Technical Specification 5.6.3

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

102-07046 TNW/TMJ
April 30, 2015

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 2014

In accordance with PVNGS Technical Specification (TS) 5.6.3, enclosed please find the Annual Radioactive Effluent Release Report for 2014.

No new commitments are being made to the NRC by this letter. Should you need further information regarding this submittal, please contact Michael D. Dilorenzo, Licensing Section Leader, at (623) 393-3495.

Sincerely,

Thomas N. Weber
Department Leader, Regulatory Affairs

TNW/TMJ/hsc

Enclosure

cc: M. L. Dapas NRC Region IV Regional Administrator
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ENCLOSURE

Palo Verde Nuclear Generating Station
Units 1, 2, & 3

2014 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

PALO VERDE NUCLEAR GENERATING STATION
UNITS 1, 2 AND 3

2014

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

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

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES

LIST OF TABLES

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 2014. 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.

BIBLIOGRAPHY

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

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

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

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

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

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

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

Technical Specifications, Palo Verde Nuclear Generating Station, Units 1, 2 and 3, Docket No. 50-528/529/530.

Bechtel Power Corp., "Cooling Tower Blowdown System Solar Evaporation Pond," Sept. 1980.

Generation Engineering, "Geotechnical Exploration for Evaporation Pond #2," Oct. 1986

Letter No. 212-00789-WFQ/RHM, "1989 PVNGS Evaporation Pan Data," Jan. 1989.

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 2014.

7.1 There were revisions to the Process Control Program (PCP) in 2014. The change package is attached as Appendix E.

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 approximately 250 acres. This equates to 3.08E+11 cc evaporated from Pond One for each of the first and fourth quarters and 8.48E+11 cc evaporated from Pond One for each of the second and third quarters. Evaporation Pond Two is approximately 235 acres. The amount evaporated from Pond Two is 2.90E+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.

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 (1R18) from October 11, 2014 to November 11, 2014.

Maintenance outages:
1M18A May 4, 2014 to May 7, 2014

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 with a refueling outage (2R16) from April 4, 2014 to May 3, 2014.

Maintenance outages:
2M18A December 2, 2014 to December 13, 2014

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 without a refueling outage.

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 2014 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 2014, PVNGS released a total of 2310 curies of tritium (see Table 39).

Total dose due to releases from all three Units for 2014 were higher than 2013, primarily due to increased 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)	4.85E-06	3.34E-06	3.65E-06	2.98E-06	
Tritium Curies	1.83E-01	1.16E+00	1.21E+00	3.52E-01	2.91E+00
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)	1.45E-06	1.46E-06	1.75E-06	1.12E-06	
Tritium curies	1.80E-01	4.91E-01	6.04E-01	1.45E-01	1.42E+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)	1.65E-06	1.08E-06	1.24E-06	8.76E-07	
3B Tritium curies	1.81E-01	3.25E-01	3.73E-01	9.62E-02	9.76E-01
Dose (mRem)	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year
Pond 1	7.61E-03	1.43E-02	1.50E-02	4.16E-03	4.12E-02
Pond 2	2.50E-03	6.81E-03	8.38E-03	2.01E-03	1.97E-02
Pond 3	2.51E-03	4.51E-03	5.18E-03	1.33E-03	1.35E-02
Total	6.71E-03	2.57E-02	2.86E-02	7.51E-03	7.44E-02

Table 2: Batch Release Data			
All times are in hours	Unit 1	Unit 2	Unit 3
January - June			
Number of batch releases	16	37	21
Total time period for batch releases	136.31	1884.81	393.92
Maximum time period for a batch release	**118.75**	**168.00**	**168.00**
Average time period for a batch release	8.52	50.94	18.76
Minimum time period for a batch release	0.45	0.10	0.63
July - December			
Number of batch releases	49	18	18
Total time period for batch releases	2417.35	92.07	252.75
Maximum time period for a batch release	**713.23**	**67.50**	**125.98**
Average time period for a batch release	49.33	5.11	14.04
Minimum time period for a batch release	0.04	0.40	0.28
January - December			
Number of batch releases	65	55	39
Total time period for batch releases	2553.66	1976.88	646.67
Maximum time period for a batch release	**713.23**	**168.00**	**168.00**
Average time period for a batch release	39.29	35.94	16.58
Minimum time period for a batch release	0.04	0.10	0.28

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	4.40E-02	4.49E-02	7.40E+00	4.33E-01	7.92E+00	3.54E+01
2. Average release rate for period	µCi/sec	5.66E-03	5.71E-03	9.31E-01	5.45E-02	2.51E-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	2.34E-05	2.34E-05	3.32E+01
2. Average release rate for period	µCi/sec	< LLD	< LLD	< LLD	2.94E-06	7.42E-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	1.90E-06	1.47E-07	2.78E-06	4.28E-04	4.33E-04	3.43E+01
2. Average release rate for period	µCi/sec	2.44E-07	1.87E-08	3.50E-07	5.39E-05	1.37E-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	1.51E+01	1.94E+02	3.80E+02	4.19E+02	1.01E+03	3.85E+01
2. Average release rate for period	µCi/sec	1.94E+00	2.47E+01	4.78E+01	5.27E+01	3.20E+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	7.05E+00	< LLD	7.05E+00
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**	**7.05E+00**	**< LLD**	**7.05E+00**
2. Iodines						
I-131	Ci	< LLD	< LLD	< LLD	1.46E-05	1.46E-05
I-132	Ci	< LLD	< LLD	< LLD	2.10E-04	2.10E-04
I-133	Ci	< LLD	< LLD	< LLD	4.05E-06	4.05E-06
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	**< LLD**	**< LLD**	**< LLD**	**2.28E-04**	**2.28E-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	1.29E-06	< LLD	< LLD	4.87E-05	5.00E-05
Co-60	Ci	< LLD	< LLD	3.40E-07	1.19E-05	1.22E-05
Cr-51	Ci	< LLD	< LLD	< LLD	1.80E-04	1.80E-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	4.29E-06	4.29E-06
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	< LLD	< LLD	< LLD	8.21E-06	8.21E-06
Os-191	Ci	< LLD	< LLD	< LLD	1.71E-05	1.71E-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	< 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	6.11E-07	1.47E-07	2.44E-06	< LLD	3.20E-06
Tc-99m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Te-123m	Ci	< LLD	< LLD	< LLD	3.13E-07	3.13E-07
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	< LLD	< LLD	4.11E-06	4.11E-06
Total	Ci	**1.90E-06**	**1.47E-07**	**2.78E-06**	**2.75E-04**	**2.80E-04**
4.Tritium						
H-3	Ci	1.51E+01	1.04E+01	1.79E+01	1.02E+02	1.46E+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	4.40E-02	4.49E-02	3.46E-01	1.45E-01	5.80E-01
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	< LLD	< LLD	7.22E-08	< LLD	7.22E-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	2.46E-03	2.46E-03
Xe-133	Ci	< LLD	< LLD	7.20E-05	2.52E-01	2.53E-01
Xe-133m	Ci	< LLD	< LLD	1.48E-06	2.89E-02	2.89E-02
Xe-135	Ci	< LLD	< LLD	4.71E-06	3.85E-03	3.85E-03
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	**4.40E-02**	**4.49E-02**	**3.46E-01**	**4.33E-01**	**8.68E-01**
2. Iodines						
I-131	Ci	< LLD	< LLD	< LLD	8.81E-06	8.81E-06
I-132	Ci	< LLD	< LLD	< LLD	5.95E-04	5.95E-04
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**	**6.03E-04**	**6.03E-04**

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	< LLD	< LLD	< LLD	1.06E-05	1.06E-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	1.96E-05	1.96E-05
Co-60	Ci	< LLD	< LLD	< LLD	9.48E-06	9.48E-06
Cr-51	Ci	< LLD	< LLD	< LLD	8.43E-05	8.43E-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	9.69E-07	9.69E-07
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	< LLD	< LLD	1.11E-06	1.11E-06
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	< LLD	< LLD	< LLD	2.02E-05	2.02E-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	< LLD	< LLD	1.75E-05	1.75E-05
Total	Ci	**< LLD**	**< LLD**	**< LLD**	**1.64E-04**	**1.64E-04**
4.Tritium						
H-3	Ci	9.49E-03	1.84E+02	3.62E+02	3.17E+02	8.63E+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	4.40E-02	4.49E-02	3.46E-01	1.45E-01	5.80E-01
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	< LLD	< LLD	7.22E-08	< LLD	7.22E-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	7.05E+00	2.46E-03	7.05E+00
Xe-133	Ci	< LLD	< LLD	7.20E-05	2.52E-01	2.53E-01
Xe-133m	Ci	< LLD	< LLD	1.48E-06	2.89E-02	2.89E-02
Xe-135	Ci	< LLD	< LLD	4.71E-06	3.85E-03	3.85E-03
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	**4.40E-02**	**4.49E-02**	**7.40E+00**	**4.33E-01**	**7.92E+00**
2. Iodines						
I-131	Ci	< LLD	< LLD	< LLD	2.34E-05	2.34E-05
I-132	Ci	< LLD	< LLD	< LLD	8.04E-04	8.04E-04
I-133	Ci	< LLD	< LLD	< LLD	4.05E-06	4.05E-06
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	**< LLD**	**< LLD**	**< LLD**	**8.32E-04**	**8.32E-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	< LLD	< LLD	< LLD	1.06E-05	1.06E-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	1.29E-06	< LLD	< LLD	6.83E-05	6.96E-05
Co-60	Ci	< LLD	< LLD	3.40E-07	2.14E-05	2.17E-05
Cr-51	Ci	< LLD	< LLD	< LLD	2.65E-04	2.65E-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	9.69E-07	9.69E-07
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	< LLD	< LLD	5.40E-06	5.40E-06
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	< LLD	< LLD	< LLD	2.84E-05	2.84E-05
Os-191	Ci	< LLD	< LLD	< LLD	1.71E-05	1.71E-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	< 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	6.11E-07	1.47E-07	2.44E-06	< LLD	3.20E-06
Tc-99m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Te-123m	Ci	< LLD	< LLD	< LLD	3.13E-07	3.13E-07
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	< LLD	< LLD	2.16E-05	2.16E-05
Total	Ci	**1.90E-06**	**1.47E-07**	**2.78E-06**	**4.39E-04**	**4.44E-04**
Total > 8 days	Ci	**1.90E-06**	**1.47E-07**	**2.78E-06**	**4.28E-04**	**4.33E-04**
4.Tritium						
H-3	Ci	1.51E+01	1.94E+02	3.80E+02	4.19E+02	1.01E+03

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	1.16E-04	1.18E-04	1.22E-03	4.12E-04	1.86E-03
ODCM Req 4.1 Limit	mrad	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
% ODCM Limit	%	**2.32E-03**	**2.36E-03**	**2.44E-02**	**8.24E-03**	**1.86E-02**
Beta Air Dose	mrad	4.08E-05	4.16E-05	2.53E-03	2.25E-04	2.84E-03
ODCM Req 4.1 Limit	mrad	1.00E+01	1.00E+01	1.00E+01	1.00E+01	2.00E+01
% ODCM Limit	%	**4.08E-04**	**4.16E-04**	**2.53E-02**	**2.25E-03**	**1.42E-02**
Maximum Organ Dose (excluding skin)	mrem	**5.43E-03**	**6.97E-02**	**1.36E-01**	**1.50E-01**	**3.62E-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	%	**7.24E-02**	**9.29E-01**	**1.81E+00**	**2.00E+00**	**2.41E+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	6.55E-02	6.30E+00	4.84E-02	7.12E-02	6.49E+00	**3.54E+01**
2. Average release rate for period	µCi/sec	8.42E-03	8.01E-01	6.09E-03	8.96E-03	2.06E-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	2.14E-05	< LLD	< LLD	2.14E-05	**3.32E+01**
2. Average release rate for period	µCi/sec	< LLD	2.72E-06	< LLD	< LLD	6.79E-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	5.00E-07	1.63E-04	3.74E-07	1.39E-07	1.64E-04	**3.43E+01**
2. Average release rate for period	µCi/sec	6.43E-08	2.07E-05	4.71E-08	1.75E-08	5.20E-06	
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	6.02E+02	3.10E+02	2.50E+01	2.07E+01	9.58E+02	**3.85E+01**
2. Average release rate for period	µCi/sec	7.74E+01	3.94E+01	3.15E+00	2.60E+00	3.04E+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 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	2.13E-05	< LLD	< LLD	2.13E-05
I-132	Ci	< LLD	4.36E-04	< LLD	< LLD	4.36E-04
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**	**4.57E-04**	**< LLD**	**< LLD**	**4.57E-04**

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	6.26E-05	< LLD	< LLD	6.26E-05
Co-60	Ci	< LLD	1.37E-05	< LLD	< LLD	1.37E-05
Cr-51	Ci	< LLD	6.81E-05	< LLD	< LLD	6.81E-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	1.85E-06	< LLD	< LLD	1.85E-06
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	< LLD	1.69E-06	< LLD	< LLD	1.69E-06
Os-191	Ci	< LLD	8.24E-06	< LLD	< LLD	8.24E-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	< LLD	4.53E-07	1.31E-08	< LLD	4.66E-07
Sr-90	Ci	5.00E-07	4.41E-08	3.61E-07	1.39E-07	1.04E-06
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	**5.00E-07**	**1.57E-04**	**3.74E-07**	**1.39E-07**	**1.58E-04**
4. Tritium						
H-3	Ci	2.15E+01	6.12E+01	2.50E+01	2.06E+01	1.28E+02

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	5.88E-02	5.43E+00	4.28E-02	3.91E-02	5.57E+00
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	4.33E-03	< LLD	< LLD	4.33E-03
Kr-85m	Ci	1.81E-08	< LLD	< LLD	1.05E-04	1.05E-04
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	6.73E-03	8.18E-01	5.56E-03	3.20E-02	8.62E-01
Xe-133m	Ci	7.81E-08	< LLD	< LLD	< LLD	7.81E-08
Xe-135	Ci	5.34E-07	4.47E-02	4.25E-05	1.76E-05	4.47E-02
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	**6.55E-02**	**6.30E+00**	**4.84E-02**	**7.12E-02**	**6.49E+00**
2. Iodines						
I-131	Ci	< LLD	9.91E-08	< LLD	< LLD	9.91E-08
I-132	Ci	< LLD	4.00E-06	< LLD	< LLD	4.00E-06
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**	**4.10E-06**	**< LLD**	**< LLD**	**4.10E-06**

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	6.90E-05	< LLD	1.01E-05	7.91E-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	1.18E-06	< LLD	< LLD	1.18E-06
Co-60	Ci	< LLD	9.42E-07	< LLD	< LLD	9.42E-07
Cr-51	Ci	< LLD	1.95E-06	< LLD	< LLD	1.95E-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	1.53E-07	< LLD	< LLD	1.53E-07
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	< LLD	1.25E-06	< LLD	< LLD	1.25E-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	7.46E-07	< LLD	< LLD	7.46E-07
Total	Ci	**< LLD**	**7.52E-05**	**< LLD**	**1.01E-05**	**8.53E-05**
4. Tritium						
H-3	Ci	5.81E+02	2.49E+02	8.07E-03	1.24E-01	8.30E+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	5.88E-02	5.43E+00	4.28E-02	3.91E-02	5.57E+00
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	4.33E-03	< LLD	< LLD	4.33E-03
Kr-85m	Ci	1.81E-08	< LLD	< LLD	1.05E-04	1.05E-04
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	6.73E-03	8.18E-01	5.56E-03	3.20E-02	8.62E-01
Xe-133m	Ci	7.81E-08	< LLD	< LLD	< LLD	7.81E-08
Xe-135	Ci	5.34E-07	4.47E-02	4.25E-05	1.76E-05	4.47E-02
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	**6.55E-02**	**6.30E+00**	**4.84E-02**	**7.12E-02**	**6.49E+00**
2. Iodines						
I-131	Ci	< LLD	2.14E-05	< LLD	< LLD	2.14E-05
I-132	Ci	< LLD	4.40E-04	< LLD	< LLD	4.40E-04
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**	**4.61E-04**	**< LLD**	**< LLD**	**4.61E-04**

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	6.90E-05	< LLD	1.01E-05	7.91E-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	6.38E-05	< LLD	< LLD	6.38E-05
Co-60	Ci	< LLD	1.47E-05	< LLD	< LLD	1.47E-05
Cr-51	Ci	< LLD	7.00E-05	< LLD	< LLD	7.00E-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	2.00E-06	< LLD	< LLD	2.00E-06
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	< LLD	2.95E-06	< LLD	< LLD	2.95E-06
Os-191	Ci	< LLD	8.24E-06	< LLD	< LLD	8.24E-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	< LLD	4.53E-07	1.31E-08	< LLD	4.66E-07
Sr-90	Ci	5.00E-07	4.41E-08	3.61E-07	1.39E-07	1.04E-06
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	7.46E-07	< LLD	< LLD	7.46E-07
Total	Ci	**5.00E-07**	**2.32E-04**	**3.74E-07**	**1.03E-05**	**2.43E-04**
Total > 8 days	Ci	**5.00E-07**	**1.63E-04**	**3.74E-07**	**1.39E-07**	**1.64E-04**
4. Tritium						
H-3	Ci	6.02E+02	3.10E+02	2.50E+01	2.07E+01	9.58E+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	1.55E-04	1.44E-02	1.13E-04	1.06E-04	1.48E-02
ODCM Req 4.1 Limit	mrad	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
% ODCM Limit	%	**3.10E-03**	**2.88E-01**	**2.26E-03**	**2.12E-03**	**1.48E-01**
Beta Air Dose	mrad	5.64E-05	5.31E-03	4.13E-05	4.58E-05	5.45E-03
ODCM Req 4.1 Limit	mrad	1.00E+01	1.00E+01	1.00E+01	1.00E+01	2.00E+01
% ODCM Limit	%	**5.64E-04**	**5.31E-02**	**4.13E-04**	**4.58E-04**	**2.73E-02**
Maximum Organ Dose (excluding skin)	mrem	2.16E-01	1.11E-01	8.98E-03	7.42E-03	3.44E-01
Age		Teen	Teen	Teen	Teen	Teen
Organ		Thyroid	Thyroid	Thyroid	Thyroid	Thyroid
ODCM Req. 4.2 Limit	%	7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01
% ODCM Limit	%	**2.88E+00**	**1.48E+00**	**1.20E-01**	**9.89E-02**	**2.29E+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.

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	4.31E-02	4.56E-02	4.36E-02	4.58E-02	1.78E-01	**3.54E+01**
2. Average release rate for period	µCi/sec	5.54E-03	5.80E-03	5.49E-03	5.76E-03	5.64E-03	
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	7.36E-06	4.31E-07	3.83E-06	1.33E-06	1.30E-05	**3.43E+01**
2. Average release rate for period	µCi/sec	9.47E-07	5.48E-08	4.82E-07	1.67E-07	4.11E-07	
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	1.24E+02	2.59E+01	1.80E+02	1.73E+01	3.47E+02	**3.85E+01**
2. Average release rate for period	µCi/sec	1.59E+01	3.29E+00	2.26E+01	2.18E+00	1.10E+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	< 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 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	5.01E-06	3.59E-07	2.40E-06	< LLD	7.77E-06
Co-60	Ci	9.84E-07	< LLD	< LLD	< LLD	9.84E-07
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	1.18E-06	< LLD	< LLD	< LLD	1.18E-06
Os-191	Ci	< LLD	< LLD	< LLD	1.04E-06	1.04E-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	< LLD	< LLD	7.46E-07	< LLD	7.46E-07
Sr-90	Ci	< LLD	< LLD	6.87E-07	2.89E-07	9.76E-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	**7.17E-06**	**3.59E-07**	**3.83E-06**	**1.33E-06**	**1.27E-05**
4. Tritium						
H-3	Ci	3.01E+01	2.59E+01	2.28E+01	1.73E+01	9.60E+01

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	4.31E-02	4.56E-02	4.36E-02	4.58E-02	1.78E-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	< LLD	3.35E-07	< LLD	< LLD	3.35E-07
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	**4.31E-02**	**4.56E-02**	**4.36E-02**	**4.58E-02**	**1.78E-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 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	< 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	1.89E-07	7.21E-08	< LLD	< LLD	2.62E-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	< LLD	< LLD	< LLD	< LLD
Total	Ci	**1.89E-07**	**7.21E-08**	**< LLD**	**< LLD**	**2.62E-07**
4. Tritium						
H-3	Ci	9.37E+01	1.15E-02	1.57E+02	5.84E-02	2.51E+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	4.31E-02	4.56E-02	4.36E-02	4.58E-02	1.78E-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	< LLD	3.35E-07	< LLD	< LLD	3.35E-07
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	**4.31E-02**	**4.56E-02**	**4.36E-02**	**4.58E-02**	**1.78E-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 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	< 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	5.01E-06	3.59E-07	2.40E-06	< LLD	7.77E-06
Co-60	Ci	9.84E-07	< LLD	< LLD	< LLD	9.84E-07
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	1.37E-06	7.21E-08	< LLD	< LLD	1.44E-06
Os-191	Ci	< LLD	< LLD	< LLD	1.04E-06	1.04E-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	< LLD	< LLD	7.46E-07	< LLD	7.46E-07
Sr-90	Ci	< LLD	< LLD	6.87E-07	2.89E-07	9.76E-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	**7.36E-06**	**4.31E-07**	**3.83E-06**	**1.33E-06**	**1.30E-05**
Total > 8 days	Ci	**7.36E-06**	**4.31E-07**	**3.83E-06**	**1.33E-06**	**1.30E-05**
4. Tritium						
H-3	Ci	1.24E+02	2.59E+01	1.80E+02	1.73E+01	3.47E+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	1.13E-04	1.20E-04	1.15E-04	1.20E-04	4.68E-04
ODCM Req 4.1 Limit	mrad	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
% ODCM Limit	%	**2.26E-03**	**2.40E-03**	**2.30E-03**	**2.40E-03**	**4.68E-03**
Beta Air Dose	mrad	3.99E-05	4.22E-05	4.04E-05	4.24E-05	1.65E-04
ODCM Req 4.1 Limit	mrad	1.00E+01	1.00E+01	1.00E+01	1.00E+01	2.00E+01
% ODCM Limit	%	**3.99E-04**	**4.22E-04**	**4.04E-04**	**4.24E-04**	**8.25E-04**
Maximum Organ Dose (excluding skin)	mrem	4.44E-02	9.28E-03	6.44E-02	6.22E-03	9.40E-02
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	%	**5.92E-01**	**1.24E-01**	**8.59E-01**	**8.29E-02**	**8.27E-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.

