06E-01	4.94E-01
CHILD	3.65E-01	3.65E-01	5.10E-02	3.65E-01	3.65E-01	3.65E-01	3.65E-01	4.54E-01
INFANT	2.31E-01	2.31E-01	5.10E-02	2.31E-01	2.31E-01	2.31E-01	2.32E-01	2.39E-01
2ND SEMI-ANNUAL								
ADULT	7.03E-01	7.03E-01	5.19E-02	7.03E-01	7.03E-01	7.03E-01	7.03E-01	7.92E-01
TEEN	7.07E-01	7.07E-01	5.19E-02	7.07E-01	7.07E-01	7.07E-01	7.07E-01	7.96E-01
CHILD	6.32E-01	6.32E-01	5.19E-02	6.32E-01	6.32E-01	6.32E-01	6.32E-01	7.21E-01
INFANT	3.85E-01	3.85E-01	5.18E-02	3.85E-01	3.85E-01	3.85E-01	3.85E-01	3.94E-01
ANNUAL								
ADULT	1.36E+00	1.36E+00	6.33E-02	1.36E+00	1.36E+00	1.36E+00	1.36E+00	1.45E+00
TEEN	1.36E+00	1.36E+00	6.34E-02	1.36E+00	1.36E+00	1.36E+00	1.36E+00	1.46E+00
CHILD	1.21E+00	1.21E+00	6.33E-02	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.31E+00
INFANT	7.24E-01	7.24E-01	6.32E-02	7.24E-01	7.24E-01	7.24E-01	7.24E-01	7.40E-01

Table 44:
Integrated Population Dose for 2013

JAN - MAR

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.29E-03 .02%	1.29E-03 .02%	1.29E-03 93.31%	1.29E-03 .02%	1.29E-03 .02%	1.29E-03 .02%	1.29E-03 .02%	2.84E-03 .05%
GROUND	1.85E-05 .00%	1.85E-05 .00%	1.85E-05 1.34%	1.85E-05 .00%	1.85E-05 .00%	1.85E-05 .00%	1.85E-05 .00%	2.17E-05 .00%
INHAL	1.66E+00 26.89%	1.66E+00 26.89%	1.60E-05 1.15%	1.66E+00 26.89%	1.66E+00 26.89%	1.66E+00 26.89%	1.66E+00 26.89%	1.66E+00 26.88%
VEGET	3.86E+00 62.75%	3.86E+00 62.75%	5.71E-05 4.13%	3.86E+00 62.75%	3.86E+00 62.75%	3.86E+00 62.75%	3.86E+00 62.75%	3.86E+00 62.73%
COW MILK	4.50E-01 7.30%	4.50E-01 7.30%	7.96E-07 .06%	4.50E-01 7.30%	4.50E-01 7.30%	4.50E-01 7.30%	4.50E-01 7.30%	4.50E-01 7.30%
MEAT	1.87E-01 3.04%	1.87E-01 3.04%	1.07E-07 .01%	1.87E-01 3.04%	1.87E-01 3.04%	1.87E-01 3.04%	1.87E-01 3.04%	1.87E-01 3.04%
TOTAL	6.16E+00	6.16E+00	1.38E-03	6.16E+00	6.16E+00	6.16E+00	6.16E+00	6.16E+00
(1) PER CAPITA DOSE (REM)	3.14E-06	3.14E-06	7.04E-10	3.14E-06	3.14E-06	3.14E-06	3.14E-06	3.14E-06

APR - JUN

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.60E-04 .00%	1.60E-04 .00%	1.60E-04 21.90%	1.60E-04 .00%	1.60E-04 .00%	1.60E-04 .00%	1.60E-04 .00%	3.04E-04 .01%
GROUND	4.58E-04 .01%	4.58E-04 .01%	4.58E-04 62.57%	4.58E-04 .01%	4.58E-04 .01%	4.58E-04 .01%	4.58E-04 .01%	5.38E-04 .02%
INHAL	1.22E+00 37.03%	1.22E+00 37.03%	3.26E-05 4.46%	1.22E+00 37.03%	1.22E+00 37.03%	1.22E+00 37.03%	1.22E+00 37.03%	1.22E+00 37.02%
VEGET	1.70E+00 51.63%	1.70E+00 51.63%	7.87E-05 10.76%	1.70E+00 51.63%	1.70E+00 51.63%	1.70E+00 51.62%	1.70E+00 51.62%	1.70E+00 51.62%
COW MILK	3.05E-01 9.24%	3.05E-01 9.24%	2.08E-06 .28%	3.05E-01 9.24%	3.05E-01 9.24%	3.05E-01 9.24%	3.05E-01 9.24%	3.05E-01 9.24%
MEAT	6.89E-02 2.09%	6.89E-02 2.09%	1.53E-07 .02%	6.89E-02 2.09%	6.89E-02 2.09%	6.89E-02 2.09%	6.89E-02 2.09%	6.89E-02 2.09%
TOTAL	3.30E+00	3.30E+00	7.31E-04	3.30E+00	3.30E+00	3.30E+00	3.30E+00	3.30E+00
(1) PER CAPITA DOSE (REM)	1.68E-06	1.68E-06	3.73E-10	1.68E-06	1.68E-06	1.68E-06	1.68E-06	1.68E-06