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	7.05E+00	< LLD	7.05E+00
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**	**7.05E+00**	**< LLD**	**7.05E+00**
2. Iodines						
I-131	Ci	< LLD	2.13E-05	< LLD	1.46E-05	3.59E-05
I-132	Ci	< LLD	4.36E-04	< LLD	2.10E-04	6.45E-04
I-133	Ci	< LLD	< LLD	< LLD	4.05E-06	4.05E-06
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	**< LLD**	**4.57E-04**	**< LLD**	**2.28E-04**	**6.85E-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	6.30E-06	6.30E-05	2.40E-06	4.87E-05	1.20E-04
Co-60	Ci	9.84E-07	1.37E-05	3.40E-07	1.19E-05	2.69E-05
Cr-51	Ci	< LLD	6.81E-05	< LLD	1.80E-04	2.49E-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	1.85E-06	< LLD	4.29E-06	6.14E-06
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	1.18E-06	1.69E-06	< LLD	8.21E-06	1.11E-05
Os-191	Ci	< LLD	8.24E-06	< LLD	1.82E-05	2.64E-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	< 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	4.53E-07	7.59E-07	< LLD	1.21E-06
Sr-90	Ci	1.11E-06	1.91E-07	3.49E-06	4.28E-07	5.22E-06
Tc-99m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Te-123m	Ci	< LLD	< LLD	< LLD	3.13E-07	3.13E-07
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	< LLD	< LLD	4.11E-06	4.11E-06
Total	Ci	**9.57E-06**	**1.57E-04**	**6.98E-06**	**2.77E-04**	**4.50E-04**
4. Tritium						
H-3	Ci	6.67E+01	9.75E+01	6.57E+01	1.40E+02	3.70E+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	1.46E-01	5.52E+00	4.32E-01	2.30E-01	6.33E+00
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	4.33E-03	< LLD	< LLD	4.33E-03
Kr-85m	Ci	1.81E-08	< LLD	7.22E-08	1.05E-04	1.05E-04
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	2.46E-03	2.46E-03
Xe-133	Ci	6.73E-03	8.18E-01	5.63E-03	2.84E-01	1.11E+00
Xe-133m	Ci	7.81E-08	< LLD	1.48E-06	2.89E-02	2.89E-02
Xe-135	Ci	5.34E-07	4.47E-02	4.72E-05	3.87E-03	4.86E-02
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	**1.53E-01**	**6.39E+00**	**4.38E-01**	**5.50E-01**	**7.53E+00**
2. Iodines						
I-131	Ci	< LLD	9.91E-08	< LLD	8.81E-06	8.91E-06
I-132	Ci	< LLD	4.00E-06	< LLD	5.95E-04	5.99E-04
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**	**4.10E-06**	**< LLD**	**6.03E-04**	**6.08E-04**

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	< LLD	6.90E-05	< LLD	2.07E-05	8.97E-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	1.18E-06	< LLD	1.96E-05	2.08E-05
Co-60	Ci	< LLD	9.42E-07	< LLD	9.48E-06	1.04E-05
Cr-51	Ci	< LLD	1.95E-06	< LLD	8.43E-05	8.62E-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	9.69E-07	9.69E-07
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	1.53E-07	< LLD	1.11E-06	1.26E-06
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	1.89E-07	1.32E-06	< LLD	2.02E-05	2.17E-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	7.46E-07	< LLD	1.75E-05	1.82E-05
Total	Ci	**1.89E-07**	**7.53E-05**	**< LLD**	**1.74E-04**	**2.49E-04**
4. Tritium						
H-3	Ci	6.75E+02	4.33E+02	5.19E+02	3.17E+02	1.94E+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	1.46E-01	5.52E+00	4.32E-01	2.30E-01	6.33E+00
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	4.33E-03	< LLD	< LLD	4.33E-03
Kr-85m	Ci	1.81E-08	< LLD	7.22E-08	1.05E-04	1.05E-04
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	7.05E+00	2.46E-03	7.05E+00
Xe-133	Ci	6.73E-03	8.18E-01	5.63E-03	2.84E-01	1.11E+00
Xe-133m	Ci	7.81E-08	< LLD	1.48E-06	2.89E-02	2.89E-02
Xe-135	Ci	5.34E-07	4.47E-02	4.72E-05	3.87E-03	4.86E-02
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	**1.53E-01**	**6.39E+00**	**7.49E+00**	**5.50E-01**	**1.46E+01**
2. Iodines						
I-131	Ci	< LLD	2.14E-05	< LLD	2.34E-05	4.48E-05
I-132	Ci	< LLD	4.40E-04	< LLD	8.04E-04	1.24E-03
I-133	Ci	< LLD	< LLD	< LLD	4.05E-06	4.05E-06
I-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total	Ci	**< LLD**	**4.61E-04**	**< LLD**	**8.32E-04**	**1.29E-03**

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	< LLD	6.90E-05	< LLD	2.07E-05	8.97E-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	6.30E-06	6.42E-05	2.40E-06	6.83E-05	1.41E-04
Co-60	Ci	9.84E-07	1.47E-05	3.40E-07	2.14E-05	3.74E-05
Cr-51	Ci	< LLD	7.00E-05	< LLD	2.65E-04	3.35E-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	9.69E-07	9.69E-07
La-140	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	< LLD	2.00E-06	< LLD	5.40E-06	7.40E-06
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	1.37E-06	3.02E-06	< LLD	2.84E-05	3.28E-05
Os-191	Ci	< LLD	8.24E-06	< LLD	1.82E-05	2.64E-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	< 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	4.53E-07	7.59E-07	< LLD	1.21E-06
Sr-90	Ci	1.11E-06	1.91E-07	3.49E-06	4.28E-07	5.22E-06
Tc-99m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Te-123m	Ci	< LLD	< LLD	< LLD	3.13E-07	3.13E-07
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	< LLD	7.46E-07	< LLD	2.16E-05	2.23E-05
Total	Ci	**9.76E-06**	**2.33E-04**	**6.98E-06**	**4.50E-04**	**7.00E-04**
Total > 8 days	Ci	**9.76E-06**	**1.64E-04**	**6.98E-06**	**4.30E-04**	**6.10E-04**
4. Tritium						
H-3	Ci	7.41E+02	5.30E+02	5.85E+02	4.57E+02	2.31E+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	7.05E+00	< LLD	< LLD	7.05E+00
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	**7.05E+00**	**< LLD**	**< LLD**	**7.05E+00**
2. Iodines					
I-131	Ci	1.46E-05	2.13E-05	< LLD	3.59E-05
I-132	Ci	2.10E-04	4.36E-04	< LLD	6.45E-04
I-133	Ci	4.05E-06	< LLD	< LLD	4.05E-06
I-134	Ci	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD
Total	Ci	**2.28E-04**	**4.57E-04**	**< LLD**	**6.85E-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	5.00E-05	6.26E-05	7.77E-06	1.20E-04
Co-60	Ci	1.22E-05	1.37E-05	9.84E-07	2.69E-05
Cr-51	Ci	1.80E-04	6.81E-05	< LLD	2.49E-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	< LLD	< LLD	< LLD	< LLD
La-140	Ci	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	4.29E-06	1.85E-06	< LLD	6.14E-06
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	8.21E-06	1.69E-06	1.18E-06	1.11E-05
Os-191	Ci	1.71E-05	8.24E-06	1.04E-06	2.64E-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	< 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	< LLD	4.66E-07	7.46E-07	1.21E-06
Sr-90	Ci	3.20E-06	1.04E-06	9.76E-07	5.22E-06
Tc-99m	Ci	< LLD	< LLD	< LLD	< LLD
Te-123m	Ci	3.13E-07	< LLD	< LLD	3.13E-07
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	4.11E-06	< LLD	< LLD	4.11E-06
Total	Ci	**2.80E-04**	**1.58E-04**	**1.27E-05**	**4.50E-04**
4. Tritium					
H-3	Ci	1.46E+02	1.28E+02	9.60E+01	3.70E+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	5.80E-01	5.57E+00	1.78E-01	6.33E+00
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	4.33E-03	< LLD	4.33E-03
Kr-85m	Ci	7.22E-08	1.05E-04	< LLD	1.05E-04
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	2.46E-03	< LLD	< LLD	2.46E-03
Xe-133	Ci	2.53E-01	8.62E-01	3.35E-07	1.11E+00
Xe-133m	Ci	2.89E-02	7.81E-08	< LLD	2.89E-02
Xe-135	Ci	3.85E-03	4.47E-02	< LLD	4.86E-02
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD
Xe-138		< LLD	< LLD	< LLD	< LLD
Total	Ci	**8.68E-01**	**6.49E+00**	**1.78E-01**	**7.53E+00**
2. Iodines					
I-131	Ci	8.81E-06	9.91E-08	< LLD	8.91E-06
I-132	Ci	5.95E-04	4.00E-06	< LLD	5.99E-04
I-133	Ci	< LLD	< LLD	< LLD	< LLD
I-134	Ci	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD
Total	Ci	**6.03E-04**	**4.10E-06**	**< LLD**	**6.08E-04**

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	1.06E-05	7.91E-05	< LLD	8.97E-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	1.96E-05	1.18E-06	< LLD	2.08E-05
Co-60	Ci	9.48E-06	9.42E-07	< LLD	1.04E-05
Cr-51	Ci	8.43E-05	1.95E-06	< LLD	8.62E-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	9.69E-07	< LLD	< LLD	9.69E-07
La-140	Ci	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	1.11E-06	1.53E-07	< LLD	1.26E-06
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	2.02E-05	1.25E-06	2.62E-07	2.17E-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	1.75E-05	7.46E-07	< LLD	1.82E-05
Total	Ci	**1.64E-04**	**8.53E-05**	**2.62E-07**	**2.49E-04**
4. Tritium					
H-3	Ci	8.63E+02	8.30E+02	2.51E+02	1.94E+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	5.80E-01	5.57E+00	1.78E-01	6.33E+00
Kr-83m	Ci	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	4.33E-03	< LLD	4.33E-03
Kr-85m	Ci	7.22E-08	1.05E-04	< LLD	1.05E-04
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	7.05E+00	< LLD	< LLD	7.05E+00
Xe-133	Ci	2.53E-01	8.62E-01	3.35E-07	1.11E+00
Xe-133m	Ci	2.89E-02	7.81E-08	< LLD	2.89E-02
Xe-135	Ci	3.85E-03	4.47E-02	< LLD	4.86E-02
Xe-135m	Ci	< LLD	< LLD	< LLD	< LLD
Xe-137	Ci	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD
Total	Ci	**7.92E+00**	**6.49E+00**	**1.78E-01**	**1.46E+01**
2. Iodines					
I-131	Ci	2.34E-05	2.14E-05	< LLD	4.48E-05
I-132	Ci	8.04E-04	4.40E-04	< LLD	1.24E-03
I-133	Ci	4.05E-06	< LLD	< LLD	4.05E-06
I-134	Ci	< LLD	< LLD	< LLD	< LLD
I-135	Ci	< LLD	< LLD	< LLD	< LLD
Total	Ci	**8.32E-04**	**4.61E-04**	**< LLD**	**1.29E-03**

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	1.06E-05	7.91E-05	< LLD	8.97E-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	6.96E-05	6.38E-05	7.77E-06	1.41E-04
Co-60	Ci	2.17E-05	1.47E-05	9.84E-07	3.74E-05
Cr-51	Ci	2.65E-04	7.00E-05	< LLD	3.35E-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	9.69E-07	< LLD	< LLD	9.69E-07
La-140	Ci	< LLD	< LLD	< LLD	< LLD
Mn-54	Ci	5.40E-06	2.00E-06	< LLD	7.40E-06
Mo-99	Ci	< LLD	< LLD	< LLD	< LLD
Nb-95	Ci	2.84E-05	2.95E-06	1.44E-06	3.28E-05
Os-191	Ci	1.71E-05	8.24E-06	1.04E-06	2.64E-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	< 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	< LLD	4.66E-07	7.46E-07	1.21E-06
Sr-90	Ci	3.20E-06	1.04E-06	9.76E-07	5.22E-06
Tc-99m	Ci	< LLD	< LLD	< LLD	< LLD
Te-123m	Ci	3.13E-07	< LLD	< LLD	3.13E-07
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD
Zr-95	Ci	2.16E-05	7.46E-07	< LLD	2.23E-05
Total	Ci	**4.44E-04**	**2.43E-04**	**1.30E-05**	**7.00E-04**
Total > 8 days	Ci	**4.33E-04**	**1.64E-04**	**1.30E-05**	**6.10E-04**
4. Tritium					
H-3	Ci	1.01E+03	9.58E+02	3.47E+02	2.31E+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	3.30E+02	N/A
	Ci	1.62E+01	2.50E+01
1.b. Dry compressible waste, contaminated equipment, etc.	m^3	8.31E+02	N/A
	Ci	2.22E+00	2.50E+01
1.c. Irradiated components, control rods, etc.	m^3	6.50E-01	N/A
	Ci	6.43E+00	2.50E+01
1.d. Other	m^3	N/A	N/A
	Ci	N/A	2.50E+01

2.0 Principal Radionuclides

2.a. Spent resin, filters, sludges evaporator bottoms, etc.			
Waste Class	Nuclide Name	Percent Abundance	Curies
A	Ag-108m	3.08E-06	4.97E-07
A	Ag-110m	4.50E-04	7.27E-05
A	Am-241	3.04E-03	4.92E-04
A	Am-243	1.11E-03	1.79E-04
A	Be-7	9.38E-06	1.52E-06
A	C-14	1.15E+00	1.86E-01
A	Ce-141	2.60E-15	4.20E-16
A	Ce-144	3.08E-02	4.98E-03
A	Cm-242	7.88E-07	1.27E-07
A	Cm-243	2.66E-03	4.29E-04
A	Co-57	9.01E-02	1.46E-02
A	Co-58	3.13E+00	5.06E-01
A	Co-60	9.57E+00	1.55E+00
A	Cr-51	1.06E-01	1.71E-02
A	Cs-134	1.61E-01	2.60E-02
A	Cs-137	7.70E+00	1.24E+00
A	Fe-55	3.02E+01	4.87E+00
A	Fe-59	1.90E-02	3.07E-03
A	H-3	1.94E+00	3.13E-01
A	Hf-181	8.17E-04	1.32E-04
A	I-125	4.52E-16	7.30E-17
A	Mn-54	1.44E+00	2.33E-01
A	Nb-95	8.67E-02	1.40E-02
A	Ni-59	6.36E-01	1.03E-01
A	Ni-63	4.24E+01	6.85E+00
A	Pu-238	1.50E-03	2.42E-04
A	Pu-239	4.83E-04	7.81E-05
A	Pu-241	4.10E-02	6.62E-03
A	Pu-242	2.00E-04	3.23E-05
A	Ru-103	4.26E-18	6.88E-19
A	Sb-124	1.16E-03	1.87E-04
A	Sb-125	8.28E-01	1.34E-01
A	Sn-113	1.56E-02	2.52E-03
A	Sr-85	5.06E-18	8.18E-19
A	Sr-89	1.89E-08	3.06E-09
A	Sr-90	2.33E-01	3.77E-02
A	Tc-99	1.45E-03	2.34E-04
A	Te-123m	1.87E-03	3.02E-04
A	Zn-65	1.19E-02	1.92E-03
A	Zr-95	2.33E-01	3.77E-02
		Total	1.62E+01

2.b. Dry compressible waste, contaminated equip, etc.			
Waste Class	Nuclide Name	Percent Abundance	Curies
A	Am-241	4.94E-04	1.10E-05
A	Am-243	7.37E-05	1.64E-06
A	C-14	1.07E+00	2.38E-02
A	Ce-141	5.80E-19	1.29E-20
A	Ce-144	8.98E-02	2.00E-03
A	Cm-242	4.04E-05	8.99E-07
A	Cm-243	5.91E-05	1.31E-06
A	Co-57	1.38E-01	3.08E-03
A	Co-58	2.53E+01	5.62E-01
A	Co-60	1.36E+01	3.03E-01
A	Cr-51	2.03E+01	4.51E-01
A	Cs-137	1.77E-01	3.93E-03
A	Fe-55	1.92E+01	4.26E-01
A	Fe-59	5.50E-01	1.22E-02
A	H-3	8.79E-02	1.95E-03
A	Hf-181	4.06E-02	9.02E-04
A	Mn-54	2.15E+00	4.78E-02
A	Nb-95	6.27E+00	1.40E-01
A	Ni-59	1.64E-02	3.65E-04
A	Ni-63	5.02E+00	1.12E-01
A	Pu-238	1.79E-04	3.97E-06
A	Pu-239	2.78E-04	6.19E-06
A	Pu-241	1.10E-02	2.46E-04
A	Sb-124	4.86E-02	1.08E-03
A	Sb-125	3.93E-01	8.73E-03
A	Sn-113	1.77E-01	3.94E-03
A	Sr-89	7.16E-08	1.59E-09
A	Sr-90	4.56E-03	1.01E-04
A	Te-123m	4.01E-02	8.92E-04
A	Zn-65	1.34E-01	2.98E-03
A	Zr-95	5.20E+00	1.16E-01
		Total	2.22E+00

2.c. Irradiated components, control rods, etc.			
Waste Class	Nuclide Name	Percent Abundance	Curies
A	Am-241	1.36E-04	8.77E-06
A	C-14	3.88E-02	2.50E-03
A	Ce-144	1.92E-04	1.23E-05
A	Cm-242	4.02E-08	2.59E-09
A	Cm-243	1.25E-05	8.04E-07
A	Co-60	5.72E+01	3.68E+00
A	Cs-137	3.06E-03	1.97E-04
A	Fe-55	3.84E+01	2.47E+00
A	H-3	3.12E-02	2.01E-03
A	I-129	5.77E-05	3.71E-06
A	Nb-94	2.86E-04	1.84E-05
A	Ni-59	5.09E-02	3.27E-03
A	Ni-63	4.23E+00	2.72E-01
A	Pu-238	2.78E-05	1.79E-06
A	Pu-239	1.83E-04	1.18E-05
A	Pu-241	1.14E-03	7.32E-05
A	Sr-90	6.86E-05	4.41E-06
A	Tc-99	2.38E-05	1.53E-06
		Total	6.43E+00

2.d. Other (NONE)

3.0 Solid Waste Disposition

3.a

Number of Shipments	Mode Of Transport	Destination
18	Truck	EnergySolutions, UT Bulk Waste Facility
10	Truck	EnergySolutions, UT Containerized Waste Facility
14	Truck	EnergySolutions, UT Treatment Facility

3.b Irradiated Fuel Shipments: None

3.c Supplemental Information:

Number of Containers	Type of Waste	Container Type	Solidification Agent
57	Liners as Exempt Quantity	Liner	NONE
4	Liners transported as LSA-I	Liner	NONE
4	Casks transported as LSA-II	Cask	NONE
10	Type A transportation casks	Cask	NONE
20	Sea land container as LSA-I	Sealand	NONE
1	Metal box transported as LSA-II	Metal box	NONE
2	Metal boxes transported as SCO-II	Metal box	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 2014. 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 2014 Joint Frequency Distribution (JFD) shows a somewhat typical, but variable year. Of the 8760 hours available, 373 hours of data were lost due to a communication line failure for an effective 95.7% data recovery.

The average 35 foot mean wind speed was 6.4 mph. Distribution of directions was spread over the compass with a predominant direction (3 sectors of 22.5 degrees each) centered on southwest. (32.0%) A secondary maximum of three sectors centered on the north contained 18.8% 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) 58.7%.
Stability class G, (extremely stable) 26.7%.
Stability class A, B, C, (unstable categories) 20.7%.
Stability class D, (neutral category) 20.6%.

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 1/01/2014 TO 3/31/2014

*** 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	0	0
6.51- 8.50	0	0	2	0	0	0	0	0	2	0	0	0	0	1	0	2	7
8.51-11.50	1	0	0	0	0	0	0	0	0	4	4	0	1	0	0	1	11
11.51-14.50	0	0	0	0	0	0	0	0	0	0	3	1	0	3	0	2	9
14.51-20.50	0	0	0	0	0	0	0	0	0	1	8	3	3	1	4	0	20
>20.50	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
TOTAL	1	0	2	0	0	0	0	0	2	5	18	4	4	5	4	5	50

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	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	3
5.51- 6.50	0	0	4	2	0	1	0	1	2	1	0	0	0	0	1	0	12
6.51- 8.50	0	0	1	1	1	0	3	1	3	1	0	0	0	0	0	0	11
8.51-11.50	0	0	0	0	0	0	0	1	2	3	2	1	0	0	0	1	10
11.51-14.50	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
14.51-20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	5	3	2	1	3	3	8	5	2	2	0	0	2	1	38

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	0	0	0
3.51- 4.50	0	0	1	1	0	0	0	1	0	2	0	0	1	1	1	0	8
4.51- 5.50	0	1	1	1	2	0	0	0	4	1	1	2	0	0	0	1	14
5.51- 6.50	0	1	3	0	1	0	1	1	9	3	3	1	1	0	0	1	25
6.51- 8.50	0	1	3	0	0	0	2	3	3	2	0	0	0	0	0	0	14
8.51-11.50	0	0	1	1	1	0	0	0	0	1	0	3	0	0	0	0	7
11.51-14.50	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
14.51-20.50	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	3	9	3	4	0	3	5	17	9	5	6	3	1	1	2	71

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2014 TO 3/31/2014

*** 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	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	3
1.51- 2.50	2	0	0	2	0	2	0	1	6	6	3	1	4	0	1	2	30
2.51- 3.50	5	4	4	3	2	3	4	2	14	19	17	13	9	9	3	7	118
3.51- 4.50	2	6	6	11	3	2	4	4	17	29	16	5	1	3	4	5	118
4.51- 5.50	0	5	12	1	4	1	0	3	11	15	13	10	1	0	1	1	78
5.51- 6.50	2	2	3	1	0	1	1	3	15	9	7	2	3	1	0	0	50
6.51- 8.50	0	4	3	4	2	3	4	0	5	4	10	4	2	1	1	0	47
8.51-11.50	0	0	0	3	5	0	3	0	1	1	6	2	3	1	0	1	26
11.51-14.50	0	0	0	0	2	0	0	0	0	1	4	1	2	2	0	0	12
14.51-20.50	0	0	0	0	4	0	0	0	2	4	2	3	1	2	1	0	19
>20.50	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
TOTAL	11	22	28	25	22	12	16	13	71	89	79	41	27	19	11	16	502

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	1	0	0	0	0	0	1	0	0	0	2
1.51- 2.50	2	2	2	0	0	2	0	2	1	2	4	6	4	4	4	2	37
2.51- 3.50	4	2	1	1	1	0	1	3	1	1	4	3	8	6	3	2	41
3.51- 4.50	3	1	0	0	0	1	0	1	1	9	1	1	3	3	0	0	24
4.51- 5.50	2	1	3	1	0	0	0	0	0	8	4	5	1	0	0	1	26
5.51- 6.50	1	0	0	1	0	1	0	1	2	3	6	8	1	0	1	0	25
6.51- 8.50	0	0	0	0	0	1	0	1	0	5	2	4	6	2	3	0	24
8.51-11.50	0	0	0	0	1	1	1	0	2	7	2	2	4	6	2	0	28
11.51-14.50	0	0	0	2	2	0	0	0	1	1	4	3	0	4	2	0	19
14.51-20.50	0	0	0	1	2	0	0	0	1	1	0	1	1	2	1	0	10
>20.50	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
TOTAL	12	6	6	7	7	6	3	8	9	37	27	33	29	27	16	5	238

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	1	0	0	0	0	0	1	1	0	0	0	3
1.51- 2.50	3	1	0	1	2	0	0	0	2	1	1	1	6	6	2	2	28
2.51- 3.50	5	3	3	3	0	0	0	1	0	2	3	5	5	7	9	5	51
3.51- 4.50	4	4	0	1	0	0	2	0	2	0	4	5	5	7	11	6	51
4.51- 5.50	1	0	0	0	0	0	0	0	1	2	1	2	2	2	7	3	21
5.51- 6.50	1	1	1	1	0	0	0	1	2	0	6	1	3	4	2	1	24
6.51- 8.50	1	0	1	0	0	0	0	0	0	1	7	6	4	5	2	2	29
8.51-11.50	0	0	1	0	0	0	0	0	0	7	9	2	0	0	2	0	21
11.51-14.50	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	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	15	9	6	7	2	1	2	2	7	13	31	23	26	31	36	19	230

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2014 TO 3/31/2014

*** 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	1	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	5
1.51- 2.50	13	4	0	0	0	0	1	1	0	1	2	6	6	5	13	13	65
2.51- 3.50	42	15	2	0	1	1	1	0	3	1	1	2	9	16	40	50	184
3.51- 4.50	66	27	4	0	0	0	1	1	0	2	3	6	7	13	47	67	244
4.51- 5.50	69	14	2	0	0	0	0	0	1	0	3	4	2	4	12	45	156
5.51- 6.50	55	12	1	1	0	0	0	0	0	1	2	0	2	2	9	18	103
6.51- 8.50	21	13	1	0	0	0	0	0	0	1	0	0	0	0	2	7	45
8.51-11.50	3	2	1	0	0	0	0	0	0	1	1	0	0	0	0	4	12
11.51-14.50	1	0	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	271	87	11	1	1	1	3	2	4	7	12	18	27	42	124	204	815

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	1	1	0	0	0	1	1	0	0	1	0	1	4	2	1	0	13
1.51- 2.50	20	7	2	3	2	4	1	4	9	10	10	14	20	15	20	19	160
2.51- 3.50	56	24	10	7	4	4	6	6	18	23	25	23	31	38	55	64	394
3.51- 4.50	75	38	11	13	3	3	7	7	20	42	24	17	17	27	63	78	445
4.51- 5.50	72	22	18	3	7	1	0	3	18	26	22	23	6	6	20	51	298
5.51- 6.50	59	16	12	6	1	3	2	7	30	17	24	12	10	7	13	20	239
6.51- 8.50	22	18	11	5	3	4	9	5	13	14	19	14	12	9	8	11	177
8.51-11.50	4	2	3	4	7	1	4	1	5	24	24	10	8	7	4	7	115
11.51-14.50	1	0	0	3	4	0	0	0	2	2	11	6	2	9	3	2	45
14.51-20.50	0	0	0	1	6	0	0	0	3	6	11	7	6	5	7	0	52
>20.50	0	0	0	1	1	0	0	0	0	0	4	0	0	0	0	0	6
TOTAL	310	128	67	46	38	21	30	33	118	165	174	127	116	125	194	252	1944

TOTAL NUMBER OF OBSERVATIONS: 2160
TOTAL NUMBER OF VALID OBSERVATIONS: 1944
TOTAL NUMBER OF MISSING OBSERVATIONS: 216
PERCENT DATA RECOVERY FOR THIS PERIOD: 90.0 %
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
2.57	1.95	3.65	25.82	12.24	11.83	41.92

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	2	0	0	0	0	0	2	5	18	4	4	5	4	5	0
B	0	1	5	3	2	1	3	3	8	5	2	2	0	0	2	1	0
C	0	3	9	3	4	0	3	5	17	9	5	6	3	1	1	2	0
D	11	22	28	25	22	12	16	13	71	89	79	41	27	19	11	16	0
E	12	6	6	7	7	6	3	8	9	37	27	33	29	27	16	5	0
F	15	9	6	7	2	1	2	2	7	13	31	23	26	31	36	19	0
G	271	87	11	1	1	1	3	2	4	7	12	18	27	42	124	204	0
TOTAL	310	128	67	46	38	21	30	33	118	165	174	127	116	125	194	252	0

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 4/01/2014 TO 6/30/2014

*** 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	1	0	1
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	1	1	0	0	2
5.51- 6.50	0	0	0	0	1	1	0	3	3	5	2	0	0	0	0	0	15
6.51- 8.50	0	0	3	1	2	2	1	9	10	17	19	11	1	3	0	0	79
8.51-11.50	1	0	4	5	4	0	0	0	12	40	33	12	4	2	0	0	117
11.51-14.50	0	2	4	4	0	0	1	0	2	15	47	12	8	1	6	2	104
14.51-20.50	0	6	13	1	1	0	0	1	1	11	45	7	4	6	0	1	97
>20.50	0	0	1	0	0	0	0	0	0	0	0	4	0	0	0	0	5
TOTAL	1	8	25	11	8	3	2	13	28	88	146	46	18	13	7	3	423

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	1	0	0	0	0	0	1
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	0	0	0	0	0	0	1
4.51- 5.50	1	1	0	0	1	0	0	1	3	1	1	1	0	0	0	1	11
5.51- 6.50	0	1	2	0	2	3	0	7	18	3	6	3	1	2	1	0	49
6.51- 8.50	0	0	1	3	3	4	1	6	9	9	15	3	0	0	0	0	54
8.51-11.50	0	1	1	0	0	0	0	0	1	6	9	2	2	1	0	0	23
11.51-14.50	0	0	0	1	0	0	0	1	0	3	3	0	0	0	1	0	9
14.51-20.50	1	0	3	1	2	0	0	0	0	0	5	1	0	1	0	0	14
>20.50	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	2	3	7	6	8	7	2	15	31	22	40	10	3	4	2	1	164

STABILITY CLASS C

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
.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	1	0	0	0	0	2	1	1	0	0	0	0	0	1	0	6
4.51- 5.50	1	0	0	1	4	0	0	5	12	6	1	2	2	0	1	0	35
5.51- 6.50	0	2	0	1	0	0	1	7	17	5	5	2	1	0	0	0	41
6.51- 8.50	0	0	0	0	1	4	2	1	4	4	5	2	1	0	0	0	24
8.51-11.50	0	0	0	0	0	1	1	0	1	1	6	1	2	0	0	0	13
11.51-14.50	0	0	0	0	0	0	0	1	0	0	2	1	0	0	0	0	4
14.51-20.50	0	0	1	1	0	1	0	0	0	1	6	0	0	0	0	0	10
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	3	1	3	5	6	6	15	35	17	25	8	6	0	2	0	135

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 4/01/2014 TO 6/30/2014

*** 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																	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	1	0	0	1	0	0	0	0	2	1	0	1	2	8
2.51- 3.50	1	0	2	4	3	5	2	2	6	2	4	1	4	1	2	0	39
3.51- 4.50	0	2	2	0	3	1	1	3	20	5	1	3	2	3	0	1	47
4.51- 5.50	0	2	1	0	3	1	1	3	5	4	4	1	1	1	0	0	27
5.51- 6.50	0	1	1	0	0	0	0	5	8	3	8	1	0	0	0	0	27
6.51- 8.50	0	0	1	1	2	1	2	0	1	14	5	2	3	0	0	0	32
8.51-11.50	0	2	1	0	1	3	0	0	0	2	14	4	3	0	3	2	35
11.51-14.50	1	1	2	1	0	0	0	0	1	6	9	4	2	2	2	1	32
14.51-20.50	0	1	0	0	3	0	0	0	2	1	12	6	1	2	0	0	28
>20.50	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2
TOTAL	2	10	10	7	15	11	7	13	43	37	57	25	17	9	8	6	278

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	1	0	0	1	0	0	0	0	0	0	0	1	0	0	3
1.51- 2.50	2	1	0	0	0	1	1	0	1	0	1	0	2	1	1	1	12
2.51- 3.50	6	3	0	0	0	0	0	0	0	4	2	0	5	0	5	6	31
3.51- 4.50	1	2	1	1	0	0	0	0	4	2	6	6	2	1	1	1	28
4.51- 5.50	1	1	0	0	0	0	0	2	1	3	3	2	3	1	1	0	18
5.51- 6.50	0	0	1	1	0	0	0	1	2	5	1	2	1	2	0	0	16
6.51- 8.50	0	1	1	0	0	0	0	0	3	16	12	12	4	2	3	1	55
8.51-11.50	1	2	2	0	0	1	0	0	1	25	34	28	12	1	2	3	112
11.51-14.50	3	7	1	0	0	0	0	0	2	19	20	10	3	5	3	3	76
14.51-20.50	3	4	2	0	1	0	0	0	0	8	5	1	2	3	0	0	29
>20.50	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4
TOTAL	17	24	10	2	1	3	1	3	14	82	84	61	34	17	16	15	384

STABILITY CLASS F

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	4	0	1	0	0	0	0	0	2	0	3	2	0	3	3	1	19
2.51- 3.50	8	0	0	0	0	0	0	0	1	2	11	10	9	8	3	5	57
3.51- 4.50	3	2	4	0	0	0	0	0	3	5	11	7	6	3	6	6	56
4.51- 5.50	3	0	0	1	0	0	1	0	1	9	16	5	1	6	1	1	45
5.51- 6.50	2	1	1	0	0	0	0	0	1	13	15	7	2	1	0	0	43
6.51- 8.50	2	0	3	0	1	0	0	0	2	17	28	15	9	1	0	0	78
8.51-11.50	6	9	0	0	0	0	0	0	1	22	28	13	3	0	0	3	85
11.51-14.50	1	3	0	0	0	0	0	0	0	1	2	0	0	0	1	1	9
14.51-20.50	0	0	0	0	0	0	0	0	0	0	1	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	29	15	9	1	1	0	1	0	11	69	115	59	30	22	14	17	395

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 4/01/2014 TO 6/30/2014

*** 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																	2
.76- 1.50	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2
1.51- 2.50	2	1	2	1	0	0	0	1	1	1	0	2	0	1	4	3	19
2.51- 3.50	18	3	3	1	1	0	0	1	1	1	4	5	1	11	9	11	70
3.51- 4.50	34	16	3	1	0	0	0	0	0	3	2	3	4	7	8	20	101
4.51- 5.50	30	14	4	1	0	0	0	0	0	0	5	2	3	0	4	8	71
5.51- 6.50	10	3	1	0	0	0	0	0	1	4	6	3	2	2	0	3	35
6.51- 8.50	5	6	1	0	0	0	0	0	0	6	6	2	0	0	0	3	29
8.51-11.50	1	5	1	0	0	0	0	0	0	4	3	0	0	0	0	2	16
11.51-14.50	0	1	0	0	0	0	0	0	0	1	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	100	49	15	4	1	0	1	2	3	20	26	17	10	21	25	51	347

STABILITY CLASS ALL

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	11
.76- 1.50	0	0	1	0	0	1	1	0	0	0	0	0	0	1	0	1	5
1.51- 2.50	8	2	3	2	0	1	2	1	4	1	5	6	3	5	10	7	60
2.51- 3.50	33	6	5	5	4	5	2	3	8	9	21	16	19	20	19	22	197
3.51- 4.50	38	23	10	2	3	1	4	4	28	15	20	19	14	14	16	28	239
4.51- 5.50	36	18	5	3	8	1	2	11	22	23	30	13	11	9	7	10	209
5.51- 6.50	12	8	6	2	3	4	1	23	50	38	43	18	7	7	1	3	226
6.51- 8.50	7	7	10	5	9	11	6	16	29	83	90	47	18	6	3	4	351
8.51-11.50	9	19	9	5	5	5	1	0	16	100	127	60	26	4	5	10	401
11.51-14.50	5	14	7	6	0	0	1	2	5	45	83	27	13	8	13	7	236
14.51-20.50	4	11	19	3	7	1	0	1	3	21	74	15	7	12	0	1	179
>20.50	0	4	2	1	0	0	0	0	0	0	0	5	0	0	0	0	12
TOTAL	152	112	77	34	39	30	20	61	165	335	493	226	118	86	74	93	2126

TOTAL NUMBER OF OBSERVATIONS: 2184
TOTAL NUMBER OF VALID OBSERVATIONS: 2126
TOTAL NUMBER OF MISSING OBSERVATIONS: 58
PERCENT DATA RECOVERY FOR THIS PERIOD: 97.3 %
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
19.90	7.71	6.35	13.08	18.06	18.58	16.32

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	8	25	11	8	3	2	13	28	88	146	46	18	13	7	3	3
B	2	3	7	6	8	7	2	15	31	22	40	10	3	4	2	1	1
C	1	3	1	3	5	6	6	15	35	17	25	8	6	0	2	0	2
D	2	10	10	7	15	11	7	13	43	37	57	25	17	9	8	6	1
E	17	24	10	2	1	3	1	3	14	82	84	61	34	17	16	15	0
F	29	15	9	1	1	0	1	0	11	69	115	59	30	22	14	17	2
G	100	49	15	4	1	0	1	2	3	20	26	17	10	21	25	51	2
TOTAL	152	112	77	34	39	30	20	61	165	335	493	226	118	86	74	93	11

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2014 TO 6/30/2014

*** 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	1	0	1
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	1	1	0	0	2
5.51- 6.50	0	0	0	0	1	1	0	3	3	5	2	0	0	0	0	0	15
6.51- 8.50	0	0	5	1	2	2	1	9	12	17	19	11	1	4	0	2	86
8.51-11.50	2	0	4	5	4	0	0	0	12	44	37	12	5	2	0	1	128
11.51-14.50	0	2	4	4	0	0	1	0	2	15	50	13	8	4	6	4	113
14.51-20.50	0	6	13	1	1	0	0	1	1	12	53	10	7	7	4	1	117
>20.50	0	0	1	0	0	0	0	0	0	0	3	4	0	0	0	0	8
TOTAL	2	8	27	11	8	3	2	13	30	93	164	50	22	18	11	8	473

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	1	0	0	0	0	0	1
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	0	0	0	0	0	0	1
4.51- 5.50	1	2	0	0	2	0	0	1	4	1	1	1	0	0	0	1	14
5.51- 6.50	0	1	6	2	2	4	0	8	20	4	6	3	1	2	2	0	61
6.51- 8.50	0	0	2	4	4	4	4	7	12	10	15	3	0	0	0	0	65
8.51-11.50	0	1	1	0	0	0	0	1	3	9	11	3	2	1	0	1	33
11.51-14.50	0	0	0	1	0	0	0	1	0	3	3	1	0	0	1	0	10
14.51-20.50	1	0	3	1	2	0	0	0	0	0	5	1	0	1	1	0	15
>20.50	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	2	4	12	9	10	8	5	18	39	27	42	12	3	4	4	2	202

STABILITY CLASS C

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
.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	1	1	1	0	0	2	2	1	2	0	0	1	1	2	0	14
4.51- 5.50	1	1	1	2	6	0	0	5	16	7	2	4	2	0	1	1	49
5.51- 6.50	0	3	3	1	1	0	2	8	26	8	8	3	2	0	0	1	66
6.51- 8.50	0	1	3	0	1	4	4	4	7	6	5	2	1	0	0	0	38
8.51-11.50	0	0	1	1	1	1	1	0	1	2	6	4	2	0	0	0	20
11.51-14.50	0	0	0	0	0	0	0	1	1	0	2	1	0	0	0	0	5
14.51-20.50	0	0	1	1	0	1	0	0	0	1	7	0	1	0	0	0	12
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	6	10	6	9	6	9	20	52	26	30	14	9	1	3	2	206

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2014 TO 6/30/2014

*** 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																	1
.76- 1.50	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	3
1.51- 2.50	2	0	0	3	0	2	1	1	6	6	3	3	5	0	2	4	38
2.51- 3.50	6	4	6	7	5	8	6	4	20	21	21	14	13	10	5	7	157
3.51- 4.50	2	8	8	11	6	3	5	7	37	34	17	8	3	6	4	6	165
4.51- 5.50	0	7	13	1	7	2	1	6	16	19	17	11	2	1	1	1	105
5.51- 6.50	2	3	4	1	0	1	1	8	23	12	15	3	3	1	0	0	77
6.51- 8.50	0	4	4	5	4	4	6	0	6	18	15	6	5	1	1	0	79
8.51-11.50	0	2	1	3	6	3	3	0	1	3	20	6	6	1	3	3	61
11.51-14.50	1	1	2	1	2	0	0	0	1	7	13	5	4	4	2	1	44
14.51-20.50	0	1	0	0	7	0	0	0	4	5	14	9	2	4	1	0	47
>20.50	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	3
TOTAL	13	32	38	32	37	23	23	26	114	126	136	66	44	28	19	22	780

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	1	0	0	1	1	0	0	0	0	0	1	1	0	0	5
1.51- 2.50	4	3	2	0	0	3	1	2	2	2	5	6	6	5	5	3	49
2.51- 3.50	10	5	1	1	1	0	1	3	1	5	6	3	13	6	8	8	72
3.51- 4.50	4	3	1	1	0	1	0	1	5	11	7	7	5	4	1	1	52
4.51- 5.50	3	2	3	1	0	0	0	2	1	11	7	7	4	1	1	1	44
5.51- 6.50	1	0	1	2	0	1	0	2	4	8	7	10	2	2	1	0	41
6.51- 8.50	0	1	1	0	0	1	0	1	3	21	14	16	10	4	6	1	79
8.51-11.50	1	2	2	0	1	2	1	0	3	32	36	30	16	7	4	3	140
11.51-14.50	3	7	1	2	2	0	0	0	3	20	24	13	3	9	5	3	95
14.51-20.50	3	4	2	1	3	0	0	0	1	9	5	2	3	5	1	0	39
>20.50	0	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	6
TOTAL	29	30	16	9	8	9	4	11	23	119	111	94	63	44	32	20	622

STABILITY CLASS F

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
.76- 1.50	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	3
1.51- 2.50	7	1	1	1	2	0	0	0	4	1	4	3	6	9	5	3	47
2.51- 3.50	13	3	3	3	0	0	0	1	1	4	14	15	14	15	12	10	108
3.51- 4.50	7	6	4	1	0	0	2	0	5	5	15	12	11	10	17	12	107
4.51- 5.50	4	0	0	1	0	0	1	0	2	11	17	7	3	8	8	4	66
5.51- 6.50	3	2	2	1	0	0	0	1	3	13	21	8	5	5	2	1	67
6.51- 8.50	3	0	4	0	1	0	0	0	2	18	35	21	13	6	2	2	107
8.51-11.50	6	9	1	0	0	0	0	0	1	29	37	15	3	0	2	3	106
11.51-14.50	1	3	0	1	0	0	0	0	0	1	2	0	0	0	2	1	11
14.51-20.50	0	0	0	0	0	0	0	0	0	0	1	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	44	24	15	8	3	1	3	2	18	82	146	82	56	53	50	36	625