Table 44: (continued)
Integrated Population Dose for 2013

JAN - JUN

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.45E-03 .02%	1.45E-03 .02%	1.45E-03 68.60%	1.45E-03 .02%	1.45E-03 .02%	1.45E-03 .02%	1.45E-03 .02%	3.14E-03 .03%
GROUND	4.76E-04 .01%	4.76E-04 .01%	4.76E-04 22.53%	4.76E-04 .01%	4.76E-04 .01%	4.76E-04 .01%	4.76E-04 .01%	5.60E-04 .01%
INHAL	2.88E+00 30.42%	2.88E+00 30.42%	4.85E-05 2.30%	2.88E+00 30.42%	2.88E+00 30.42%	2.88E+00 30.43%	2.88E+00 30.43%	2.88E+00 30.42%
VEGET	5.57E+00 58.87%	5.57E+00 58.87%	1.36E-04 6.43%	5.57E+00 58.87%	5.57E+00 58.87%	5.57E+00 58.87%	5.57E+00 58.87%	5.57E+00 58.86%
COW MILK	7.54E-01 7.98%	7.54E-01 7.98%	2.87E-06 .14%	7.54E-01 7.98%	7.54E-01 7.98%	7.54E-01 7.98%	7.54E-01 7.98%	7.54E-01 7.98%
MEAT	2.56E-01 2.71%	2.56E-01 2.71%	2.60E-07 .01%	2.56E-01 2.71%	2.56E-01 2.71%	2.56E-01 2.71%	2.56E-01 2.71%	2.56E-01 2.71%
TOTAL	9.45E+00	9.45E+00	2.11E-03	9.45E+00	9.45E+00	9.46E+00	9.45E+00	9.46E+00
(1) PER CAPITA DOSE (REM)	4.82E-06	4.82E-06	1.08E-09	4.82E-06	4.82E-06	4.83E-06	4.82E-06	4.83E-06

JUL - SEP

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.22E-04 .00%	1.22E-04 .00%	1.22E-04 8.55%	1.22E-04 .00%	1.22E-04 .00%	1.22E-04 .00%	1.22E-04 .00%	2.30E-04 .01%
GROUND	4.98E-06 .00%	4.98E-06 .00%	4.98E-06 .35%	4.98E-06 .00%	4.98E-06 .00%	4.98E-06 .00%	4.98E-06 .00%	5.86E-06 .00%
INHAL	1.52E+00 33.06%	1.52E+00 33.06%	2.42E-04 16.95%	1.52E+00 33.06%	1.52E+00 33.06%	1.52E+00 33.06%	1.52E+00 33.06%	1.52E+00 33.06%
VEGET	2.55E+00 55.48%	2.55E+00 55.47%	1.04E-03 72.71%	2.55E+00 55.47%	2.55E+00 55.47%	2.55E+00 55.47%	2.55E+00 55.47%	2.55E+00 55.47%
COW MILK	4.16E-01 9.06%	4.16E-01 9.06%	1.87E-05 1.31%	4.16E-01 9.06%	4.16E-01 9.06%	4.16E-01 9.06%	4.16E-01 9.06%	4.16E-01 9.06%
MEAT	1.10E-01 2.40%	1.10E-01 2.40%	1.86E-06 .13%	1.10E-01 2.40%	1.10E-01 2.40%	1.10E-01 2.40%	1.10E-01 2.40%	1.10E-01 2.40%
TOTAL	4.59E+00	4.59E+00	1.43E-03	4.59E+00	4.59E+00	4.59E+00	4.59E+00	4.59E+00
(1) PER CAPITA DOSE (REM)	2.34E-06	2.34E-06	7.30E-10	2.34E-06	2.34E-06	2.34E-06	2.34E-06	2.34E-06

Table 44: (continued)
Integrated Population Dose for 2013

OCT - DEC

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.90E-01 2.86%	1.90E-01 2.86%	1.90E-01 99.45%	1.90E-01 2.86%	1.90E-01 2.86%	1.90E-01 2.86%	1.90E-01 2.86%	6.65E-01 9.36%
GROUND	2.91E-04 .00%	2.91E-04 .00%	2.91E-04 .15%	2.91E-04 .00%	2.91E-04 .00%	2.91E-04 .00%	2.91E-04 .00%	3.43E-04 .00%
INHAL	1.86E+00 28.00%	1.86E+00 28.00%	2.66E-04 .14%	1.86E+00 28.00%	1.86E+00 28.00%	1.86E+00 28.00%	1.86E+00 28.01%	1.86E+00 26.13%
VEGET	3.89E+00 58.73%	3.89E+00 58.73%	4.77E-04 .25%	3.89E+00 58.73%	3.89E+00 58.73%	3.89E+00 58.73%	3.89E+00 58.72%	3.89E+00 54.80%
COW MILK	5.10E-01 7.69%	5.10E-01 7.69%	6.30E-06 .00%	5.10E-01 7.69%	5.10E-01 7.69%	5.10E-01 7.69%	5.10E-01 7.69%	5.10E-01 7.17%
MEAT	1.80E-01 2.72%	1.80E-01 2.72%	1.11E-06 .00%	1.80E-01 2.72%	1.80E-01 2.72%	1.80E-01 2.72%	1.80E-01 2.72%	1.80E-01 2.54%
TOTAL	6.63E+00	6.63E+00	1.91E-01	6.63E+00	6.63E+00	6.63E+00	6.63E+00	7.10E+00
(1) PER CAPITA DOSE (REM)	3.38E-06	3.38E-06	9.75E-08	3.38E-06	3.38E-06	3.38E-06	3.38E-06	3.62E-06