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2014 TO 6/30/2014

*** 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																	2
.76- 1.50	1	0	0	0	0	0	1	0	0	0	0	0	1	2	1	1	7
1.51- 2.50	15	5	2	1	0	0	1	2	1	2	2	8	6	6	17	16	84
2.51- 3.50	60	18	5	1	2	1	1	1	4	2	5	7	10	27	49	61	254
3.51- 4.50	100	43	7	1	0	0	1	1	0	5	5	9	11	20	55	87	345
4.51- 5.50	99	28	6	1	0	0	0	0	1	0	8	6	5	4	16	53	227
5.51- 6.50	65	15	2	1	0	0	0	0	1	5	8	3	4	4	9	21	138
6.51- 8.50	26	19	2	0	0	0	0	0	0	7	6	2	0	0	2	10	74
8.51-11.50	4	7	2	0	0	0	0	0	0	5	4	0	0	0	0	6	28
11.51-14.50	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3
14.51-20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	371	136	26	5	2	1	4	4	7	27	38	35	37	63	149	255	1162

STABILITY CLASS ALL

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	11
.76- 1.50	1	1	1	0	0	2	2	0	0	1	0	1	4	3	1	1	18
1.51- 2.50	28	9	5	5	2	5	3	5	13	11	15	20	23	20	30	26	220
2.51- 3.50	89	30	15	12	8	9	8	9	26	32	46	39	50	58	74	86	591
3.51- 4.50	113	61	21	15	6	4	11	11	48	57	44	36	31	41	79	106	684
4.51- 5.50	108	40	23	6	15	2	2	14	40	49	52	36	17	15	27	61	507
5.51- 6.50	71	24	18	8	4	7	3	30	80	55	67	30	17	14	14	23	465
6.51- 8.50	29	25	21	10	12	15	15	21	42	97	109	61	30	15	11	15	528
8.51-11.50	13	21	12	9	12	6	5	1	21	124	151	70	34	11	9	17	516
11.51-14.50	6	14	7	9	4	0	1	2	7	47	94	33	15	17	16	9	281
14.51-20.50	4	11	19	4	13	1	0	1	6	27	85	22	13	17	7	1	231
>20.50	0	4	2	2	1	0	0	0	0	0	4	5	0	0	0	0	18
TOTAL	462	240	144	80	77	51	50	94	283	500	667	353	234	211	268	345	4070

TOTAL NUMBER OF OBSERVATIONS: 4344
TOTAL NUMBER OF VALID OBSERVATIONS: 4070
TOTAL NUMBER OF MISSING OBSERVATIONS: 274
PERCENT DATA RECOVERY FOR THIS PERIOD: 93.7 %
MEAN WIND SPEED FOR THIS PERIOD: 6.7 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
11.62	4.96	5.06	19.16	15.28	15.36	28.55

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	2	8	27	11	8	3	2	13	30	93	164	50	22	18	11	8	3
B	2	4	12	9	10	8	5	18	39	27	42	12	3	4	4	2	1
C	1	6	10	6	9	6	9	20	52	26	30	14	9	1	3	2	2
D	13	32	38	32	37	23	23	26	114	126	136	66	44	28	19	22	1
E	29	30	16	9	8	9	4	11	23	119	111	94	63	44	32	20	0
F	44	24	15	8	3	1	3	2	18	82	146	82	56	53	50	36	2
G	371	136	26	5	2	1	4	4	7	27	38	35	37	63	149	255	2
TOTAL	462	240	144	80	77	51	50	94	283	500	667	353	234	211	268	345	11

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2014 TO 9/30/2014

*** 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	0	0	0	0	0
4.51- 5.50	0	0	0	0	0	0	1	0	1	2	1	0	1	1	0	0	7
5.51- 6.50	0	0	1	0	0	0	1	0	4	4	6	1	2	1	0	1	21
6.51- 8.50	0	0	2	0	5	3	2	6	15	12	17	18	7	2	0	3	92
8.51-11.50	0	0	0	3	2	3	3	5	4	14	24	24	1	2	0	0	85
11.51-14.50	0	1	1	1	3	0	1	0	0	3	6	2	0	0	0	0	18
14.51-20.50	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	4
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
TOTAL	0	1	4	4	10	6	8	11	24	38	55	45	11	6	0	5	228

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	1	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	5
4.51- 5.50	0	1	0	0	0	0	0	3	4	3	3	4	0	1	1	0	20
5.51- 6.50	1	0	0	0	2	2	2	9	10	10	6	1	1	0	2	1	47
6.51- 8.50	0	0	3	2	3	2	5	10	14	8	5	8	5	0	0	0	65
8.51-11.50	0	0	2	0	3	2	1	1	2	4	11	3	1	0	0	0	30
11.51-14.50	0	1	0	1	3	0	0	0	1	1	0	0	0	0	0	0	7
14.51-20.50	0	0	0	0	3	0	0	1	0	1	0	0	0	0	0	0	5
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	2	5	3	14	6	8	24	31	27	26	17	9	1	3	1	179

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	0	0	0
3.51- 4.50	1	1	2	0	0	0	0	2	2	1	1	4	1	0	0	1	16
4.51- 5.50	0	3	1	0	0	1	2	1	8	8	8	3	0	0	0	1	36
5.51- 6.50	0	0	1	0	2	1	1	4	21	5	6	1	0	0	2	0	44
6.51- 8.50	1	0	0	1	5	7	6	5	14	4	12	4	1	0	0	0	60
8.51-11.50	0	0	0	5	4	3	0	0	2	2	3	1	0	1	0	0	21
11.51-14.50	0	0	0	1	4	0	0	1	0	3	1	0	0	0	0	0	10
14.51-20.50	0	0	0	0	2	0	0	0	0	0	1	1	0	0	0	0	4
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	4	4	7	17	12	9	13	47	23	32	14	2	1	2	2	191

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2014 TO 9/30/2014

*** 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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1.51- 2.50	0	0	0	1	1	1	0	0	0	0	1	2	2	2	1	1	12
2.51- 3.50	0	3	2	0	1	0	1	2	2	1	2	0	4	3	2	2	25
3.51- 4.50	8	3	3	1	0	2	1	6	9	7	3	4	1	7	2	3	60
4.51- 5.50	5	2	2	1	1	1	0	2	6	22	8	5	0	0	1	0	56
5.51- 6.50	5	4	4	2	2	3	0	4	8	8	16	1	1	0	0	3	61
6.51- 8.50	3	5	9	4	2	2	4	1	7	9	17	8	3	4	1	0	79
8.51-11.50	1	4	6	10	11	4	4	4	2	7	26	8	5	1	0	0	93
11.51-14.50	1	1	1	8	5	2	3	3	3	5	8	0	0	0	2	0	42
14.51-20.50	2	2	1	3	5	1	1	0	3	3	3	1	0	0	1	1	27
>20.50	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	1	5
TOTAL	25	24	29	30	28	17	14	23	41	63	84	29	16	17	10	11	461

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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1.51- 2.50	3	3	1	0	0	0	0	0	1	0	1	2	3	0	2	4	20
2.51- 3.50	5	4	2	0	0	1	0	1	1	1	4	4	3	4	6	9	45
3.51- 4.50	5	4	2	0	2	1	3	1	3	4	7	8	3	2	5	5	55
4.51- 5.50	6	4	7	2	0	1	2	2	4	11	17	7	2	2	2	7	76
5.51- 6.50	2	4	1	5	1	0	0	2	6	16	21	3	4	0	0	2	67
6.51- 8.50	4	4	3	4	3	2	6	4	2	22	22	15	3	2	3	2	101
8.51-11.50	1	5	6	12	8	7	5	5	3	11	33	17	0	1	0	2	116
11.51-14.50	1	1	2	6	7	0	3	4	0	4	15	3	1	0	0	0	47
14.51-20.50	0	0	3	1	11	2	1	0	1	1	3	1	1	0	0	1	26
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	28	29	27	30	32	14	20	19	21	70	123	60	20	11	18	32	554

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	2	0	0	0	1	0	0	0	1	2	0	4	3	3	0	1	17
2.51- 3.50	8	1	2	0	0	1	0	0	1	2	1	5	4	6	8	11	50
3.51- 4.50	8	4	2	1	0	1	0	1	2	4	2	7	5	3	3	9	52
4.51- 5.50	4	5	0	1	1	0	1	1	1	2	9	3	2	2	3	5	40
5.51- 6.50	4	4	2	1	0	0	0	2	4	16	2	2	2	1	2	5	47
6.51- 8.50	5	3	10	0	0	1	0	2	0	7	13	11	0	1	0	3	56
8.51-11.50	0	1	4	2	0	0	0	1	0	0	8	0	0	0	0	0	16
11.51-14.50	1	0	0	2	0	0	0	0	1	2	0	0	0	0	0	1	7
14.51-20.50	0	0	0	0	0	0	1	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	32	18	20	7	2	3	2	7	10	35	35	32	16	16	16	35	286

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2014 TO 9/30/2014

*** 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	1	0	0	0	0	1	0	0	0	0	0	2	1	4	0	0	9
2.51- 3.50	9	3	1	1	0	0	0	0	0	1	2	2	0	3	5	8	35
3.51- 4.50	25	5	0	1	1	1	0	0	0	0	1	2	4	5	6	12	63
4.51- 5.50	24	4	1	0	0	0	0	0	0	4	1	1	0	1	3	11	50
5.51- 6.50	13	10	1	0	0	0	0	0	0	0	2	0	0	0	1	2	29
6.51- 8.50	4	9	1	0	0	0	0	0	0	1	2	0	0	0	2	3	22
8.51-11.50	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
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	1	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	76	32	4	2	1	2	0	0	1	6	8	7	5	13	17	36	210

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	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1.51- 2.50	6	3	1	1	2	2	0	0	2	2	2	10	9	9	3	6	58
2.51- 3.50	22	11	7	1	1	2	1	3	4	5	9	11	11	16	21	30	155
3.51- 4.50	48	17	9	3	3	5	4	10	16	16	15	26	16	17	16	30	251
4.51- 5.50	39	19	11	4	2	3	6	9	24	52	47	23	5	7	10	24	285
5.51- 6.50	25	22	10	8	7	6	4	21	53	59	59	9	10	2	7	14	316
6.51- 8.50	17	21	28	11	18	17	23	28	52	63	88	64	19	9	6	11	475
8.51-11.50	2	11	18	32	28	19	13	16	13	38	105	53	7	5	0	2	362
11.51-14.50	3	4	4	19	22	2	7	8	5	18	30	5	1	0	2	1	131
14.51-20.50	2	2	4	4	21	3	3	1	5	8	8	3	1	0	1	2	68
>20.50	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	2	6
TOTAL	165	110	93	83	104	60	61	97	175	262	363	204	79	65	66	122	2109

TOTAL NUMBER OF OBSERVATIONS: 2208
TOTAL NUMBER OF VALID OBSERVATIONS: 2109
TOTAL NUMBER OF MISSING OBSERVATIONS: 99
PERCENT DATA RECOVERY FOR THIS PERIOD: 95.5 %
MEAN WIND SPEED FOR THIS PERIOD: 7.1 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
10.81	8.49	9.06	21.86	26.27	13.56	9.96

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	1	4	4	10	6	8	11	24	38	55	45	11	6	0	5	0
B	2	2	5	3	14	6	8	24	31	27	26	17	9	1	3	1	0
C	2	4	4	7	17	12	9	13	47	23	32	14	2	1	2	2	0
D	25	24	29	30	28	17	14	23	41	63	84	29	16	17	10	11	0
E	28	29	27	30	32	14	20	19	21	70	123	60	20	11	18	32	0
F	32	18	20	7	2	3	2	7	10	35	35	32	16	16	16	35	0
G	76	32	4	2	1	2	0	0	1	6	8	7	5	13	17	36	0
TOTAL	165	110	93	83	104	60	61	97	175	262	363	204	79	65	66	122	0

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 10/01/2014 TO 12/31/2014

*** 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	0	0	0	0	0
3.51- 4.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4.51- 5.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.51- 6.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.51- 8.50	0	1	0	0	0	0	0	0	0	0	1	1	1	0	1	0	5
8.51-11.50	0	1	0	2	2	0	0	0	0	0	1	3	2	1	0	4	16
11.51-14.50	1	0	2	1	1	0	0	0	0	1	0	0	1	0	0	2	9
14.51-20.50	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	4
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
TOTAL	1	2	2	5	3	0	0	0	0	1	2	4	4	1	1	10	36

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	1	0	1
4.51- 5.50	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	3
5.51- 6.50	0	0	0	1	1	0	0	0	0	1	1	2	0	0	0	1	7
6.51- 8.50	0	0	3	8	2	0	1	1	0	4	8	1	1	0	1	0	30
8.51-11.50	0	0	1	5	6	0	0	0	0	0	1	0	0	0	0	0	13
11.51-14.50	0	0	3	4	2	0	0	0	0	1	0	0	1	0	0	0	11
14.51-20.50	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	4
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	0	7	20	12	0	1	1	1	6	10	3	2	0	2	3	69

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	1	0	0	0	1	0	0	1	3
3.51- 4.50	0	1	3	1	1	0	1	1	1	0	2	1	0	1	0	0	13
4.51- 5.50	1	1	3	2	1	1	1	4	6	4	4	1	0	0	0	1	30
5.51- 6.50	1	1	6	3	6	0	2	4	5	5	3	0	1	0	0	1	38
6.51- 8.50	0	3	5	12	6	4	0	1	2	1	3	0	1	0	0	1	39
8.51-11.50	0	2	1	2	3	4	0	0	1	2	3	0	0	0	1	0	19
11.51-14.50	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	4
14.51-20.50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	10	18	21	18	9	4	10	16	12	15	2	4	1	1	5	148

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 10/01/2014 TO 12/31/2014

*** 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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1.51- 2.50	7	0	5	1	2	0	0	4	2	4	5	3	4	3	4	2	46
2.51- 3.50	5	6	5	3	0	2	7	9	14	12	8	8	5	2	3	3	92
3.51- 4.50	6	2	9	9	11	4	2	1	22	17	8	5	3	0	6	5	110
4.51- 5.50	1	9	11	8	4	2	0	8	13	8	6	8	0	0	2	4	84
5.51- 6.50	3	3	4	6	2	2	0	1	2	9	3	1	1	1	0	6	44
6.51- 8.50	0	8	7	7	4	1	0	1	1	6	2	1	4	2	2	1	47
8.51-11.50	1	3	2	9	4	2	2	0	0	5	5	1	5	6	1	0	46
11.51-14.50	0	1	0	1	3	0	0	0	0	0	1	0	0	5	1	1	13
14.51-20.50	1	0	0	0	0	1	0	0	0	0	0	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	25	32	43	44	30	14	11	24	54	61	38	27	22	21	19	23	488

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	1	0	0	1	1	0	0	3	0	0	6
1.51- 2.50	3	1	2	0	2	0	1	2	1	1	1	6	6	5	5	1	37
2.51- 3.50	6	2	5	0	1	2	1	3	3	3	2	1	2	3	5	8	47
3.51- 4.50	4	5	3	0	0	1	1	3	3	2	3	4	1	3	6	4	43
4.51- 5.50	2	1	4	3	0	0	0	3	6	1	9	2	1	2	2	6	42
5.51- 6.50	1	1	2	1	1	0	0	3	3	8	3	3	2	3	1	1	33
6.51- 8.50	3	2	5	2	1	2	1	2	3	3	3	1	0	5	2	3	38
8.51-11.50	0	1	2	3	4	0	1	4	0	1	6	1	3	9	5	0	40
11.51-14.50	0	0	1	1	1	2	0	0	0	0	1	0	0	5	1	0	12
14.51-20.50	0	0	0	0	1	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	19	13	24	10	11	7	6	20	19	20	29	18	15	38	27	23	299

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	1	0	0	0	0	0	0	0	0	2	0	0	0	3
1.51- 2.50	1	2	1	1	0	0	1	0	1	1	2	2	6	4	7	9	38
2.51- 3.50	4	3	2	3	0	1	0	0	1	2	2	7	9	10	11	9	64
3.51- 4.50	8	10	1	1	0	0	0	0	0	1	4	3	6	5	8	8	55
4.51- 5.50	6	3	3	1	0	0	1	2	1	1	7	2	1	2	5	8	43
5.51- 6.50	3	1	1	0	0	0	0	1	4	0	4	2	1	3	3	1	24
6.51- 8.50	5	3	0	0	1	0	0	2	0	6	6	0	1	3	10	8	45
8.51-11.50	1	5	1	1	0	0	0	0	0	1	4	0	2	0	3	2	20
11.51-14.50	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	4
14.51-20.50	0	0	0	0	2	0	0	0	0	0	0	0	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	29	28	9	9	3	1	2	5	7	12	29	16	28	27	47	46	298

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 10/01/2014 TO 12/31/2014

*** 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	1	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	4
1.51- 2.50	9	6	9	2	1	1	1	2	0	2	2	2	5	9	21	17	89
2.51- 3.50	48	18	5	4	2	1	0	0	2	2	3	6	12	17	41	46	207
3.51- 4.50	78	36	6	2	1	0	2	0	0	1	3	3	6	5	34	64	241
4.51- 5.50	67	32	3	2	0	0	0	0	0	1	1	1	0	0	9	29	145
5.51- 6.50	54	19	4	0	0	1	0	0	0	1	0	0	0	0	2	18	99
6.51- 8.50	20	22	3	0	0	0	0	0	0	0	0	0	0	0	3	15	63
8.51-11.50	6	11	0	0	0	0	0	0	0	0	0	0	0	0	0	4	21
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	283	146	30	10	4	3	4	2	2	7	9	12	24	31	110	193	870

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	2	1	0	1	0	0	2	0	0	1	1	0	3	3	0	0	14
1.51- 2.50	20	9	17	4	5	1	3	8	4	8	10	13	21	21	37	29	210
2.51- 3.50	63	29	17	10	3	6	8	12	21	19	15	22	29	32	60	67	413
3.51- 4.50	96	54	22	13	13	5	6	5	26	21	20	16	16	14	55	81	463
4.51- 5.50	77	46	24	17	5	3	2	17	27	15	27	14	2	4	18	49	347
5.51- 6.50	62	25	17	11	10	3	2	9	14	24	14	8	5	7	6	28	245
6.51- 8.50	28	39	23	29	14	7	2	7	6	20	23	4	8	10	19	28	267
8.51-11.50	8	23	7	22	19	6	3	4	1	9	20	5	12	16	10	10	175
11.51-14.50	2	5	6	9	8	2	0	0	0	2	2	0	2	10	2	4	54
14.51-20.50	2	0	0	3	4	1	0	0	0	0	0	0	1	2	0	5	18
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
TOTAL	360	231	133	119	81	34	28	62	99	119	132	82	99	119	207	303	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: 5.2 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
1.63	3.13	6.70	22.10	13.54	13.50	39.40

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	1	2	2	5	3	0	0	0	0	1	2	4	4	1	1	10	0
B	1	0	7	20	12	0	1	1	1	6	10	3	2	0	2	3	0
C	2	10	18	21	18	9	4	10	16	12	15	2	4	1	1	5	0
D	25	32	43	44	30	14	11	24	54	61	38	27	22	21	19	23	0
E	19	13	24	10	11	7	6	20	19	20	29	18	15	38	27	23	0
F	29	28	9	9	3	1	2	5	7	12	29	16	28	27	47	46	0
G	283	146	30	10	4	3	4	2	2	7	9	12	24	31	110	193	0
TOTAL	360	231	133	119	81	34	28	62	99	119	132	82	99	119	207	303	0

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2014 TO 12/31/2014

*** 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	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	1	0	1	2	1	0	1	1	0	0	7
5.51- 6.50	0	0	1	0	0	0	1	0	4	4	6	1	2	1	0	1	21
6.51- 8.50	0	1	2	0	5	3	2	6	15	12	18	19	8	2	1	3	97
8.51-11.50	0	1	0	5	4	3	3	5	4	14	25	27	3	3	0	4	101
11.51-14.50	1	1	3	2	4	0	1	0	0	4	6	2	1	0	0	2	27
14.51-20.50	0	0	0	2	0	0	0	0	0	3	1	0	0	0	0	2	8
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
TOTAL	1	3	6	9	13	6	8	11	24	39	57	49	15	7	1	15	264

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	1	0	0	0	0	0	0	0	0	0	1	1	2	0	1	0	6
4.51- 5.50	0	1	0	1	0	0	0	3	5	3	3	4	0	1	1	1	23
5.51- 6.50	1	0	0	1	3	2	2	9	10	11	7	3	1	0	2	2	54
6.51- 8.50	0	0	6	10	5	2	6	11	14	12	13	9	6	0	1	0	95
8.51-11.50	0	0	3	5	9	2	1	1	2	4	12	3	1	0	0	0	43
11.51-14.50	0	1	3	5	5	0	0	0	1	2	0	0	1	0	0	0	18
14.51-20.50	1	0	0	1	4	0	0	1	0	1	0	0	0	0	0	1	9
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	2	12	23	26	6	9	25	32	33	36	20	11	1	5	4	248