JUL - DEC

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.90E-01 1.69%	1.90E-01 1.69%	1.90E-01 98.78%	1.90E-01 1.69%	1.90E-01 1.69%	1.90E-01 1.69%	1.90E-01 1.69%	6.65E-01 5.69%
GROUND	2.96E-04 .00%	2.96E-04 .00%	2.96E-04 .15%	2.96E-04 .00%	2.96E-04 .00%	2.96E-04 .00%	2.96E-04 .00%	3.49E-04 .00%
INHAL	3.37E+00 30.07%	3.37E+00 30.07%	5.08E-04 .26%	3.37E+00 30.07%	3.37E+00 30.07%	3.37E+00 30.07%	3.37E+00 30.08%	3.37E+00 28.85%
VEGET	6.44E+00 57.40%	6.44E+00 57.40%	1.52E-03 .79%	6.44E+00 57.40%	6.44E+00 57.40%	6.44E+00 57.40%	6.44E+00 57.39%	6.44E+00 55.06%
COW MILK	9.26E-01 8.25%	9.26E-01 8.25%	2.50E-05 .01%	9.26E-01 8.25%	9.26E-01 8.25%	9.26E-01 8.25%	9.26E-01 8.25%	9.26E-01 7.92%
MEAT	2.90E-01 2.59%	2.90E-01 2.59%	2.97E-06 .00%	2.90E-01 2.59%	2.90E-01 2.59%	2.90E-01 2.59%	2.90E-01 2.59%	2.90E-01 2.48%
TOTAL	1.12E+01	1.12E+01	1.92E-01	1.12E+01	1.12E+01	1.12E+01	1.12E+01	1.17E+01
(1) PER CAPITA DOSE (REM)	5.72E-06	5.72E-06	9.80E-08	5.72E-06	5.72E-06	5.72E-06	5.72E-06	5.97E-06

Table 44: (continued)
Integrated Population Dose for 2013

JAN - DEC

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	1.91E-01 .92%	1.91E-01 .92%	1.91E-01 98.45%	1.91E-01 .92%	1.91E-01 .92%	1.91E-01 .92%	1.91E-01 .92%	6.68E-01 3.16%
GROUND	7.73E-04 .00%	7.73E-04 .00%	7.73E-04 .40%	7.73E-04 .00%	7.73E-04 .00%	7.73E-04 .00%	7.73E-04 .00%	9.09E-04 .00%
INHAL	6.25E+00 30.23%	6.25E+00 30.23%	5.56E-04 .29%	6.25E+00 30.23%	6.25E+00 30.23%	6.25E+00 30.24%	6.25E+00 30.24%	6.25E+00 29.55%
VEGET	1.20E+01 58.07%	1.20E+01 58.07%	1.65E-03 .85%	1.20E+01 58.07%	1.20E+01 58.07%	1.20E+01 58.07%	1.20E+01 58.07%	1.20E+01 56.76%
COW MILK	1.68E+00 8.13%	1.68E+00 8.13%	2.79E-05 .01%	1.68E+00 8.13%	1.68E+00 8.13%	1.68E+00 8.13%	1.68E+00 8.13%	1.68E+00 7.94%
MEAT	5.46E-01 2.64%	5.46E-01 2.64%	3.23E-06 .00%	5.46E-01 2.64%	5.46E-01 2.64%	5.46E-01 2.64%	5.46E-01 2.64%	5.46E-01 2.58%
TOTAL	2.07E+01	2.07E+01	1.94E-01	2.07E+01	2.07E+01	2.07E+01	2.07E+01	2.12E+01
(1) PER CAPITA DOSE (REM)	1.06E-05	1.06E-05	9.90E-08	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.08E-05