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	1	0	0	0	1	0	0	1	3
3.51- 4.50	1	2	5	1	1	0	1	3	3	1	3	5	1	1	0	1	29
4.51- 5.50	1	4	4	2	1	2	3	5	14	12	12	4	0	0	0	2	66
5.51- 6.50	1	1	7	3	8	1	3	8	26	10	9	1	1	0	2	1	82
6.51- 8.50	1	3	5	13	11	11	6	6	16	5	15	4	2	0	0	1	99
8.51-11.50	0	2	1	7	7	7	0	0	3	4	6	1	0	1	1	0	40
11.51-14.50	0	2	0	2	5	0	0	1	0	3	1	0	0	0	0	0	14
14.51-20.50	0	0	0	0	2	0	0	0	0	0	1	1	1	0	0	1	6
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	14	22	28	35	21	13	23	63	35	47	16	6	2	3	7	339

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2014 TO 12/31/2014

*** 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	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1.51- 2.50	7	0	5	2	3	1	0	4	2	4	6	5	6	5	5	3	58
2.51- 3.50	5	9	7	3	1	2	8	11	16	13	10	8	9	5	5	5	117
3.51- 4.50	14	5	12	10	11	6	3	7	31	24	11	9	4	7	8	8	170
4.51- 5.50	6	11	13	9	5	3	0	10	19	30	14	13	0	0	3	4	140
5.51- 6.50	8	7	8	8	4	5	0	5	10	17	19	2	2	1	0	9	105
6.51- 8.50	3	13	16	11	6	3	4	2	8	15	19	9	7	6	3	1	126
8.51-11.50	2	7	8	19	15	6	6	4	2	12	31	9	10	7	1	0	139
11.51-14.50	1	2	1	9	8	2	3	3	3	5	9	0	0	5	3	1	55
14.51-20.50	3	2	1	3	5	2	1	0	3	3	3	1	0	2	1	2	32
>20.50	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	1	5
TOTAL	50	56	72	74	58	31	25	47	95	124	122	56	38	38	29	34	949

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	1	0	0	0	0	0	1	0	0	1	1	0	0	3	0	0	7
1.51- 2.50	6	4	3	0	2	0	1	2	2	1	2	8	9	5	7	5	57
2.51- 3.50	11	6	7	0	1	3	1	4	4	4	6	5	5	7	11	17	92
3.51- 4.50	9	9	5	0	2	2	4	4	6	6	10	12	4	5	11	9	98
4.51- 5.50	8	5	11	5	0	1	2	5	10	12	26	9	3	4	4	13	118
5.51- 6.50	3	5	3	6	2	0	0	5	9	24	24	6	6	3	1	3	100
6.51- 8.50	7	6	8	6	4	4	7	6	5	25	25	16	3	7	5	5	139
8.51-11.50	1	6	8	15	12	7	6	9	3	12	39	18	3	10	5	2	156
11.51-14.50	1	1	3	7	8	2	3	4	0	4	16	3	1	5	1	0	59
14.51-20.50	0	0	3	1	12	2	1	0	1	1	3	1	1	0	0	1	27
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	47	42	51	40	43	21	26	39	40	90	152	78	35	49	45	55	853

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	1	0	0	0	0	0	0	0	0	2	0	0	0	3
1.51- 2.50	3	2	1	1	1	0	1	0	2	3	2	6	9	7	7	10	55
2.51- 3.50	12	4	4	3	0	2	0	0	2	4	3	12	13	16	19	20	114
3.51- 4.50	16	14	3	2	0	1	0	1	2	5	6	10	11	8	11	17	107
4.51- 5.50	10	8	3	2	1	0	2	3	2	3	16	5	3	4	8	13	83
5.51- 6.50	7	5	3	1	0	0	0	3	8	16	6	4	3	4	5	6	71
6.51- 8.50	10	6	10	0	1	1	0	4	0	13	19	11	1	4	10	11	101
8.51-11.50	1	6	5	3	0	0	0	1	0	1	12	0	2	0	3	2	36
11.51-14.50	2	1	0	3	0	0	0	0	1	2	0	0	0	0	0	2	11
14.51-20.50	0	0	0	0	2	0	1	0	0	0	0	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	61	46	29	16	5	4	4	12	17	47	64	48	44	43	63	81	584

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2014 TO 12/31/2014

*** 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	1	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	4
1.51- 2.50	10	6	9	2	1	2	1	2	0	2	2	4	6	13	21	17	98
2.51- 3.50	57	21	6	5	2	1	0	0	2	3	5	8	12	20	46	54	242
3.51- 4.50	103	41	6	3	2	1	2	0	0	1	4	5	10	10	40	76	304
4.51- 5.50	91	36	4	2	0	0	0	0	0	5	2	2	0	1	12	40	195
5.51- 6.50	67	29	5	0	0	1	0	0	0	1	2	0	0	0	3	20	128
6.51- 8.50	24	31	4	0	0	0	0	0	0	1	2	0	0	0	5	18	85
8.51-11.50	6	12	0	0	0	0	0	0	0	0	0	0	0	0	0	4	22
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	1	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	359	178	34	12	5	5	4	2	3	13	17	19	29	44	127	229	1080

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	1	1	1	0	0	2	0	0	1	1	0	3	3	0	0	16
1.51- 2.50	26	12	18	5	7	3	3	8	6	10	12	23	30	30	40	35	268
2.51- 3.50	85	40	24	11	4	8	9	15	25	24	24	33	40	48	81	97	568
3.51- 4.50	144	71	31	16	16	10	10	15	42	37	35	42	32	31	71	111	714
4.51- 5.50	116	65	35	21	7	6	8	26	51	67	74	37	7	11	28	73	632
5.51- 6.50	87	47	27	19	17	9	6	30	67	83	73	17	15	9	13	42	561
6.51- 8.50	45	60	51	40	32	24	25	35	58	83	111	68	27	19	25	39	742
8.51-11.50	10	34	25	54	47	25	16	20	14	47	125	58	19	21	10	12	537
11.51-14.50	5	9	10	28	30	4	7	8	5	20	32	5	3	10	4	5	185
14.51-20.50	4	2	4	7	25	4	3	1	5	8	8	3	2	2	1	7	86
>20.50	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	4	8
TOTAL	525	341	226	202	185	94	89	159	274	381	495	286	178	184	273	425	4317

TOTAL NUMBER OF OBSERVATIONS: 4416
TOTAL NUMBER OF VALID OBSERVATIONS: 4317
TOTAL NUMBER OF MISSING OBSERVATIONS: 99
PERCENT DATA RECOVERY FOR THIS PERIOD: 97.8 %
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
6.12	5.74	7.85	21.98	19.76	13.53	25.02

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	3	6	9	13	6	8	11	24	39	57	49	15	7	1	15	0
B	3	2	12	23	26	6	9	25	32	33	36	20	11	1	5	4	0
C	4	14	22	28	35	21	13	23	63	35	47	16	6	2	3	7	0
D	50	56	72	74	58	31	25	47	95	124	122	56	38	38	29	34	0
E	47	42	51	40	43	21	26	39	40	90	152	78	35	49	45	55	0
F	61	46	29	16	5	4	4	12	17	47	64	48	44	43	63	81	0
G	359	178	34	12	5	5	4	2	3	13	17	19	29	44	127	229	0
TOTAL	525	341	226	202	185	94	89	159	274	381	495	286	178	184	273	425	0

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2014 TO 12/31/2014

*** 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	1	0	1
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	1	0	1	2	1	0	2	2	0	0	9
5.51- 6.50	0	0	1	0	1	1	1	3	7	9	8	1	2	1	0	1	36
6.51- 8.50	0	1	7	1	7	5	3	15	27	29	37	30	9	6	1	5	183
8.51-11.50	2	1	4	10	8	3	3	5	16	58	62	39	8	5	0	5	229
11.51-14.50	1	3	7	6	4	0	2	0	2	19	56	15	9	4	6	6	140
14.51-20.50	0	6	13	3	1	0	0	1	1	15	54	10	7	7	4	3	125
>20.50	0	0	1	0	0	0	0	0	0	0	3	4	0	0	0	3	11
TOTAL	3	11	33	20	21	9	10	24	54	132	221	99	37	25	12	23	737

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	1	0	0	0	0	0	1
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	1	0	0	0	0	0	1	0	0	0	1	1	2	0	1	0	7
4.51- 5.50	1	3	0	1	2	0	0	4	9	4	4	5	0	1	1	2	37
5.51- 6.50	1	1	6	3	5	6	2	17	30	15	13	6	2	2	4	2	115
6.51- 8.50	0	0	8	14	9	6	10	18	26	22	28	12	6	0	1	0	160
8.51-11.50	0	1	4	5	9	2	1	2	5	13	23	6	3	1	0	1	76
11.51-14.50	0	1	3	6	5	0	0	1	1	5	3	1	1	0	1	0	28
14.51-20.50	2	0	3	2	6	0	0	1	0	1	5	1	0	1	1	1	24
>20.50	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	5	6	24	32	36	14	14	43	71	60	78	32	14	5	9	6	450

STABILITY CLASS C

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
.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	1	0	0	0	1	0	0	1	3
3.51- 4.50	1	3	6	2	1	0	3	5	4	3	3	5	2	2	2	1	43
4.51- 5.50	2	5	5	4	7	2	3	10	30	19	14	8	2	0	1	3	115
5.51- 6.50	1	4	10	4	9	1	5	16	52	18	17	4	3	0	2	2	148
6.51- 8.50	1	4	8	13	12	15	10	10	23	11	20	6	3	0	0	1	137
8.51-11.50	0	2	2	8	8	8	1	0	4	6	12	5	2	1	1	0	60
11.51-14.50	0	2	0	2	5	0	0	2	1	3	3	1	0	0	0	0	19
14.51-20.50	0	0	1	1	2	1	0	0	0	1	8	1	2	0	0	1	18
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	20	32	34	44	27	22	43	115	61	77	30	15	3	6	9	545

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2014 TO 12/31/2014

*** 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																	1
.76- 1.50	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	5
1.51- 2.50	9	0	5	5	3	3	1	5	8	10	9	8	11	5	7	7	96
2.51- 3.50	11	13	13	10	6	10	14	15	36	34	31	22	22	15	10	12	274
3.51- 4.50	16	13	20	21	17	9	8	14	68	58	28	17	7	13	12	14	335
4.51- 5.50	6	18	26	10	12	5	1	16	35	49	31	24	2	1	4	5	245
5.51- 6.50	10	10	12	9	4	6	1	13	33	29	34	5	5	2	0	9	182
6.51- 8.50	3	17	20	16	10	7	10	2	14	33	34	15	12	7	4	1	205
8.51-11.50	2	9	9	22	21	9	9	4	3	15	51	15	16	8	4	3	200
11.51-14.50	2	3	3	10	10	2	3	3	4	12	22	5	4	9	5	2	99
14.51-20.50	3	3	1	3	12	2	1	0	7	8	17	10	2	6	2	2	79
>20.50	0	1	0	0	0	1	0	1	1	1	1	1	0	0	0	1	8
TOTAL	63	88	110	106	95	54	48	73	209	250	258	122	82	66	48	56	1729

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	1	0	1	0	0	1	2	0	0	1	1	0	1	4	0	0	12
1.51- 2.50	10	7	5	0	2	3	2	4	4	3	7	14	15	10	12	8	106
2.51- 3.50	21	11	8	1	2	3	2	7	5	9	12	8	18	13	19	25	164
3.51- 4.50	13	12	6	1	2	3	4	5	11	17	17	19	9	9	12	10	150
4.51- 5.50	11	7	14	6	0	1	2	7	11	23	33	16	7	5	5	14	162
5.51- 6.50	4	5	4	8	2	1	0	7	13	32	31	16	8	5	2	3	141
6.51- 8.50	7	7	9	6	4	5	7	7	8	46	39	32	13	11	11	6	218
8.51-11.50	2	8	10	15	13	9	7	9	6	44	75	48	19	17	9	5	296
11.51-14.50	4	8	4	9	10	2	3	4	3	24	40	16	4	14	6	3	154
14.51-20.50	3	4	5	2	15	2	1	0	2	10	8	3	4	5	1	1	66
>20.50	0	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	6
TOTAL	76	72	67	49	51	30	30	50	63	209	263	172	98	93	77	75	1475

STABILITY CLASS F

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
.76- 1.50	0	0	0	1	0	1	0	0	0	0	0	1	3	0	0	0	6
1.51- 2.50	10	3	2	2	3	0	1	0	6	4	6	9	15	16	12	13	102
2.51- 3.50	25	7	7	6	0	2	0	1	3	8	17	27	27	31	31	30	222
3.51- 4.50	23	20	7	3	0	1	2	1	7	10	21	22	22	18	28	29	214
4.51- 5.50	14	8	3	3	1	0	3	3	4	14	33	12	6	12	16	17	149
5.51- 6.50	10	7	5	2	0	0	0	4	11	29	27	12	8	9	7	7	138
6.51- 8.50	13	6	14	0	2	1	0	4	2	31	54	32	14	10	12	13	208
8.51-11.50	7	15	6	3	0	0	0	1	1	30	49	15	5	0	5	5	142
11.51-14.50	3	4	0	4	0	0	0	0	1	3	2	0	0	0	2	3	22
14.51-20.50	0	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0	4
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	105	70	44	24	8	5	7	14	35	129	210	130	100	96	113	117	1209

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2014 TO 12/31/2014

*** 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																	2
.76- 1.50	2	1	0	0	0	0	2	0	0	0	0	0	2	2	1	1	11
1.51- 2.50	25	11	11	3	1	2	2	4	1	4	4	12	12	19	38	33	182
2.51- 3.50	117	39	11	6	4	2	1	1	6	5	10	15	22	47	95	115	496
3.51- 4.50	203	84	13	4	2	1	3	1	0	6	9	14	21	30	95	163	649
4.51- 5.50	190	64	10	3	0	0	0	0	1	5	10	8	5	5	28	93	422
5.51- 6.50	132	44	7	1	0	1	0	0	1	6	10	3	4	4	12	41	266
6.51- 8.50	50	50	6	0	0	0	0	0	0	8	8	2	0	0	7	28	159
8.51-11.50	10	19	2	0	0	0	0	0	0	5	4	0	0	0	0	10	50
11.51-14.50	1	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4
14.51-20.50	0	0	0	0	0	0	0	0	1	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	730	314	60	17	7	6	8	6	10	40	55	54	66	107	276	484	2242

STABILITY CLASS ALL

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	11
.76- 1.50	4	2	2	1	0	2	4	0	0	2	1	1	7	6	1	1	34
1.51- 2.50	54	21	23	10	9	8	6	13	19	21	27	43	53	50	70	61	488
2.51- 3.50	174	70	39	23	12	17	17	24	51	56	70	72	90	106	155	183	1159
3.51- 4.50	257	132	52	31	22	14	21	26	90	94	79	78	63	72	150	217	1398
4.51- 5.50	224	105	58	27	22	8	10	40	91	116	126	73	24	26	55	134	1139
5.51- 6.50	158	71	45	27	21	16	9	60	147	138	140	47	32	23	27	65	1026
6.51- 8.50	74	85	72	50	44	39	40	56	100	180	220	129	57	34	36	54	1270
8.51-11.50	23	55	37	63	59	31	21	21	35	171	276	128	53	32	19	29	1053
11.51-14.50	11	23	17	37	34	4	8	10	12	67	126	38	18	27	20	14	466
14.51-20.50	8	13	23	11	38	5	3	2	11	35	93	25	15	19	8	8	317
>20.50	0	4	2	2	1	1	0	1	1	1	4	5	0	0	0	4	26
TOTAL	987	581	370	282	262	145	139	253	557	881	1162	639	412	395	541	770	8387

TOTAL NUMBER OF OBSERVATIONS: 8760
TOTAL NUMBER OF VALID OBSERVATIONS: 8387
TOTAL NUMBER OF MISSING OBSERVATIONS: 373
PERCENT DATA RECOVERY FOR THIS PERIOD: 95.7 %
MEAN WIND SPEED FOR THIS PERIOD: 6.4 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
8.79	5.37	6.50	20.62	17.59	14.42	26.73

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	3	11	33	20	21	9	10	24	54	132	221	99	37	25	12	23	3
B	5	6	24	32	36	14	14	43	71	60	78	32	14	5	9	6	1
C	5	20	32	34	44	27	22	43	115	61	77	30	15	3	6	9	2
D	63	88	110	106	95	54	48	73	209	250	258	122	82	66	48	56	1
E	76	72	67	49	51	30	30	50	63	209	263	172	98	93	77	75	0
F	105	70	44	24	8	5	7	14	35	129	210	130	100	96	113	117	2
G	730	314	60	17	7	6	8	6	10	40	55	54	66	107	276	484	2
TOTAL	987	581	370	282	262	145	139	253	557	881	1162	639	412	395	541	770	11

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 2014 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 calculation 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, Rev. 1.

Table 43:
Doses To Special Locations For 2014

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	8.39E-04	8.36E-04	9.10E-04	8.35E-04	8.35E-04	8.34E-04	8.48E-04	1.32E-03
TEEN	8.40E-04	8.36E-04	9.16E-04	8.35E-04	8.35E-04	8.34E-04	8.56E-04	1.32E-03
CHILD	8.39E-04	8.35E-04	9.11E-04	8.35E-04	8.35E-04	8.34E-04	8.53E-04	1.32E-03
INFANT	8.36E-04	8.35E-04	8.65E-04	8.35E-04	8.35E-04	8.34E-04	8.48E-04	1.32E-03
2ND QUARTER								
ADULT	1.17E-02	1.17E-02	1.17E-02	1.17E-02	1.17E-02	1.18E-02	1.18E-02	1.88E-02
TEEN	1.17E-02	1.17E-02	1.17E-02	1.17E-02	1.17E-02	1.19E-02	1.18E-02	1.88E-02
CHILD	1.17E-02	1.17E-02	1.17E-02	1.17E-02	1.17E-02	1.19E-02	1.18E-02	1.88E-02
INFANT	1.17E-02	1.17E-02	1.17E-02	1.17E-02	1.17E-02	1.19E-02	1.18E-02	1.88E-02
1ST SEMI-ANNUAL								
ADULT	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.27E-02	1.26E-02	2.01E-02
TEEN	1.26E-02	1.26E-02	1.27E-02	1.26E-02	1.26E-02	1.27E-02	1.27E-02	2.01E-02
CHILD	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.27E-02	1.26E-02	2.01E-02
INFANT	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.27E-02	1.26E-02	2.01E-02
3RD QUARTER								
ADULT	1.05E-03	1.04E-03	1.15E-03	1.04E-03	1.04E-03	1.04E-03	1.05E-03	2.87E-03
TEEN	1.05E-03	1.04E-03	1.16E-03	1.04E-03	1.04E-03	1.04E-03	1.06E-03	2.87E-03
CHILD	1.05E-03	1.04E-03	1.15E-03	1.04E-03	1.04E-03	1.04E-03	1.06E-03	2.87E-03
INFANT	1.04E-03	1.04E-03	1.08E-03	1.04E-03	1.04E-03	1.04E-03	1.05E-03	2.87E-03
4TH QUARTER								
ADULT	3.74E-03	3.77E-03	3.75E-03	3.74E-03	3.74E-03	4.44E-03	4.20E-03	5.43E-03
TEEN	3.74E-03	3.77E-03	3.76E-03	3.74E-03	3.75E-03	4.62E-03	4.42E-03	5.43E-03
CHILD	3.74E-03	3.75E-03	3.76E-03	3.74E-03	3.75E-03	4.76E-03	4.29E-03	5.43E-03
INFANT	3.74E-03	3.74E-03	3.75E-03	3.74E-03	3.74E-03	4.66E-03	4.12E-03	5.43E-03
2ND SEMI-ANNUAL								
ADULT	4.78E-03	4.81E-03	4.90E-03	4.78E-03	4.78E-03	5.48E-03	5.25E-03	8.29E-03
TEEN	4.79E-03	4.81E-03	4.91E-03	4.78E-03	4.79E-03	5.66E-03	5.48E-03	8.29E-03
CHILD	4.79E-03	4.79E-03	4.91E-03	4.78E-03	4.79E-03	5.80E-03	5.35E-03	8.29E-03
INFANT	4.78E-03	4.78E-03	4.83E-03	4.78E-03	4.78E-03	5.70E-03	5.17E-03	8.29E-03
ANNUAL								
ADULT	1.74E-02	1.74E-02	1.75E-02	1.73E-02	1.73E-02	1.82E-02	1.79E-02	2.84E-02
TEEN	1.74E-02	1.74E-02	1.76E-02	1.73E-02	1.74E-02	1.84E-02	1.81E-02	2.84E-02
CHILD	1.74E-02	1.74E-02	1.76E-02	1.73E-02	1.74E-02	1.85E-02	1.80E-02	2.84E-02
INFANT	1.73E-02	1.73E-02	1.74E-02	1.73E-02	1.73E-02	1.84E-02	1.78E-02	2.84E-02

Table 44:
Integrated Population Dose for 2014

January to March

PLUME	7.94E-05	7.94E-05	7.94E-05	7.94E-05	7.94E-05	7.94E-05	7.94E-05	1.47E-04
	0.00%	0.00%	14.61%	0.00%	0.00%	0.00%	0.00%	0.00%
GROUND	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.24E-05
	0.00%	0.00%	1.95%	0.00%	0.00%	0.00%	0.00%	0.00%
INHAL	3.61E+00	3.61E+00	1.52E-04	3.61E+00	3.61E+00	3.61E+00	3.61E+00	3.61E+00
	28.87%	28.87%	27.93%	28.87%	28.87%	28.87%	28.87%	28.87%
VEGET	7.55E+00	7.55E+00	2.97E-04	7.55E+00	7.55E+00	7.55E+00	7.55E+00	7.55E+00
	60.39%	60.39%	54.60%	60.39%	60.39%	60.39%	60.39%	60.39%
COW MILK	9.78E-01	9.78E-01	4.25E-06	9.78E-01	9.78E-01	9.78E-01	9.78E-01	9.78E-01
	7.82%	7.82%	0.78%	7.82%	7.82%	7.82%	7.82%	7.82%
MEAT	3.66E-01	3.66E-01	6.96E-07	3.66E-01	3.66E-01	3.66E-01	3.66E-01	3.66E-01
	2.92%	2.92%	0.13%	2.92%	2.92%	2.92%	2.92%	2.92%
TOTAL	1.25E+01	1.25E+01	5.43E-04	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01
PER CAPITA DOSE (REM)	6.38E-06	6.38E-06	2.77E-10	6.38E-06	6.38E-06	6.38E-06	6.38E-06	6.38E-06