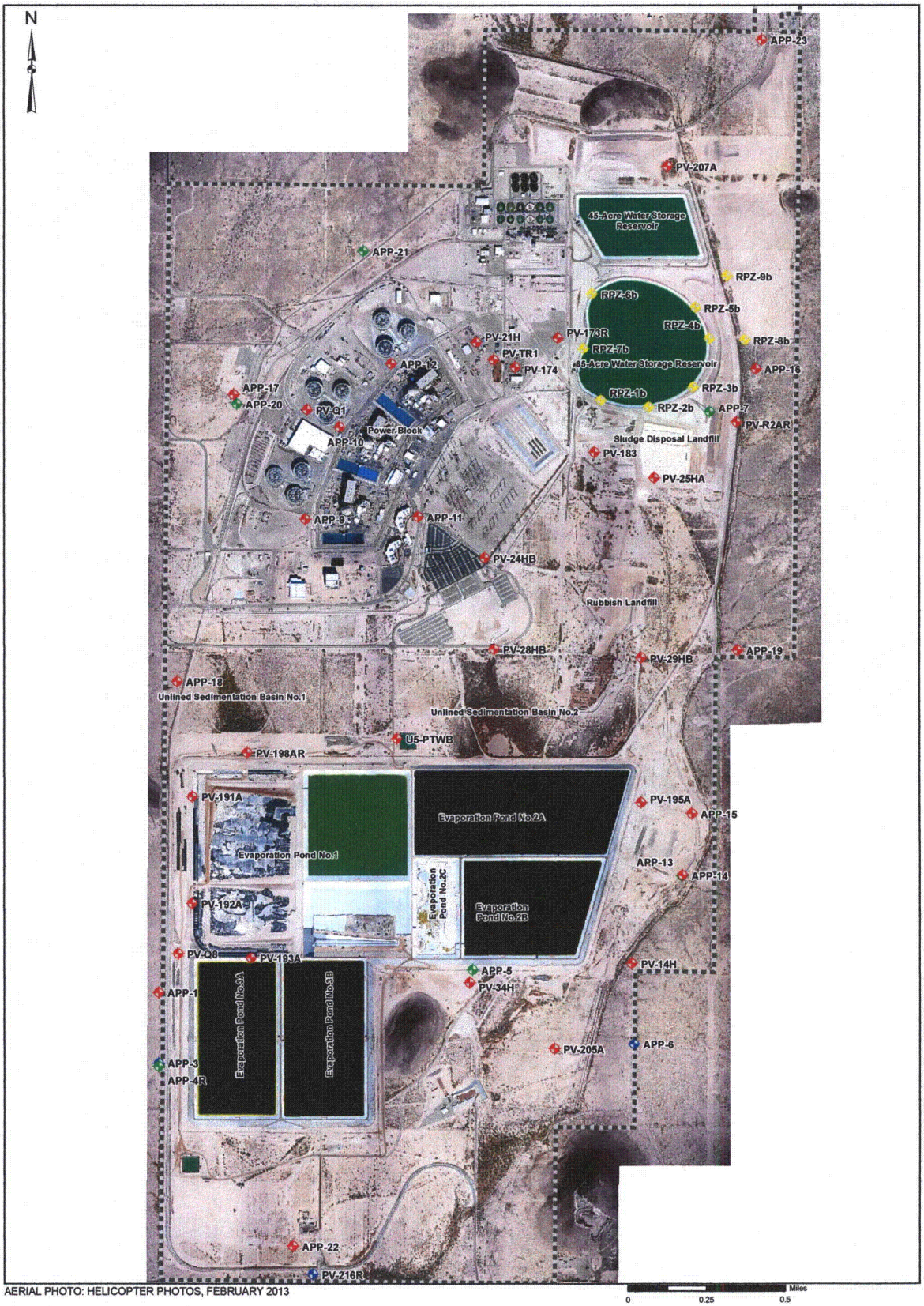
Note 1: Personrem total divided by 50-mile population of 1,959,000

Table 45: Summary of Individual Doses for 2013						
	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
Gamma Air Dose	**mrad**	4.33E-03	2.67E-04	2.92E-04	4.37E-02	4.85E-02
ODCM Req. 4.1 Limit	mrad	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
% ODCM Limit	%	8.66E-02	5.34E-03	5.84E-03	8.74E-01	4.85E-01
Beta Air Dose	**mrad**	1.74E-03	9.73E-05	1.06E-04	1.13E-01	1.15E-01
ODCM Req. 4.1 Limit	mrad	1.00E+01	1.00E+01	1.00E+01	1.00E+01	2.00E+01
% ODCM Limit	%	1.74E-02	9.73E-04	1.06E-03	1.13E+00	5.75E-01
Maximum Individual						
Total Body	mrem	2.88E-03	1.77E-04	1.94E-04	2.62E-02	2.94E-02
Skin	mrem	4.70E-03	2.85E-04	3.11E-04	7.37E-02	7.89E-02
Site Boundary Location						
Unit 1	miles	1.70 SSE	1.40 SSW	1.27 SE	1.70 SSE	1.70 SSE
Unit 2	miles	1.88 SSE	1.14 SSW	1.31 SE	1.88 SSE	1.88 SSE
Unit 3	miles	1.73 SSE	1.00 SSW	1.40 SE	1.73 SSE	1.73 SSE
Maximum Organ Dose (excluding skin)	Age	Infant	Infant	Infant	Infant	Infant
	Organ	Bone	Bone	Thyroid (2)	Bone	Bone
	mrem	1.84E-01	2.86E-01	1.59E-01	2.36E-01	8.66E-01
ODCM Req. 4.2 Limit	mrem	7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01
% ODCM Limit (1)	%	2.45E+00	3.81E+00	2.12E+00	3.15E+00	5.77E+00
Location						
Unit 1	miles	2.30 ENE	2.30 ENE	2.30 ENE	2.30 ENE	2.30 ENE
Unit 2	miles	2.52 ENE	2.52 ENE	2.52 ENE	2.52 ENE	2.52 ENE
Unit 3	miles	2.70 NE	2.70 NE	2.70 NE	2.70 NE	2.70 NE
Maximum Organ Dose excluding C-14 (3) (excluding skin)	Age	Adult	Infant	Infant	Teen	Infant
	Organ	Thyroid (2)	Thyroid	Thyroid (2)	Thyroid (2)	Thyroid
	mrem	1.23E-01	1.34E-01	1.26E-01	1.62E-01	4.51E-01
ODCM Req. 4.2 Limit		7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01
% ODCM Limit (1)		1.64E+00	1.79E+00	1.68E+00	2.16E+00	3.01E+00
Organ dose from tritium only for Unit 2 location above	**mrem**	1.21E-01	1.31E-01	1.26E-01	1.36E-01	4.45E-01
Fraction of organ dose from tritium only for Unit 2 location above(2,3)	%	65.8%	45.8%	79.2%	57.6%	51.4%
X/Q for Unit 2 location above	sec/m^3	6.62E-06	1.19E-06	6.92E-07	9.37E-06	9.49E-07
D/Q for Unit 2 location above	m^{-2}	2.33E-09	2.06E-09	1.78E-09	2.68E-09	1.43E-09