April through June

PLUME	3.40E-03	3.40E-03	3.40E-03	3.40E-03	3.40E-03	3.40E-03	3.40E-03	6.46E-03
	0.09%	0.09%	92.28%	0.09%	0.09%	0.09%	0.09%	0.17%
GROUND	1.99E-04	1.99E-04	1.99E-04	1.99E-04	1.99E-04	1.99E-04	1.99E-04	2.34E-04
	0.01%	0.01%	5.41%	0.01%	0.01%	0.01%	0.01%	0.01%
INHAL	1.28E+00	1.28E+00	1.99E-05	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00
	33.28%	33.28%	0.54%	33.28%	33.28%	33.28%	33.28%	33.25%
VEGET	2.17E+00	2.17E+00	6.38E-05	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00
	56.49%	56.49%	1.73%	56.49%	56.49%	56.49%	56.49%	56.45%
COW	2.96E-01	2.96E-01	1.36E-06	2.96E-01	2.96E-01	2.96E-01	2.96E-01	2.96E-01
	7.72%	7.72%	0.04%	7.72%	7.72%	7.72%	7.72%	7.71%
MEAT	9.25E-02	9.25E-02	1.08E-07	9.25E-02	9.25E-02	9.25E-02	9.25E-02	9.25E-02
	2.41%	2.41%	0.00%	2.41%	2.41%	2.41%	2.41%	2.41%
TOTAL	3.84E+00	3.84E+00	3.68E-03	3.84E+00	3.84E+00	3.84E+00	3.84E+00	3.84E+00
PER CAPITA DOSE (REM)	1.96E-06	1.96E-06	1.88E-09	1.96E-06	1.96E-06	1.96E-06	1.96E-06	1.96E-06

Table 44: (continued)
Integrated Population Dose for2014

January through June

PLUME	3.48E-03	3.48E-03	3.48E-03	3.48E-03	3.48E-03	3.48E-03	3.48E-03	6.61E-03
	0.02%	0.02%	82.29%	0.02%	0.02%	0.02%	0.02%	0.04%
GROUND	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.47E-04
	0.00%	0.00%	4.96%	0.00%	0.00%	0.00%	0.00%	0.00%
INHAL	4.89E+00	4.89E+00	1.72E-04	4.89E+00	4.89E+00	4.89E+00	4.89E+00	4.89E+00
	29.90%	29.90%	4.06%	29.90%	29.90%	29.90%	29.90%	29.90%
VEGET	9.72E+00	9.72E+00	3.60E-04	9.72E+00	9.72E+00	9.72E+00	9.72E+00	9.72E+00
	59.48%	59.48%	8.53%	59.48%	59.48%	59.48%	59.48%	59.46%
COW	1.27E+00	1.27E+00	5.61E-06	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00
	7.80%	7.80%	0.13%	7.80%	7.80%	7.80%	7.80%	7.79%
MEAT	4.58E-01	4.58E-01	8.04E-07	4.58E-01	4.58E-01	4.58E-01	4.58E-01	4.58E-01
	2.80%	2.80%	0.02%	2.80%	2.80%	2.80%	2.80%	2.80%
TOTAL	1.63E+01	1.63E+01	4.22E-03	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01
PER CAPITA DOSE (REM)	8.32E-06	8.32E-06	2.15E-09	8.32E-06	8.32E-06	8.32E-06	8.32E-06	8.32E-06

July through September

PLUME	5.44E-04	5.44E-04	5.44E-04	5.44E-04	5.44E-04	5.44E-04	5.44E-04	5.24E-03
	0.02%	0.02%	28.93%	0.02%	0.02%	0.02%	0.02%	0.18%
GROUND	4.01E-06	4.01E-06	4.01E-06	4.01E-06	4.01E-06	4.01E-06	4.01E-06	4.71E-06
	0.00%	0.00%	0.21%	0.00%	0.00%	0.00%	0.00%	0.00%
INHAL	9.42E-01	9.42E-01	2.27E-04	9.42E-01	9.42E-01	9.42E-01	9.42E-01	9.42E-01
	32.38%	32.38%	12.04%	32.38%	32.38%	32.38%	32.39%	32.33%
VEGET	1.67E+00	1.67E+00	1.09E-03	1.67E+00	1.67E+00	1.67E+00	1.67E+00	1.67E+00
	57.42%	57.42%	57.92%	57.42%	57.42%	57.42%	57.42%	57.32%
COW	2.25E-01	2.25E-01	1.50E-05	2.25E-01	2.25E-01	2.25E-01	2.25E-01	2.25E-01
	7.74%	7.74%	0.80%	7.74%	7.74%	7.74%	7.74%	7.73%
MEAT	7.09E-02	7.09E-02	1.91E-06	7.09E-02	7.09E-02	7.09E-02	7.09E-02	7.09E-02
	2.44%	2.44%	0.10%	2.44%	2.44%	2.44%	2.44%	2.43%
TOTAL	2.91E+00	2.91E+00	1.88E-03	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
PER CAPITA DOSE (REM)	1.49E-06	1.49E-06	9.60E-10	1.49E-06	1.49E-06	1.49E-06	1.49E-06	1.49E-06

Table 44: (continued)
Integrated Population Dose for2014

October through December

PLUME	3.77E-04	3.77E-04	3.77E-04	3.77E-04	3.77E-04	3.77E-04	3.77E-04	1.17E-03
	0.00%	0.00%	43.37%	0.00%	0.00%	0.00%	0.00%	0.01%
GROUND	3.27E-04	3.27E-04	3.27E-04	3.27E-04	3.27E-04	3.27E-04	3.27E-04	3.84E-04
	0.00%	0.00%	37.60%	0.00%	0.00%	0.00%	0.00%	0.00%
INHAL	3.31E+00	3.31E+00	5.75E-05	3.31E+00	3.31E+00	3.31E+00	3.31E+00	3.31E+00
	26.82%	26.82%	6.62%	26.82%	26.82%	26.82%	26.82%	26.82%
VEGET	7.75E+00	7.75E+00	1.06E-04	7.75E+00	7.75E+00	7.75E+00	7.75E+00	7.75E+00
	62.80%	62.80%	12.21%	62.80%	62.80%	62.80%	62.80%	62.80%
COW MILK	9.19E-01	9.19E-01	1.43E-06	9.19E-01	9.19E-01	9.19E-01	9.19E-01	9.19E-01
	7.44%	7.44%	0.17%	7.44%	7.44%	7.44%	7.44%	7.44%
MEAT	3.62E-01	3.62E-01	2.51E-07	3.62E-01	3.62E-01	3.62E-01	3.62E-01	3.62E-01
	2.93%	2.93%	0.03%	2.93%	2.93%	2.93%	2.93%	2.93%
TOTAL	1.23E+01	1.23E+01	8.69E-04	1.23E+01	1.23E+01	1.23E+01	1.23E+01	1.23E+01
PER CAPITA DOSE (REM)	6.28E-06	6.28E-06	4.44E-10	6.28E-06	6.28E-06	6.28E-06	6.28E-06	6.28E-06

July through December

PLUME	9.21E-04	9.21E-04	9.21E-04	9.21E-04	9.21E-04	9.21E-04	9.21E-04	6.41E-03
	0.01%	0.01%	33.50%	0.01%	0.01%	0.01%	0.01%	0.04%
GROUND	3.31E-04	3.31E-04	3.31E-04	3.31E-04	3.31E-04	3.31E-04	3.31E-04	3.89E-04
	0.00%	0.00%	12.03%	0.00%	0.00%	0.00%	0.00%	0.00%
INHAL	4.25E+00	4.25E+00	2.84E-04	4.25E+00	4.25E+00	4.25E+00	4.25E+00	4.25E+00
	27.88%	27.88%	10.33%	27.88%	27.88%	27.88%	27.88%	27.87%
VEGET	9.42E+00	9.42E+00	1.20E-03	9.42E+00	9.42E+00	9.43E+00	9.42E+00	9.42E+00
	61.77%	61.77%	43.48%	61.77%	61.77%	61.77%	61.77%	61.75%
COW	1.14E+00	1.14E+00	1.64E-05	1.14E+00	1.14E+00	1.14E+00	1.14E+00	1.14E+00
	7.50%	7.50%	0.60%	7.50%	7.50%	7.50%	7.50%	7.50%
MEAT	4.33E-01	4.33E-01	2.16E-06	4.33E-01	4.33E-01	4.33E-01	4.33E-01	4.33E-01
	2.84%	2.84%	0.08%	2.84%	2.84%	2.84%	2.84%	2.84%
TOTAL	1.53E+01	1.53E+01	2.75E-03	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01
PER CAPITA DOSE (REM)	7.81E-06	7.81E-06	1.40E-09	7.81E-06	7.81E-06	7.81E-06	7.81E-06	7.81E-06

Table 44: (continued)
Integrated Population Dose for 2014

January through December

PLUME	4.40E-03	4.40E-03	4.40E-03	4.40E-03	4.40E-03	4.40E-03	4.40E-03	1.30E-02
	0.01%	0.01%	63.05%	0.01%	0.01%	0.01%	0.01%	0.04%
GROUND	5.41E-04	5.41E-04	5.41E-04	5.41E-04	5.41E-04	5.41E-04	5.41E-04	6.36E-04
	0.00%	0.00%	7.75%	0.00%	0.00%	0.00%	0.00%	0.00%
INHAL	9.14E+00	9.14E+00	4.56E-04	9.14E+00	9.14E+00	9.14E+00	9.14E+00	9.14E+00
	28.93%	28.93%	6.53%	28.93%	28.93%	28.93%	28.93%	28.92%
VEGET	1.91E+01	1.91E+01	1.56E-03	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01
	60.59%	60.59%	22.31%	60.59%	60.59%	60.58%	60.58%	60.57%
COW	2.42E+00	2.42E+00	2.20E-05	2.42E+00	2.42E+00	2.42E+00	2.42E+00	2.42E+00
	7.65%	7.65%	0.32%	7.65%	7.65%	7.65%	7.65%	7.65%
MEAT	8.91E-01	8.91E-01	2.96E-06	8.91E-01	8.91E-01	8.91E-01	8.91E-01	8.91E-01
	2.82%	2.82%	0.04%	2.82%	2.82%	2.82%	2.82%	2.82%
TOTAL	3.16E+01	3.16E+01	6.98E-03	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01
PER CAPITA DOSE (REM)	1.61E-05	1.61E-05	3.56E-09	1.61E-05	1.61E-05	1.61E-05	1.61E-05	1.61E-05

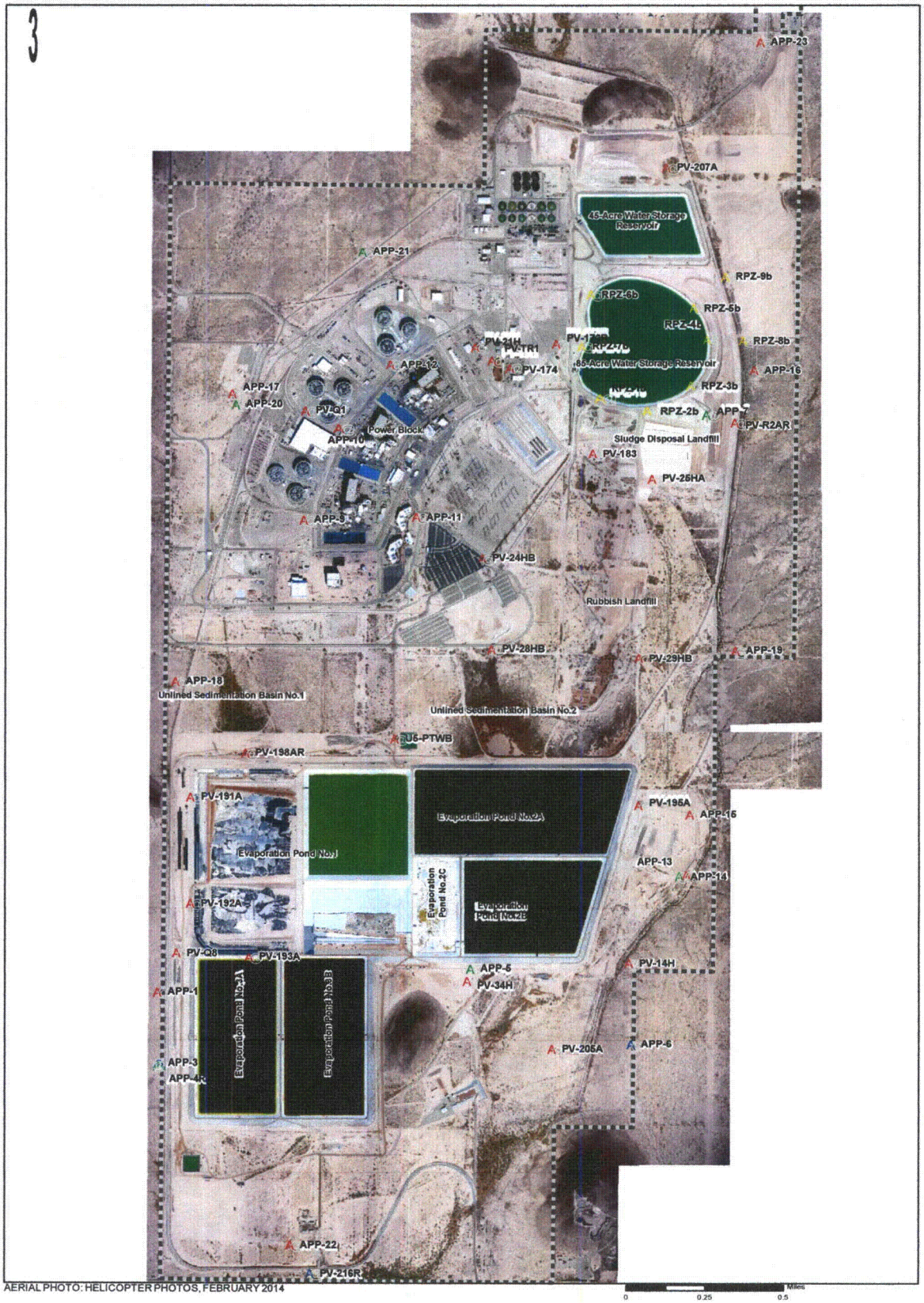
Table 45: Summary of Individual Doses for 2014						
	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
Gamma Air Dose	**mrad**	3.79E-04	5.39E-03	5.14E-04	8.28E-04	6.20E-03
ODCM Req. 4.1 Limit	mrad	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
% ODCM Limit	%	7.58E-03	1.08E-01	1.03E-02	1.66E-02	6.20E-02
Beta Air Dose	**mrad**	1.36E-04	1.99E-03	1.00E-03	4.58E-04	3.14E-03
ODCM Req. 4.1 Limit	mrad	1.00E+01	1.00E+01	1.00E+01	1.00E+01	2.00E+01
% ODCM Limit	%	1.36E-03	1.99E-02	1.00E-02	4.58E-03	1.57E-02
Maximum Individual						
Total Body	mrem	2.53E-04	3.58E-03	3.11E-04	5.46E-04	4.09E-03
Skin	mrem	4.05E-04	5.77E-03	8.84E-04	9.33E-04	6.98E-03
Site BoundaryLocation						
Unit 1	miles	1.27 SE	0.66 NNE	0.66 NNE	1.27 SE	0.66 NNE
Unit 2	miles	1.31 SE	0.83 NNE	0.83 NNE	1.31 SE	0.83 NNE
Unit 3	miles	1.40 SE	1.05 NNE	1.05 NNE	1.40 SE	1.05 NNE
Maximum Organ Dose (excluding skin)	Age	Teen	Infant	Infant	Teen	Teen
	Organ	Thyroid	Bone	Bone	Thyroid	Thyroid
	mrem	2.48E-01	2.06E-01	1.31E-01	2.53E-01	6.22E-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]	%	3.31E+00	2.75E+00	1.75E+00	3.37E+00	4.15E+00
Location						
Unit 1	miles	2.74 S	2.84 NNE	2.84 NNE	2.74 S	2.74 S
Unit 2	miles	2.56 S	3.05 NNE	3.05 NNE	2.56 S	2.56 S
Unit 3	miles	2.35 S	3.28 NNE	3.28 NNE	2.35 S	2.35 S
Maximum Organ Dose excluding C-14 [3] (excluding skin)	Age	Teen	Infant	Infant	Teen	Teen
	Organ	Thyroid	Thyroid	Thyroid	Thyroid	Thyroid
	mrem	2.48E-01	2.06E-01	1.31E-01	2.53E-01	6.22E-01
ODCM Req. 4.2 Limit		7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01
% ODCM Limit [1]		3.31E+00	2.75E+00	1.75E+00	3.37E+00	4.15E+00
Organ dose from tritium only for Unit 2 location above	**mrem**	2.47E-01	1.21E-01	8.58E-02	2.53E-01	6.19E-01
Fraction of organ dose from tritium only for Unit 2 location above[2,3]	%	99.6%	58.7%	65.5%	100.0%	99.5%
X/Q for Unit 2 location above	sec/m^3	8.17E-06	9.72E-07	6.22E-07	7.58E-06	5.30E-06
D/Q for Unit 2 location above	m^{-2}	2.50E-09	2.24E-09	1.77E-09	2.56E-09	1.85E-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

3



AERIAL PHOTO: HELICOPTER PHOTOS, FEBRUARY 2014

EXPLANATION

PVNGS Well Locations and Aquifer Monitored

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

Brown AND Caldwell

FIGURE 1
SITE MAP

PALO VERDE NUCLEAR GENERATING STATION
ARIZONA PUBLIC SERVICES

Path: N:\GIS\Projects\00PS-PVNGS\GIS_Client\MXD-DOCS\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-10-0114	1/28/2014	Tritium	< 279	routine
APP-10	PV-APP-10-0114	1/28/2014	Cesium-137	< 2.5	routine
APP-10	PV-APP-10-0114	1/28/2014	Cobalt-60	< 2.5	routine
APP-10	PV-APP-10-0114	1/28/2014	Cesium-134	< 2.6	routine
APP-10	PV-APP-10-0514	5/20/2014	Tritium	< 243	routine
APP-10	PV-APP-10-0514	5/20/2014	Cesium-137	< 2.3	routine
APP-10	PV-APP-10-0514	5/20/2014	Cobalt-60	< 2.4	routine
APP-10	PV-APP-10-0514	5/20/2014	Cesium-134	< 2.4	routine
APP-10	PV-APP-10-0814	8/26/2014	Tritium	< 272	routine
APP-10	PV-APP-10-0814	8/26/2014	Cesium-137	< 2.4	routine
APP-10	PV-APP-10-0814	8/26/2014	Cobalt-60	< 2.4	routine
APP-10	PV-APP-10-0814	8/26/2014	Cesium-134	< 2.5	routine
APP-10	PV-APP-10-1214	12/18/2014	Tritium	< 288	routine
APP-10	PV-APP-10-1214	12/18/2014	Cesium-137	< 2.3	routine
APP-10	PV-APP-10-1214	12/18/2014	Cobalt-60	< 2.4	routine
APP-10	PV-APP-10-1214	12/18/2014	Cesium-134	< 2.4	routine
APP-12	PV-APP-12-0114	1/28/2014	Tritium	< 279	routine
APP-12	PV-APP-12-0114	1/28/2014	Cesium-137	< 2.4	routine
APP-12	PV-APP-12-0114	1/28/2014	Cobalt-60	< 2.3	routine
APP-12	PV-APP-12-0114	1/28/2014	Cesium-134	< 2.5	routine
APP-12	PV-APP-12-0514	5/20/2014	Tritium	< 243	routine
APP-12	PV-APP-12-0514	5/20/2014	Cesium-137	< 2.1	routine
APP-12	PV-APP-12-0514	5/20/2014	Cobalt-60	< 2.1	routine
APP-12	PV-APP-12-0514	5/20/2014	Cesium-134	< 2.2	routine
APP-12	PV-APP-12-0814	8/26/2014	Tritium	< 272	routine
APP-12	PV-APP-12-0814	8/26/2014	Cesium-137	< 2	routine
APP-12	PV-APP-12-0814	8/26/2014	Cobalt-60	< 1.8	routine
APP-12	PV-APP-12-0814	8/26/2014	Cesium-134	< 1.9	routine
APP-12	PV-APP-12-1114	11/13/2014	Tritium	< 269	routine
APP-12	PV-APP-12-1114	11/13/2014	Cesium-137	< 2.3	routine
APP-12	PV-APP-12-1114	11/13/2014	Cobalt-60	< 2.4	routine
APP-12	PV-APP-12-1114	11/13/2014	Cesium-134	< 2.3	routine
APP-15	PV-APP-15-0414	4/30/2014	Tritium	< 262	routine
APP-15	PV-APP-15-0414	4/30/2014	Cesium-137	< 2.1	routine
APP-15	PV-APP-15-0414	4/30/2014	Cobalt-60	< 2	routine
APP-15	PV-APP-15-0414	4/30/2014	Cesium-134	< 2.2	routine
APP-15	PV-APP-15-1214	12/9/2014	Tritium	< 288	routine
APP-15	PV-APP-15-1214	12/9/2014	Cesium-137	< 2.5	routine
APP-15	PV-APP-15-1214	12/9/2014	Cobalt-60	< 2.6	routine
APP-15	PV-APP-15-1214	12/9/2014	Cesium-134	< 2.5	routine
APP-18	PV-APP-18-0414	4/30/2014	Tritium	< 262	routine
APP-18	PV-APP-18-0414	4/30/2014	Cesium-137	< 2.3	routine

Monitoring Well	Sample Name	Sample Date	Parameter	Concentration (pCi//L)		Purpose
APP-18	PV-APP-18-0414	4/30/2014	Cobalt-60	<	2.4	routine
APP-18	PV-APP-18-0414	4/30/2014	Cesium-134	<	2.3	routine
APP-18	PV-APP-18-1014	10/28/2014	Tritium	<	269	routine
APP-18	PV-APP-18-1014	10/28/2014	Cesium-137	<	1.8	routine
APP-18	PV-APP-18-1014	10/28/2014	Cobalt-60	<	2.1	routine
APP-18	PV-APP-18-1014	10/28/2014	Cesium-134	<	1.8	routine
APP-19	PV-APP-19-0514	5/13/2014	Tritium	<	302	routine
APP-19	PV-APP-19-0514	5/13/2014	Cesium-137	<	2.1	routine
APP-19	PV-APP-19-0514	5/13/2014	Cobalt-60	<	2.2	routine
APP-19	PV-APP-19-0514	5/13/2014	Cesium-134	<	2.2	routine
APP-19	PV-APP-19-1214	12/9/2014	Tritium	<	288	routine
APP-19	PV-APP-19-1214	12/9/2014	Cesium-137	<	2.4	routine
APP-19	PV-APP-19-1214	12/9/2014	Cobalt-60	<	2.3	routine
APP-19	PV-APP-19-1214	12/9/2014	Cesium-134	<	2.3	routine
APP-20	PV-APP-20-0514	5/13/2014	Tritium	<	302	routine
APP-20	PV-APP-20-0514	5/13/2014	Cesium-137	<	2.3	routine
APP-20	PV-APP-20-0514	5/13/2014	Cobalt-60	<	2.4	routine
APP-20	PV-APP-20-0514	5/13/2014	Cesium-134	<	2.4	routine
APP-20	PV-APP-20-1214	12/16/2014	Tritium	<	288	routine
APP-20	PV-APP-20-1214	12/16/2014	Cesium-137	<	2.5	routine
APP-20	PV-APP-20-1214	12/16/2014	Cobalt-60	<	2.6	routine
APP-20	PV-APP-20-1214	12/16/2014	Cesium-134	<	2.6	routine
APP-21	PV-APP-21-0514	5/13/2014	Tritium	<	302	routine
APP-21	PV-APP-21-0514	5/13/2014	Cesium-137	<	2	routine
APP-21	PV-APP-21-0514	5/13/2014	Cobalt-60	<	2.2	routine
APP-21	PV-APP-21-0514	5/13/2014	Cesium-134	<	2.2	routine
APP-21	PV-APP-21-0814	8/26/2014	Tritium	<	272	quarterly contingency
APP-21	PV-APP-21-0814	8/26/2014	Cesium-137	<	1.9	quarterly contingency
APP-21	PV-APP-21-0814	8/26/2014	Cobalt-60	<	1.9	quarterly contingency
APP-21	PV-APP-21-0814	8/26/2014	Cesium-134	<	2	quarterly contingency
APP-21	PV-APP-21-1014	10/28/2014	Tritium	<	269	quarterly contingency
APP-21	PV-APP-21-1014	10/28/2014	Cesium-137	<	2.3	quarterly contingency
APP-21	PV-APP-21-1014	10/28/2014	Cobalt-60	<	2.5	quarterly contingency
APP-21	PV-APP-21-1014	10/28/2014	Cesium-134	<	2.6	quarterly contingency
APP-22	PV-APP-22-0514	5/12/2014	Tritium	<	302	routine
APP-22	PV-APP-22-0514	5/12/2014	Cesium-137	<	2.5	routine
APP-22	PV-APP-22-0514	5/12/2014	Cobalt-60	<	2.3	routine
APP-22	PV-APP-22-0514	5/12/2014	Cesium-134	<	2.4	routine
APP-22	PV-APP-22-1114	11/24/2014	Tritium	<	275	routine
APP-22	PV-APP-22-1114	11/24/2014	Cesium-137	<	1.8	routine
APP-22	PV-APP-22-1114	11/24/2014	Cobalt-60	<	1.9	routine
APP-22	PV-APP-22-1114	11/24/2014	Cesium-134	<	2.1	routine

Monitoring Well	Sample Name	Sample Date	Parameter	Concentration (pCi//L)		Purpose
APP-23	PV-APP-23-0114	1/28/2014	Tritium	<	279	ambient monitoring
APP-23	PV-APP-23-0114	1/28/2014	Cesium-137	<	2.3	ambient monitoring
APP-23	PV-APP-23-0114	1/28/2014	Cobalt-60	<	2.4	ambient monitoring
APP-23	PV-APP-23-0114	1/28/2014	Cesium-134	<	2.5	ambient monitoring
APP-23	PV-APP-23-0514	5/13/2014	Tritium	<	302	ambient monitoring
APP-23	PV-APP-23-0514	5/13/2014	Cesium-137	<	2.5	ambient monitoring
APP-23	PV-APP-23-0514	5/13/2014	Cobalt-60	<	2.3	ambient monitoring
APP-23	PV-APP-23-0514	5/13/2014	Cesium-134	<	2.3	ambient monitoring
APP-23	PV-APP-23-0814	8/26/2014	Tritium	<	272	ambient monitoring
APP-23	PV-APP-23-0814	8/26/2014	Cesium-137	<	2.6	ambient monitoring
APP-23	PV-APP-23-0814	8/26/2014	Cobalt-60	<	2.4	ambient monitoring
APP-23	PV-APP-23-0814	8/26/2014	Cesium-134	<	2.6	ambient monitoring
APP-23	PV-APP-23-1214	12/16/2014	Tritium	<	288	ambient monitoring
APP-23	PV-APP-23-1214	12/16/2014	Cesium-137	<	1.8	ambient monitoring
APP-23	PV-APP-23-1214	12/16/2014	Cobalt-60	<	2	ambient monitoring
APP-23	PV-APP-23-1214	12/16/2014	Cesium-134	<	2.2	ambient monitoring
APP-3	PV-APP-3-0114	1/28/2014	Tritium	<	279	routine
APP-3	PV-APP-3-0114	1/28/2014	Cesium-137	<	2	routine
APP-3	PV-APP-3-0114	1/28/2014	Cobalt-60	<	2.2	routine
APP-3	PV-APP-3-0114	1/28/2014	Cesium-134	<	2.1	routine
APP-4R	PV-APP-4R-0414	4/30/2014	Tritium	<	262	routine
APP-4R	PV-APP-4R-0414	4/30/2014	Cesium-137	<	2.1	routine
APP-4R	PV-APP-4R-0414	4/30/2014	Cobalt-60	<	2.2	routine
APP-4R	PV-APP-4R-0414	4/30/2014	Cesium-134	<	2.4	routine
APP-4R	PV-APP-4R-1214	12/15/2014	Tritium	<	288	routine
APP-4R	PV-APP-4R-1214	12/15/2014	Cesium-137	<	1.9	routine
APP-4R	PV-APP-4R-1214	12/15/2014	Cobalt-60	<	1.9	routine
APP-4R	PV-APP-4R-1214	12/15/2014	Cesium-134	<	1.9	routine
APP-5	PV-APP-5-0214	2/25/2014	Tritium	<	244	routine
APP-5	PV-APP-5-0214	2/25/2014	Cesium-137	<	2.1	routine
APP-5	PV-APP-5-0214	2/25/2014	Cobalt-60	<	2.5	routine
APP-5	PV-APP-5-0214	2/25/2014	Cesium-134	<	2.3	routine
APP-7	PV-APP-7-0114	1/28/2014	Tritium	<	279	routine
APP-7	PV-APP-7-0114	1/28/2014	Cesium-137	<	2.4	routine
APP-7	PV-APP-7-0114	1/28/2014	Cobalt-60	<	2.4	routine
APP-7	PV-APP-7-0114	1/28/2014	Cesium-134	<	2.4	routine
APP-9	PV-APP-9-0114	1/28/2014	Tritium	<	278	routine
APP-9	PV-APP-9-0114	1/28/2014	Cesium-137	<	2.4	routine
APP-9	PV-APP-9-0114	1/28/2014	Cobalt-60	<	2.4	routine
APP-9	PV-APP-9-0114	1/28/2014	Cesium-134	<	2.5	routine
APP-9	PV-APP-9-0614	6/5/2014	Tritium	<	244	routine
APP-9	PV-APP-9-0614	6/5/2014	Cesium-137	<	2.1	routine

Monitoring Well	Sample Name	Sample Date	Parameter	Concentration (pCi//L)		Purpose
APP-9	PV-APP-9-0614	6/5/2014	Cobalt-60	<	2.3	routine
APP-9	PV-APP-9-0614	6/5/2014	Cesium-134	<	2.2	routine
APP-9	PV-APP-9-0614-A	6/23/2014	Tritium	<	244	Hydrosleeve testing
APP-9	PV-APP-9-0614-A	6/23/2014	Cesium-137	<	4.6	Hydrosleeve testing
APP-9	PV-APP-9-0614-A	6/23/2014	Cobalt-60	<	4.3	Hydrosleeve testing
APP-9	PV-APP-9-0614-A	6/23/2014	Cesium-134	<	4.8	Hydrosleeve testing
APP-9	PV-APP-9-0614-B	6/23/2014	Tritium	<	244	Hydrosleeve testing
APP-9	PV-APP-9-0614-B	6/23/2014	Cesium-137	<	5.2	Hydrosleeve testing
APP-9	PV-APP-9-0614-B	6/23/2014	Cobalt-60	<	5.4	Hydrosleeve testing
APP-9	PV-APP-9-0614-B	6/23/2014	Cesium-134	<	5.3	Hydrosleeve testing
APP-9	PV-APP-9-0714	7/10/2014	Tritium	<	279	routine
APP-9	PV-APP-9-0714	7/10/2014	Cesium-137	<	5	routine
APP-9	PV-APP-9-0714	7/10/2014	Cobalt-60	<	5.2	routine
APP-9	PV-APP-9-0714	7/10/2014	Cesium-134	<	5.3	routine
APP-9	PV-APP-9-1114	11/5/2014	Tritium	<	269	routine
APP-9	PV-APP-9-1114	11/5/2014	Cesium-137	<	2.3	routine
APP-9	PV-APP-9-1114	11/5/2014	Cobalt-60	<	2.4	routine
APP-9	PV-APP-9-1114	11/5/2014	Cesium-134	<	2.4	routine
PV-14H	PV-PV-14H-0214	2/11/2014	Tritium	<	282	Discretionary
PV-14H	PV-PV-14H-0214	2/11/2014	Cesium-137	<	2.4	Discretionary
PV-14H	PV-PV-14H-0214	2/11/2014	Cobalt-60	<	2.2	Discretionary
PV-14H	PV-PV-14H-0214	2/11/2014	Cesium-134	<	2.4	Discretionary
PV-14H	PV-PV-14H-0514	5/12/2014	Tritium	<	302	routine
PV-14H	PV-PV-14H-0514	5/12/2014	Cesium-137	<	1.9	routine
PV-14H	PV-PV-14H-0514	5/12/2014	Cobalt-60	<	2.1	routine
PV-14H	PV-PV-14H-0514	5/12/2014	Cesium-134	<	2.2	routine
PV-14H	PV-PV-14H-1214	12/1/2014	Tritium	<	275	routine
PV-14H	PV-PV-14H-1214	12/1/2014	Cesium-137	<	2.3	routine
PV-14H	PV-PV-14H-1214	12/1/2014	Cobalt-60	<	2.3	routine
PV-14H	PV-PV-14H-1214	12/1/2014	Cesium-134	<	2.6	routine
PV-193A	PV-PV-193A-0214	2/25/2014	Tritium	<	244	routine
PV-193A	PV-PV-193A-0214	2/25/2014	Cesium-137	<	2.1	routine
PV-193A	PV-PV-193A-0214	2/25/2014	Cobalt-60	<	2	routine
PV-193A	PV-PV-193A-0214	2/25/2014	Cesium-134	<	2.1	routine
PV-195A	PV-PV-195A-0414	4/30/2014	Tritium	<	262	routine
PV-195A	PV-PV-195A-0414	4/30/2014	Cesium-137	<	2	routine
PV-195A	PV-PV-195A-0414	4/30/2014	Cobalt-60	<	2.1	routine
PV-195A	PV-PV-195A-0414	4/30/2014	Cesium-134	<	2.1	routine
PV-195A	PV-PV-195A-1114	11/24/2014	Tritium	<	275	routine
PV-195A	PV-PV-195A-1114	11/24/2014	Cesium-137	<	2.1	routine
PV-195A	PV-PV-195A-1114	11/24/2014	Cobalt-60	<	2.4	routine
PV-195A	PV-PV-195A-1114	11/24/2014	Cesium-134	<	2.3	routine

Monitoring Well	Sample Name	Sample Date	Parameter	Concentration (pCi//L)		Purpose
PV-198AR	PV-PV-198AR-0614-B	6/23/2014	Tritium	<	244	Hydrasleeve testing
PV-198AR	PV-PV-198AR-0614-B	6/23/2014	Cesium-137	<	5.6	Hydrasleeve testing
PV-198AR	PV-PV-198AR-0614-B	6/23/2014	Cobalt-60	<	5.5	Hydrasleeve testing
PV-198AR	PV-PV-198AR-0614-B	6/23/2014	Cesium-134	<	5.4	Hydrasleeve testing
PV-198AR	PV-PV-198AR-0714	7/10/2014	Tritium	<	279	Hydrasleeve testing
PV-198AR	PV-PV-198AR-0714	7/10/2014	Cesium-137	<	4.4	Hydrasleeve testing
PV-198AR	PV-PV-198AR-0714	7/10/2014	Cobalt-60	<	4.2	Hydrasleeve testing
PV-198AR	PV-PV-198AR-0714	7/10/2014	Cesium-134	<	4.7	Hydrasleeve testing
PV-198AR	PV-PV-198AR-0714-A	7/14/2014	Tritium	<	279	Hydrasleeve testing
PV-198AR	PV-PV-198AR-0714-A	7/14/2014	Cesium-137	<	5.3	Hydrasleeve testing
PV-198AR	PV-PV-198AR-0714-A	7/14/2014	Cobalt-60	<	5.4	Hydrasleeve testing
PV-198AR	PV-PV-198AR-0714-A	7/14/2014	Cesium-134	<	5.4	Hydrasleeve testing
PV-198AR	PV-PV-198AR-1114	11/4/2014	Tritium	<	269	routine
PV-198AR	PV-PV-198AR-1114	11/4/2014	Cesium-137	<	1.9	routine
PV-198AR	PV-PV-198AR-1114	11/4/2014	Cobalt-60	<	2.1	routine
PV-198AR	PV-PV-198AR-1114	11/4/2014	Cesium-134	<	2.1	routine
PV-34H	PV-PV-34H-0214	2/25/2014	Tritium	<	244	routine
PV-34H	PV-PV-34H-0214	2/25/2014	Cesium-137	<	2.3	routine
PV-34H	PV-PV-34H-0214	2/25/2014	Cobalt-60	<	2.4	routine
PV-34H	PV-PV-34H-0214	2/25/2014	Cesium-134	<	2.4	routine
PV-Q8	PV-PV-Q8-0214	2/25/2014	Tritium	<	244	routine
PV-Q8	PV-PV-Q8-0214	2/25/2014	Cesium-137	<	2.1	routine
PV-Q8	PV-PV-Q8-0214	2/25/2014	Cobalt-60	<	1.9	routine
PV-Q8	PV-PV-Q8-0214	2/25/2014	Cesium-134	<	2.1	routine
PV-R2AR	PV-PV-R2AR-0414	4/30/2014	Tritium	<	262	routine
PV-R2AR	PV-PV-R2AR-0414	4/30/2014	Cesium-137	<	2.3	routine
PV-R2AR	PV-PV-R2AR-0414	4/30/2014	Cobalt-60	<	2.3	routine
PV-R2AR	PV-PV-R2AR-0414	4/30/2014	Cesium-134	<	2.3	routine
PV-R2AR	PV-PV-R2AR-1214	12/9/2014	Tritium	<	288	routine
PV-R2AR	PV-PV-R2AR-1214	12/9/2014	Cesium-137	<	2.2	routine
PV-R2AR	PV-PV-R2AR-1214	12/9/2014	Cobalt-60	<	2.5	routine
PV-R2AR	PV-PV-R2AR-1214	12/9/2014	Cesium-134	<	2.5	routine

Appendix E

Changes to the PCP

Palo Verde
Nuclear Generating Station

PCP Revision Notice

Page 1 of 1

Originator: Christopher J Tubman	**Ext:** 82-1164	**Date:** 04/01/14

Description of Revision:
76RP-0RW88, Set-Up for the APS CD-600 System Serial Number 5973 and 76RP-0RW89, Operation of the APS CD-600 System Serial Number 5973 are new procedures within the PCP.

☐ Revision is NOT reportable - PRB review, Radiation Protection Director approval, and reporting in the Annual Radioactive Effluent Release Report are not required.

☑ Revision is reportable - Requires PRB review and acceptance, Radiation Protection Director approval, reporting in the Annual Radioactive Effluent Release Report, and a justification for the revision below.

Justification for Revision: (*Ensure the following items are addressed*) (*UFSAR 13.5.2.2.E*)

1. Sufficient information to support the change together with the appropriate analyses or evaluations justifying the change(s), and
2. A determination that the change will maintain the overall conformance of the solidified waste product to existing requirements of Federal, State, or other applicable regulations.

See attached pages for justification for the revision.

Approval: RP Support Services Department Leader,	Signature: Thomas Gray	Date: 4-1-14

As stated in the PVNGS UFSAR 13.5.2.2.E, any changes to the Process Control Program shall become effective after review and acceptance by the PRB (refer to subsection 13.4.2.6.h) and approval by the Radiation Protection Director.

Plant Review Board review and acceptance was obtained on 3-25-14 as documented in meeting minutes.

Approval: Radiation Protection Director	Signature: Calc Mueller	Date: 4-2-2014

76DP-0RP03

Justification for revision

76DP-0RP03, Radwaste Process Control Program describes the Process Control Program (PCP) at Palo Verde Nuclear Generating Station (PVNGS) for processing radioactive wet waste.

The scope of the program includes the processing of radioactive wet waste using plant portable processing systems, and or vendor provided portable processing systems. The process control program provides the procedures and processes by which the processing and packaging of low-level radioactive wet waste is accomplished to provide reasonable assurance compliance with the low-level radioactive waste characteristics requirements of 10CFR 61.56 are met, specifically the absence of free liquid.

76DP-0RP03, Step 3.1.1 lists the procedures considered to be within the scope of the PCP. Procedure 76RP-0RW88, Set-Up for the APS CD-600 System Serial Number 5973 is a new procedure developed with the purpose to provide guidance on the sets up, performance of preoperational checks, and tests on the equipment prior to processing evaporator concentrates. Procedure 76RP-0RW89, Operation of the APS CD-600 System Serial Number 5973 is a new procedure developed with the purpose to give guidance on the processing of evaporator concentrates to provide reasonable assurance the free liquid criteria for waste disposal is met. These new procedure are considered within the scope of the PCP, and represent a change in the scope of the PCP as described in step 3.7.2.2. The addition of 76RP-0RW88 and 76RP-0RW89 is a reportable change to the PCP and requires review and acceptance by the Plant Review Board and approval by the Director of Radiation Protection.

An evaluation of a reportable change is required in accordance with UFSAR 13.5.2.2.E . The evaluation will contain sufficient information to support the change together with the appropriate analyses or evaluations justifying the change and a determination that the change will maintain overall conformance of the solidified waste product to the existing requirements of Federal, State, or other applicable regulations.

The scope of the PCP is being changed due to the addition of two new procedures to the program. Procedure 76RP-0RW88, Set Up for the APS CD-600 System Serial Number 5973 is a new procedure developed with the purpose to provide guidance on the sets up, performance of preoperational

checks, and tests on the equipment prior to processing evaporator concentrates. This procedure does not contain processing parameters that will impact the waste characteristics of the final product; therefore, the change does not impact the conformance of the waste product to the existing requirements of Federal, State, or other applicable regulations. Procedure 76RP-0RW89, Operation of the APS CD-600 System Serial Number 5973 is a new procedure developed with the purpose to give guidance on the processing of evaporator concentrates to provide reasonable assurance the free liquid criteria for waste disposal is met in accordance with the existing requirements of Federal, State, or other applicable regulations. The processing parameters for the CD-600 System Serial Number 5973 are identical to the processing parameters employed for the transfer of evaporator concentrates from the original CD-600 System Serial Number 4969. The use of these established processing parameters will provide reasonable assurance the free liquid criteria is met.

10 CFR 50.59 Screening and Evaluation, S-06-0462, was performed to review the use of the mobile RWE NUKEM Corporation CD-600 Solid Radwaste Processing System in 2006. This processing system is still used at Palo Verde and is further designated with the serial number 4969. RWE NUKEM was acquired by EnergySoultions, and the EnergySolutions CD-600 serial 5973 is essentially the same design with upgraded instrumentation and electronics such as human machine interface screens and program logic control.