Note 1: ODCM Requirement 5.1 has higher limits than ODCM Requirement 4.2, therefore the percent of limits are more conservative based on ODCM Requirement 4.2 than on ODCM Requirement 5.1.
Note 2: All organs except bone
Note 3 Refer to discussion in section 10.4

APPENDIX D

NEI 07-07 GROUNDWATER PROTECTION INITIATIVE SAMPLING



AERIAL PHOTO: HELICOPTER PHOTOS, FEBRUARY 2013

EXPLANATION

PVNGS Well Locations and Aquifer Monitored

- Shallow Aquifer Well
- 85-Acre WSR Piezometer
- Palo Verde Clay Aquifer Well
- Regional Aquifer Well
- PVNGS Boundary

FIGURE 1
SITE MAP

PALO VERDE NUCLEAR GENERATING STATION
ARIZONA PUBLIC SERVICES

Brown AND Caldwell

Path: N:\GIS\Projects\APS-PVNGS\GIS_Client\MAPDOCS\WORKING\144162_Figure 1 Site Map 2012 Annual Rpt.mxd Date: 5/9/2013

Monitoring Well	Sample Name	Sample Date	Parameter	Concentration (pCi//L)	Purpose
APP-10	PV-APP-10-0213	2/19/2013	Cesium-134	<2.3	routine
APP-10	PV-APP-10-0213	2/19/2013	Cesium-137	<2.14	routine
APP-10	PV-APP-10-0213	2/19/2013	Cobalt-60	<2.23	routine
APP-10	PV-APP-10-0213	2/19/2013	Tritium	<252	routine
APP-10	PV-APP-10-0413	4/16/2013	Cesium-134	<2.4	routine
APP-10	PV-APP-10-0413	4/16/2013	Cesium-137	<2.1	routine
APP-10	PV-APP-10-0413	4/16/2013	Cobalt-60	<2.1	routine
APP-10	PV-APP-10-0413	4/16/2013	Tritium	<255	routine
APP-10	PV-APP-10-0513	5/29/2013	Cesium-134	<2.2	routine
APP-10	PV-FD01-0513	5/29/2013	Cesium-134	<2.4	field duplicate sample
APP-10	PV-APP-10-0513	5/29/2013	Cesium-137	<2.1	routine
APP-10	PV-FD01-0513	5/29/2013	Cesium-137	<2.4	field duplicate sample
APP-10	PV-APP-10-0513	5/29/2013	Cobalt-60	<2.3	routine
APP-10	PV-FD01-0513	5/29/2013	Cobalt-60	<2.5	field duplicate sample
APP-10	PV-APP-10-0513	5/29/2013	Tritium	<252	routine
APP-10	PV-FD01-0513	5/29/2013	Tritium	<252	field duplicate sample
APP-10	PV-APP-10-0713	7/16/2013	Cesium-134	<2.4	routine
APP-10	PV-APP-10-0713	7/16/2013	Cesium-137	<2.4	routine
APP-10	PV-APP-10-0713	7/16/2013	Cobalt-60	<2.6	routine
APP-10	PV-APP-10-0713	7/16/2013	Tritium	<264	routine
APP-10	PV-APP-10-1013	10/29/2013	Cesium-134	<2.1	routine
APP-10	PV-APP-10-1013	10/29/2013	Cesium-137	<2	routine
APP-10	PV-APP-10-1013	10/29/2013	Cobalt-60	<2	routine
APP-10	PV-APP-10-1013	10/29/2013	Tritium	<247	routine
APP-12	PV-APP-12-0213	2/19/2013	Cesium-134	<2.44	routine
APP-12	PV-APP-12-0213	2/19/2013	Cesium-137	<2.44	routine
APP-12	PV-APP-12-0213	2/19/2013	Cobalt-60	<2.54	routine
APP-12	PV-APP-12-0213	2/19/2013	Tritium	<252	routine
APP-12	PV-APP-12-0513	5/29/2013	Cesium-134	<2.4	routine
APP-12	PV-APP-12-0513	5/29/2013	Cesium-137	<2.2	routine
APP-12	PV-APP-12-0513	5/29/2013	Cobalt-60	<2.3	routine
APP-12	PV-APP-12-0513	5/29/2013	Tritium	<252	routine
APP-12	PV-APP-12-0713	7/16/2013	Cesium-134	<2.5	routine
APP-12	PV-APP-12-0713	7/16/2013	Cesium-137	<2.6	routine
APP-12	PV-APP-12-0713	7/16/2013	Cobalt-60	<2.4	routine
APP-12	PV-APP-12-0713	7/16/2013	Tritium	<264	routine
APP-12	PV-APP-12-1013	10/29/2013	Cesium-134	<2.4	routine
APP-12	PV-APP-12-1013	10/29/2013	Cesium-137	<2.3	routine
APP-12	PV-APP-12-1013	10/29/2013	Cobalt-60	<2.4	routine
APP-12	PV-APP-12-1013	10/29/2013	Tritium	<247	routine
APP-15	PV-APP-15-0413	4/24/2013	Cesium-134	<2.1	routine
APP-15	PV-APP-15-0413	4/24/2013	Cesium-137	<2.1	routine
APP-15	PV-APP-15-0413	4/24/2013	Cobalt-60	<2.1	routine
APP-15	PV-APP-15-0413	4/24/2013	Tritium	<257	routine
APP-15	PV-APP-15-1013	10/22/2013	Cesium-134	<2.6	routine
APP-15	PV-APP-15-1013	10/22/2013	Cesium-137	<2.5	routine
APP-15	PV-APP-15-1013	10/22/2013	Cobalt-60	<2.5	routine
APP-15	PV-APP-15-1013	10/22/2013	Tritium	<252	routine
APP-18	PV-APP-18-0413	4/23/2013	Cesium-134	<2.2	routine
APP-18	PV-APP-18-0413	4/23/2013	Cesium-137	<2.2	routine
APP-18	PV-APP-18-0413	4/23/2013	Cobalt-60	<2.1	routine
APP-18	PV-APP-18-0413	4/23/2013	Tritium	<257	routine