In accordance with 93DP-0LC07-01, 10 CFR 50.59 and 72.48 Administrative Guideline, step 5.2.1.1.b, no further screening is required since the two pieces of equipment are similar in design and perform the same function. The technical arguments to support S-06-0462 are correct for the set up and operation of both CD-600 systems.

10 CFR 50.59 SCREENING

Screening/Evaluation Number: S-06-0462 **Revision:** 0

ACTIVITY UNDER REVIEW (DOCUMENT NUMBER/REVISION NUMBER):

76RP-0RW78, R 0, "CD-600 System Setup" 76RP-0RW79, R 1, "CD-600 System Operations"

DESCRIPTION OF PROPOSED ACTIVITY:

Review use of the mobile RWE NUKEM Corporation (RNC) CD-600 Solid Radwaste Processing System at PVNGS along with setup and operating procedures for compliance with the PVNGS PCP and all regulations and quidance concerning the processing and product waste form produced from the processing of wet radioactive waste in the CD-600.

(continue on Response Justification Page)

10 CFR 50.59 SCREENING	**NO**	**YES**
1. Does the proposed activity adversely affect a design function described in the UFSAR?	X	
2. Does the proposed activity adversely affect the method of performing or controlling a design function described in the UFSAR?	X	
3. Does the proposed activity replace or adversely revise an evaluation or method of evaluation described in the UFSAR?	X	
4. Does the proposed activity involve a test or experiment not described in the UFSAR, where an SSC is used or controlled in a manner that is outside the reference bounds of the design for the SSC or is inconsistent with analyses or descriptions as provided in the UFSAR?	X	
5. Does the proposed activity require a change to the Technical Specifications?	X	

I verify that the above screening is accurate and that I am currently qualified to perform activities as a 10 CFR 50.59 Screener/Reviewer.

Heckman, David J (Z00977)

Digitally signed by Heckman, David J(Z00977)
DN: CN = Heckman, David J (Z00977)
Reason: I am the author of this document.
Date: 2006.11.16 07:51:05 -07'00'

SCREENER (Digital Signature)

Murphy, Thomas W (Z01906)

Digitally signed by Murphy, Thomas W(Z01906)
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Reason: I have reviewed this document.
Date: 2006.11.16 07:57:38 -07'00'

REVIEWER (Digital Signature)

10 CFR 50.59 EVALUATION

Screening/Evaluation Number: S-06-0462 **Revision:** 0

ACTIVITY UNDER REVIEW (DOCUMENT NUMBER/REVISION NUMBER):
76RP-0RW78, R 0, "CD-600 System Setup" 76RP-0RW79, R 1, "CD-600 System Operations"

10 CFR 50.59 EVALUATION	**NO**	**YES**
1. Does the proposed activity result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the UFSAR?	____	____
2. Does the proposed activity result in more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC important to safety previously evaluated in the UFSAR?	____	____
3. Does the proposed activity result in more than a minimal increase in the consequences of an accident previously evaluated in the UFSAR?	____	____
4. Does the proposed activity result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the UFSAR?	____	____
5. Does the proposed activity create a possibility for an accident of a different type than any previously evaluated in the UFSAR?	____	____
6. Does the proposed activity create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in the UFSAR?	____	____
7. Does the proposed activity result in a design basis limit for a fission product barrier as described in the UFSAR being exceeded or altered?	____	____
8. Does the proposed activity result in a departure from a method of evaluation described in the UFSAR used in establishing the design bases or in the safety analyses?	____	____

I verify that the above evaluation is accurate and that I am currently qualified to perform activities as a 10 CFR 50.59 Evaluator/Reviewer.

EVALUATOR (Digital Signature)

REVIEWER (Digital Signature)

SCREENING/EVALUATION NUMBER:	REVISION:
S-06-0462	0

ACTIVITY UNDER REVIEW:
76RP-0RW78, R 0, "CD-600 System Setup" 76RP-0RW79, R 1, "CD-600 System Operations"

RESPONSE JUSTIFICATION

INTRODUCTION:
The RWE NUKEM CD-600 solid radwaste processing system (CD-600) is an upgrade to the portable CD-1000 solid radwaste processing model used at PVNGS. Because of the abandonment-in-place of the original installed Hittman system (per SARCN #3476 in 1994), PVNGS can currently only process radioactive concentrates using temporary, portable technologies. Succinctly, processing through both systems occurs after liquid waste is reduced in volume to the capabilities of the installed LRS system and is collected in the form of concentrates in the Concentrate Monitor Tanks (CMTs). These concentrates are held and recirculated until they can be transferred through the truck connection valve (SRN-V111) via the Wet Waste Processing Subsystem (described in section UFSAR 11.4.2) of the Solid Waste Management System. Waste is then transferred to a processing system (in this instance the CD-600) designed to create a final product that meets the PVNGS PCP. As per UFSAR section 11.4.2.3, complete waste processing is IAW 76DP-0RP03, "Radwaste Process Control Program."

Use of the CD-1000 was evaluated in February of 2002 IAW the 10CFR50.59 evaluation process as implemented by site procedure 93DP-0LC07, "10 CFR 50.59 and 72.48 Screenings and Evaluations." At the time the evaluation was performed, it was determined that the connection of the CD-1000 to PVNGS systems "screened out" of the 10CFR50.59 process by reasons cited in an Applicability Determination (AD) documented in letter 115-02371-TSG/MHS (attachment). Specifics of this AD identified that connecting a mobile waste processing system does not constitute a temporary or permanent change to the power production facility as per section 1.2 and the flow chart in Appendix D of 93DP-0LC07, Revision 5. This Screening coheres to the findings of the 2002 AD as it applies to connecting the CD-1000 to plant systems and extends the AD to include the connection of the CD-600, which is similar to the CD-1000 in design and identical in its interface with plant systems. However, questions have arisen as to whether or not the very presence and use of a portable solid waste processing system at PVNGS:

1. Changes a design function as per Regulatory Guide 1.143, "Design guidance for Radioactive Waste Management Systems, Structures and Components Installed in Light-Water–Cooled Nuclear Power Plants,"
2. Constitutes an "unreviewed safety question" as per IE Circular 80-18, "10CFR50.59 Safety Evaluations for Changes to Radioactive Waste Treatment Systems,"
3. Requires a revision to an evaluation described in the PVNGS UFSAR,
4. Produces a final waste form that conforms to the PVNGS Process Control Program (PCP) IAW UFSAR 11.4.2.

Section 1.8 of the UFSAR commits PVNGS to Regulatory Guide 1.143 with exceptions. The CD-600 is constructed by RWE NUKEM to meet the guidance of ANSI/ANS-40.37-1993, "Standard for Low-Level Radioactive Waste Processing Systems," and the intent of R.G. 1.143. As a mobile radioactive waste processing system, the CD-600 meets the quality criteria of R.G. 1.143 as part of NUKEM's contractual agreement with PVNGS.

IEC 80-18, "10CFR50.59 Safety Evaluations for Changes to Radioactive Waste Treatment Systems" was written in August of 1980 and is still active and endorsed by HPPOS-086. IEC 80-18 instructs compliance with elements of 10CFR50.59 that are not in the current (Oct 4, 1999), amended (Dec 14, 2001) revision of 10CFR50.59. For instance, the term "unreviewed safety question" is no longer used, and documented screenings and applicability determinations were not part of 50.59 in 1980. Functionally, it is apparent that the intent of 80-18 was to reinforce the requirements of 10CFR50.59 which were not generally being applied to radioactive waste treatment systems across the industry. It is the position of PVNGS Radiological Engineering that the proper way to implement IEC 80-18 is by strictly adhering to the 50.59 process in its current revision as implemented by procedure 93DP-0CL07, with the following specifically considered in the evaluation:

- **The need for PRB review per UFSAR** – PRB review is necessary for this action as discussed in answering question 2.
- **Evaluation against Regulatory Guide 1.143** – In this action, all PVNGS radwaste SSCs are used in accordance with their design functions (note previous discussion on LRS, SRS and Wet Waste Subsystem). As previously discussed, the CD-600 meets the intent of R.G. 1.143.
- **Evaluation against Regulatory Guide 1.21 and UFSAR, section 11.5 for effluent monitoring and sampling controls.** - The Effluent Monitoring Program is implemented at PVNGS per 74DP-9CY08, "Radiological Monitoring Program." Operation of the CD-600 is within the Radwaste Building and is therefore bounded by in-plant RMS monitoring. No additional monitoring is necessary, nor is a change necessary to the ODCM. IEC 80-18 also requires that this action be bounded for uncontrolled releases to a small fraction of the 10CFR100 guidelines. This bounding is discussed in depth in answering question 1.

SCREENING/EVALUATION NUMBER:	REVISION:
S-06-0462	0

ACTIVITY UNDER REVIEW:
76RP-0RW78, R 0, "CD-600 System Setup" 76RP-0RW79, R 1, "CD-600 System Operations"

RESPONSE JUSTIFICATION

The following UFSAR requirements were also considered during this screening:

TRM 5.0.500.4, "Radioactive Effluent Controls Program" promulgates the PVNGS ODCM and effluent release limits to members of the public. As previously discussed, effluents from the CD-600 are through the RW Building ventilation system, which is monitored. No changes to the ODCM are necessary as a result of this action. Catastrophic release is bounded by PVNGS UFSAR, 15.7.2, 15.7.3 and 2.4.13.

Table 9.5-1 of the UFSAR addresses the issue of fire protection in the Radwaste Truck Bay where the CD-600 is operated. Notably, the area is not designated as a safety-related area as per UFSAR 9B.2.10.2. The only consequence of a fire might be the release of the contents of the evaporator body, which is bounded by PVNGS UFSAR, 15.7.2, 15.7.3 and 2.4.13.

TRM 5.0.500.17, "Process Control Program (PCP)," requires the maintenance of a PCP program. Changes will be initiated to 76DP-0RP03, "Radwaste Process Control Program," section 3.1.1 to add new CD-600 procedures, 76RP-0RW78, "CD-600 System Setup," and 76RP-0RW79, "CD-600 System Operations."

TLCO 3.10.200, "Liquid Holdup Tanks," imposes a 60 Curie limit to all outdoor radwaste tanks that are not surrounded by liners, dikes, or walls. The CD-600 will be operated inside the Radwaste Building and is therefore, not subject to this limit. However, even if the CD-600 were used outside, it would not reach the 60 Curie limit. Using the UFSAR maximum inventories for the CMTs from Table 12.2-5, a total curie content of approximately 866 Curies can be derived. Since the CD-600 can hold only 1/50 of the contents of the CMT, the maximum curie content for the CD-600 would be below 18 Curies.

QUESTIONS:

Question 1) Does the proposed activity adversely affect a design function described in the UFSAR? NO

The design bases for the Liquid and Solid waste management systems that might be challenged by this action are described in Sections 11.2.1.C (10CFR50 Appendix I release limits) and 11.4.1.A (SRS process capabilities) of the UFSAR. As per the introduction, the CD-600 is constructed by RWE NUKEM under a Quality Assurance Program that meets ANSI/ANS-40.37-1993 and the intent of R.G. 1.143 and provides the capability to process and package wet waste. Therefore, this activity does not adversely affect the design function of the SRS described in 11.4.1.A.

Stated as part of the design basis in section 11.2.1.C, is the consideration of the effect of LRS design on dose to the public within 50 miles of the site (per 10CFR50 Appendix I). While the CD-600 is technically not part of the LRS, it is processing liquid radwaste; therefore, the impact of its operation on dose to the public should be considered pursuant to NEI 96-07 and 10CFR50.59.

The CD-600 evaporator chamber processes concentrates in batches received from the CMTs. While the CMTs each hold 5,000 gallons of concentrates, the CD-600 can only process 100 gallons (200 for the CD-1000) at any given time. Each batch is dried and the product drummed in DOT-7A containers prior to receiving another subsequent batch. Since the CD-600 is located in the RW Building and all liquids would be captured by the designed berms and drain system, gaseous release from such an accident is of primary concern. During normal operation the CD-600 vents to the RW Building ventilation system, hence any release of radioactive material from the CD-600 is monitored and quantified by the plant RMS system and station procedures. In the event of a leak, the consequences of a complete breach of the CD-600 could easily be bounded by determining the consequences of a postulated rupture of a CMT (which could contain 50 times more activity than the CD-600). During licensing, PVNGS chose to use a Refueling Water Tank (RWT) rupture as its bounding Liquid Tank Failure in UFSAR sections 15.7.2 and 15.7.3. This was found acceptable to the NRC as noted in Q&A 15A.4 (NRC Question 460.19); however, the NRC did perform an analysis of a rupture in our CMTs per Standard Review Plan (NUREG-0800) SER 15.4.9. The conclusions reached in UFSAR SER 15.4.9 were that a catastrophic failure of the CMT would result in dose to the public <1% of applicable 10CFR20 limits. The analysis in UFSAR 15.7.3.4 demonstrates that a catastrophic failure of the RWT would result in dose to the public <1% of applicable 10CFR100 limits. In both scenarios, dose to the public within 50 miles is maintained within the limits of 10CFR50, Appendix I.

SCREENING/EVALUATION NUMBER:	REVISION:
S-06-0462	0

ACTIVITY UNDER REVIEW:
76RP-0RW78, R 0, "CD-600 System Setup" 76RP-0RW79, R 1, "CD-600 System Operations"

[redacted]

RESPONSE JUSTIFICATION

Hence, normal operation as well as the consequence of a catastrophic rupture of the CD-600 is bounded by existing analysis and will not adversely affect the design basis cited in UFSAR 11.2.1.

The description of the Low Level Storage Area (LLSA) in section 11.4.2 identifies that, by design, there is 350 square feet of usable floor area in the LLSA. Operation of the CD-600 constitutes an appropriate use of this floor space. Therefore, the presence of the CD-600 does not constitute a condition adverse to the design of the LLSA.

UFSAR ALARA design Table 12.1-1 identifies the design radiation zones for areas within the plant. Drawing 13-N-RAR-002 shows that the Low Level Storage Area, in which processing and temporary storage occur, is a radiation zone 3 with design dose rates below 2.5 mR/hr. Drums of processed wet waste with dose rates of several hundred mRem/hr have been produced at PVNGS using the CD-1000. Drums of waste are temporarily posted, then shielded by placing them in large shielding containers. A review of routine area radiation surveys indicates that the general area in the Low Level Storage Area has consistently been maintained below 2 mR/hr and excursions above 2.5 mR/hr have been temporary, with posting and access control IAW the PVNGS RP Program. Therefore, the processing of waste with the CD-600 does not constitute a condition adverse to the designed radiation zone 3 designation for the LLSA.

Question 2) Does the proposed activity adversely affect the method of performing or controlling a design function described in the UFSAR? NO

The methods of performing and controlling the design functions identified in USFAR 11.2.1 and 11.4.1 for the LRS and SRS are contained in the site PCP (see answer to question 1). Because the CD-600 is marginally different than the CD-1000, new procedures have been written for the setup and operation of the unit. Setup of the CD-600 is IAW new procedure 76RP-0RW78, "CD-600 System Setup," and operation is IAW 76RP-0RW79, "CD-600 System Operations." Procedures for Radioactive Waste Management are identified in UFSAR 13.5.2.2.E. Accordingly, changes to the PCP must be reviewed by the Plant Review Board (PRB) prior to becoming effective. IAW 76DP-0RP03, "Radwaste Process Control Program," step 3.7.1.1 states:

> *Any change in processing parameters that could cause an alteration in the final waste product characteristics (e.g., changing: minimum dewatering /drying times or temperatures, processing time or temperature for concentrate evaporation, vendors, or methods for processing liquid waste, etc.).*

Because the CD-600 will reduce processing times and will process smaller volume batches, the use of the CD-600 requires PRB approval. PRB approval for the use of the CD-600 is also conservatively necessary per 13.4.2.6 (h), as this action may be perceived to be a "*major change*" to the solid waste treatment system.

76DP-0RP03, "Radwaste Process Control Program" will require an administrative change to include the CD-600 procedures to section 3.1.1, "PCP Procedures." However, by design, the CD-600 will produce the same final waste product as that produced by the CD-1000. Therefore, this action does not adversely affect the method of performing or controlling the design function of the LRS and the SRS as described in the UFSAR.

Question 3) Does the proposed activity replace or adversely revise an evaluation or method of evaluation described in the UFSAR? NO

Evaluations relevant to this action are those concerning the wet waste product waste form (per PCP) and those involved in determining the consequences of an uncontrolled release in the form of a rupture of the CD-600 evaporator.

CD-600 product waste form is per 76DP-0RP03, "Radwaste Process Control Program," IAW NRC Technical Position on Waste Form, Rev 1, January 1991, 10CFR61, 10CFR71 and other pertinent publications. Administrative changes to the PCP resulting from this action are pending as discussed in the answer to question 2.

SCREENING/EVALUATION NUMBER:	REVISION:
S-06-0462	0

ACTIVITY UNDER REVIEW:
76RP-0RW78, R 0, "CD-600 System Setup" 76RP-0RW79, R 1, "CD-600 System Operations"

RESPONSE JUSTIFICATION

PVNGS used a Refueling Water Tank (RWT) rupture as its bounding evaluation for a Liquid Tank Failure in UFSAR sections 15.7.2 and 15.7.3. The consequence to ground water of this postulated rupture is addressed in UFSAR section 2.4.13. The evaluation for this Liquid Tank Failure is contained in Calculation 13-NC-ZY-202. The resulting analysis in section 15.7.3.4 demonstrates that a gaseous release from catastrophic failure of the RWT would result in a dose to the public of <1% of 10CFR100 limits. Consequently, this activity is bounded by existing UFSAR analysis and will not require any revision to supporting calculations. Hence, this activity does not replace or adversely revise any evaluation or method of evaluation described in the UFSAR.

Question 4) Does the proposed activity involve a test or experiment not described in the UFSAR, where an SSC is used or controlled in a manner that is outside the reference bounds of the design for the SSC or is inconsistent with analyses or descriptions as provided in the UFSAR? NO

Initial Radwaste system testing criteria for the installed SSCs are located in UFSAR 14.B.48. The CD-600 is not subject to these test criteria, but must meet ANSI/ANS-40.37 and the relevant provisions of R.G. 1.143. All tests and experiments involved in the proper classification of wet wastes are identified in the PCP and its implementing procedures IAW TRM 5.0.500.17. Tests and experiments involved in the PCP are not specifically delineated in the UFSAR; however, they are consistent with analyses and descriptions within the reference bounds of the radioactive waste systems' design and will not be modified as a result of this action.

Question 5) Does the proposed activity require a change to the Technical Specifications? NO

There are no Technical specifications directly associated with connecting or operating a mobile radioactive waste processing unit.

TS 5.7, "High Radiation Area," prescribes the administrative controls for High Radiation Areas at PVNGS. These controls are implemented by the PVNGS RP Program. As discussed in Question 1, the LLSA is subject to excursions in dose rates when processing wet waste with the CD-600. Transitory High Radiation Areas are dealt with by shielding or moving the source to an appropriate storage area and/or by posting and controlling access. No Change is required to TS 5.7.

SCREENING/EVALUATION NUMBER:	REVISION:
S-06-0462	0

ACTIVITY UNDER REVIEW:
76RP-0RW78, R 0, "CD-600 System Setup" 76RP-0RW79, R 1, "CD-600 System Operations"

RESPONSE JUSTIFICATION

REFERENCES:

1) UFSAR, Revision 13, List E, dated 08/2005.
2) 76DP-0RP03, "Radwaste Process Control Program," Rev. 5, effective 6/7/05.
3) 93DP-0LC07, "10 CFR 50.59 and 72.48 Screenings and Evaluations," Revs. 4 (eff. 9/14/01) and 14 (7/11/06-active).
4) PVNGS Letter 115-02371-TSG/MHS, 2/19/02.
5) USNRC IEC 80-18, "10CFR50.59 Safety Evaluations for Changes to Radioactive Waste Treatment Systems," 8/22/1980.
6) USNRC Regulatory Guide 1.143, "Design guidance for Radioactive Waste Management Systems, Structures and Components Installed in Light-Water–Cooled Nuclear Power Plants," Rev. 0, 1978.
7) ANSI/ANS-40.37-1993, "Standard for Low-Level Radioactive Waste Processing Systems."
8) 74DP-9CY08, "Radiological Monitoring Program," Rev. 15, effective 7/28/06.
9) USNRC 10CFR50, "Domestic Licensing of Production and Utilization Facilities," 1/13/1998.
10) NEI 96-07, "Guidelines for 10CFR50.59 Implementation," Revision 1, Nov. 2000.
11) UFSAR SER 15.4.9, "Liquid Tank Failures," November 1981.
12) USNRC Standard Review Plan (NUREG-0800), Section 15.7.3, "Postulated Radioactive Releases Due to Liquid Containing Tank Failures," Rev. 2, July, 1981.
13) PVNGS Drawing 13-N-RAR-002, Rev. 3, 10/21/1997.
14) 76RP-0RW78, "CD-600 System Setup," effective 08/30/06.
15) 76RP-0RW79, "CD-600 System Operations," effective 08/30/06.
16) USNRC 10CFR61, "Licensing Requirements for Land Disposal of Radioactive Waste," as amended 11/2/01.
17) USNRC 10CFR71, "Packaging and Transportation of Radioactive Material," as amended 8/2/2006.
18) PVNGS Calculation 13-NC-ZY-202, "Storage Water Tank Failure, EAB and LPZ Dose," Rev. 11, April 2000.
19) ANSI/ANS-40.37, "Mobile Radioactive Waste Processing Systems," 1993.