Monitoring Well	Sample Name	Sample Date	Parameter	Concentration (pCi//L)	Purpose
APP-18	PV-APP-18-1013	10/22/2013	Cesium-134	<2.1	routine
APP-18	PV-APP-18-1013	10/22/2013	Cesium-137	<2	routine
APP-18	PV-APP-18-1013	10/22/2013	Cobalt-60	<2.3	routine
APP-18	PV-APP-18-1013	10/22/2013	Tritium	<252	routine
APP-19	PV-APP-19-0413	4/24/2013	Cesium-134	<2.4	routine
APP-19	PV-APP-19-0413	4/24/2013	Cesium-137	<2.5	routine
APP-19	PV-APP-19-0413	4/24/2013	Cobalt-60	<2.6	routine
APP-19	PV-APP-19-0413	4/24/2013	Tritium	<257	routine
APP-19	PV-APP-19-1013	10/22/2013	Cesium-134	<2.2	routine
APP-19	PV-APP-19-1013	10/22/2013	Cesium-137	<2.2	routine
APP-19	PV-APP-19-1013	10/22/2013	Cobalt-60	<2.2	routine
APP-19	PV-APP-19-1013	10/22/2013	Tritium	<252	routine
APP-20	PV-APP-20-0413	4/23/2013	Cesium-134	<2.3	routine
APP-20	PV-APP-20-0413	4/23/2013	Cesium-137	<2.1	routine
APP-20	PV-APP-20-0413	4/23/2013	Cobalt-60	<2.1	routine
APP-20	PV-APP-20-0413	4/23/2013	Tritium	<257	routine
APP-20	PV-APP-20-1013	10/22/2013	Cesium-134	<2.3	routine
APP-20	PV-APP-20-1013	10/22/2013	Cesium-137	<2.1	routine
APP-20	PV-APP-20-1013	10/22/2013	Cobalt-60	<2.1	routine
APP-20	PV-APP-20-1013	10/22/2013	Tritium	<252	routine
APP-21	PV-APP-21-0413	4/23/2013	Cesium-134	<2.3	routine
APP-21	PV-APP-21-0413	4/23/2013	Cesium-137	<2.4	routine
APP-21	PV-APP-21-0413	4/23/2013	Cobalt-60	<2.6	routine
APP-21	PV-APP-21-0413	4/23/2013	Tritium	<257	routine
APP-21	PV-APP-21-1013	10/22/2013	Cesium-134	<2.3	routine
APP-21	PV-APP-21-1013	10/22/2013	Cesium-137	<2.5	routine
APP-21	PV-APP-21-1013	10/22/2013	Cobalt-60	<2.4	routine
APP-21	PV-APP-21-1013	10/22/2013	Tritium	<252	routine
APP-22	PV-APP-22-0413	4/23/2013	Cesium-134	<2.5	routine
APP-22	PV-APP-22-0413	4/23/2013	Cesium-137	<2.3	routine
APP-22	PV-APP-22-0413	4/23/2013	Cobalt-60	<2.6	routine
APP-22	PV-APP-22-0413	4/23/2013	Tritium	<257	routine
APP-22	PV-APP-22-1013	10/29/2013	Cesium-134	<2.8	routine
APP-22	PV-APP-22-1013	10/29/2013	Cesium-137	<2.6	routine
APP-22	PV-APP-22-1013	10/29/2013	Cobalt-60	<2.6	routine
APP-22	PV-APP-22-1013	10/29/2013	Tritium	<247	routine
APP-23	PV-APP-23-0113	1/30/2013	Cesium-134	<2.5	ambient monitoring
APP-23	PV-APP-23-0113	1/30/2013	Cesium-137	<2.6	ambient monitoring
APP-23	PV-APP-23-0113	1/30/2013	Cobalt-60	<2.4	ambient monitoring
APP-23	PV-APP-23-0113	1/30/2013	Tritium	<248	ambient monitoring
APP-23	PV-APP-23-0413	4/16/2013	Cesium-134	<2.7	ambient monitoring
APP-23	PV-APP-23-0413	4/16/2013	Cesium-137	<2.3	ambient monitoring
APP-23	PV-APP-23-0413	4/16/2013	Cobalt-60	<2.5	ambient monitoring
APP-23	PV-APP-23-0413	4/16/2013	Tritium	<255	ambient monitoring
APP-23	PV-APP-23-0713	7/16/2013	Cesium-134	<2.2	ambient monitoring
APP-23	PV-APP-23-0713	7/16/2013	Cesium-137	<2	ambient monitoring
APP-23	PV-APP-23-0713	7/16/2013	Cobalt-60	<2.1	ambient monitoring
APP-23	PV-APP-23-0713	7/16/2013	Tritium	<264	ambient monitoring
APP-23	PV-APP-23-1013	10/29/2013	Cesium-134	<2.4	ambient monitoring
APP-23	PV-APP-23-1013	10/29/2013	Cesium-137	<2	ambient monitoring
APP-23	PV-APP-23-1013	10/29/2013	Cobalt-60	<2.2	ambient monitoring
APP-23	PV-APP-23-1013	10/29/2013	Tritium	<247	ambient monitoring

Monitoring Well	Sample Name	Sample Date	Parameter	Concentration (pCi//L)	Purpose
APP-3	PV-APP-3-0513	5/29/2013	Cesium-134	<2.3	routine
APP-3	PV-APP-3-0513	5/29/2013	Cesium-137	<2	routine
APP-3	PV-APP-3-0513	5/29/2013	Cobalt-60	<2.2	routine
APP-3	PV-APP-3-0513	5/29/2013	Tritium	<252	routine
APP-4R	PV-APP-4R-0413	4/23/2013	Cesium-134	<2.7	routine
APP-4R	PV-APP-4R-0413	4/23/2013	Cesium-137	<2.4	routine
APP-4R	PV-APP-4R-0413	4/23/2013	Cobalt-60	<2.6	routine
APP-4R	PV-APP-4R-0413	4/23/2013	Tritium	<257	routine
APP-4R	PV-APP-4R-1013	10/22/2013	Cesium-134	<2.5	routine
APP-4R	PV-APP-4R-1013	10/22/2013	Cesium-137	<2.3	routine
APP-4R	PV-APP-4R-1013	10/22/2013	Cobalt-60	<2.4	routine
APP-4R	PV-APP-4R-1013	10/22/2013	Tritium	<252	routine
APP-5	PV-APP-5-0513	5/9/2013	Cesium-134	<2.1	routine
APP-5	PV-APP-5-0513	5/9/2013	Cesium-137	<2.2	routine
APP-5	PV-APP-5-0513	5/9/2013	Cobalt-60	<2.2	routine
APP-5	PV-APP-5-0513	5/9/2013	Tritium	<251	routine
APP-7	PV-APP-7-0613	6/18/2013	Cesium-134	<2.5	routine
APP-7	PV-APP-7-0613	6/18/2013	Cesium-137	<2.4	routine
APP-7	PV-APP-7-0613	6/18/2013	Cobalt-60	<2.5	routine
APP-7	PV-APP-7-0613	6/18/2013	Tritium	<254	routine
APP-9	PV-APP-9-0213	2/19/2013	Cesium-134	<2.68	routine
APP-9	PV-APP-9-0213	2/19/2013	Cesium-137	<2.39	routine
APP-9	PV-APP-9-0213	2/19/2013	Cobalt-60	<2.58	routine
APP-9	PV-APP-9-0213	2/19/2013	Tritium	<252	routine
APP-9	PV-APP-9-0413	4/16/2013	Cesium-134	<2.2	routine
APP-9	PV-APP-9-0413	4/16/2013	Cesium-137	<2.2	routine
APP-9	PV-APP-9-0413	4/16/2013	Cobalt-60	<2.1	routine
APP-9	PV-APP-9-0413	4/16/2013	Tritium	<255	routine
APP-9	PV-APP-9-0513	5/29/2013	Cesium-134	<2.7	routine
APP-9	PV-APP-9-0513	5/29/2013	Cesium-137	<2.5	routine
APP-9	PV-APP-9-0513	5/29/2013	Cobalt-60	<2.4	routine
APP-9	PV-APP-9-0513	5/29/2013	Tritium	<252	routine
APP-9	PV-APP-9-0713	7/16/2013	Cesium-134	<2.4	routine
APP-9	PV-APP-9-0713	7/16/2013	Cesium-137	<2.4	routine
APP-9	PV-APP-9-0713	7/16/2013	Cobalt-60	<2.5	routine
APP-9	PV-APP-9-0713	7/16/2013	Tritium	<264	routine
APP-9	PV-APP-9-1013-A	10/8/2013	Cesium-134	<2.4	routine
APP-9	PV-APP-9-1013-A	10/8/2013	Cesium-137	<2.1	routine
APP-9	PV-APP-9-1013-A	10/8/2013	Cobalt-60	<2.2	routine
APP-9	PV-APP-9-1013-A	10/8/2013	Tritium	<254	routine
PV-14H	PV-PV-14H-0413	4/22/2013	Cesium-134	<2.2	routine
PV-14H	PV-PV-14H-0413	4/22/2013	Cesium-137	<2.1	routine
PV-14H	PV-PV-14H-0413	4/22/2013	Cobalt-60	<2.2	routine
PV-14H	PV-PV-14H-0413	4/22/2013	Tritium	<257	routine
PV-14H	PV-PV-14H-1013	10/22/2013	Cesium-134	<2.5	routine
PV-14H	PV-PV-14H-1013	10/22/2013	Cesium-137	<2.3	routine
PV-14H	PV-PV-14H-1013	10/22/2013	Cobalt-60	<2.4	routine
PV-14H	PV-PV-14H-1013	10/22/2013	Tritium	<252	routine
PV-193A	PV-PV-193A-0513	5/9/2013	Cesium-134	<2.5	routine
PV-193A	PV-PV-193A-0513	5/9/2013	Cesium-137	<2.3	routine
PV-193A	PV-PV-193A-0513	5/9/2013	Cobalt-60	<2.3	routine
PV-193A	PV-PV-193A-0513	5/9/2013	Tritium	<251	routine

Monitoring Well	Sample Name	Sample Date	Parameter	Concentration (pCi//L)	Purpose
PV-195A	PV-PV-195A-0613	6/18/2013	Cesium-134	<2.5	routine
PV-195A	PV-PV-195A-0613	6/18/2013	Cesium-137	<2.5	routine
PV-195A	PV-PV-195A-0613	6/18/2013	Cobalt-60	<2.5	routine
PV-195A	PV-PV-195A-0613	6/18/2013	Tritium	<254	routine
PV-195A	PV-PV-195A-1013	10/29/2013	Cesium-134	<2.3	routine
PV-195A	PV-PV-195A-1013	10/29/2013	Cesium-137	<2.1	routine
PV-195A	PV-PV-195A-1013	10/29/2013	Cobalt-60	<2	routine
PV-195A	PV-PV-195A-1013	10/29/2013	Tritium	<247	routine
PV-198AR	PV-PV-198AR-0613	6/18/2013	Cesium-134	<3.4	routine
PV-198AR	PV-FD01-0613	6/18/2013	Cesium-134	<2.2	field duplicate sample
PV-198AR	PV-PV-198AR-0613	6/18/2013	Cesium-137	<2.4	routine
PV-198AR	PV-FD01-0613	6/18/2013	Cesium-137	<2.1	field duplicate sample
PV-198AR	PV-PV-198AR-0613	6/18/2013	Cobalt-60	<2.8	routine
PV-198AR	PV-FD01-0613	6/18/2013	Cobalt-60	<2.2	field duplicate sample
PV-198AR	PV-PV-198AR-0613	6/18/2013	Tritium	<254	routine
PV-198AR	PV-FD01-0613	6/18/2013	Tritium	<254	field duplicate sample
PV-198AR	PV-PV-198AR-1013	10/8/2013	Cesium-134	<2.5	routine
PV-198AR	PV-PV-198AR-1013	10/8/2013	Cesium-137	<2.5	routine
PV-198AR	PV-PV-198AR-1013	10/8/2013	Cobalt-60	<2.5	routine
PV-198AR	PV-PV-198AR-1013	10/8/2013	Tritium	<254	routine
PV-34H	PV-PV-34H-0513	5/9/2013	Cesium-134	<2.5	routine
PV-34H	PV-PV-34H-0513	5/9/2013	Cesium-137	<2.3	routine
PV-34H	PV-PV-34H-0513	5/9/2013	Cobalt-60	<2.4	routine
PV-34H	PV-PV-34H-0513	5/9/2013	Tritium	<251	routine
PV-Q8	PV-PV-Q8-0513	5/9/2013	Tritium	<251	routine
PV-Q8	PV-PV-Q8-0613	6/18/2013	Cesium-134	<2.3	routine
PV-Q8	PV-PV-Q8-0613	6/18/2013	Cesium-137	<2.3	routine
PV-Q8	PV-PV-Q8-0613	6/18/2013	Cobalt-60	<2.4	routine
PV-Q8	PV-PV-Q8-0613	6/18/2013	Tritium	<254	routine
PV-R2AR	PV-FD01-0413	4/24/2013	Cesium-134	<2	field duplicate sample
PV-R2AR	PV-PV-R2AR-0413	4/24/2013	Cesium-134	<2	routine
PV-R2AR	PV-FD01-0413	4/24/2013	Cesium-137	<2.2	field duplicate sample
PV-R2AR	PV-PV-R2AR-0413	4/24/2013	Cesium-137	<2.2	routine
PV-R2AR	PV-FD01-0413	4/24/2013	Cobalt-60	<2	field duplicate sample
PV-R2AR	PV-PV-R2AR-0413	4/24/2013	Cobalt-60	<2	routine
PV-R2AR	PV-FD01-0413	4/24/2013	Tritium	<257	field duplicate sample
PV-R2AR	PV-PV-R2AR-0413	4/24/2013	Tritium	<257	routine
PV-R2AR	PV-PV-R2AR-1013	10/22/2013	Cesium-134	<2.5	routine
PV-R2AR	PV-PV-R2AR-1013	10/22/2013	Cesium-137	<2.4	routine
PV-R2AR	PV-PV-R2AR-1013	10/22/2013	Cobalt-60	<2.5	routine
PV-R2AR	PV-PV-R2AR-1013	10/22/2013	Tritium	<252	routine