Technical Specification 5.6.3
Technical Requirements Manual 3.7.102.4

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

102-07904 MDD/MSC
April 25, 2019

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
Docket Nos. STN 50-528/529/530 and 72-44
Annual Radioactive Effluent Release Report 2018

In accordance with Technical Specification 5.6.3, the 2018 Annual Radioactive Effluent Release Report is enclosed.

PVNGS Technical Requirement Manual section 3.7.102.4 requires an annual report to be prepared and submitted if sealed source or fission detector leakage tests reveal the presence of greater than or equal to 0.005 microcuries of removable contamination. There were no events in 2018 that met this reporting threshold.

No new commitments are being made to the NRC by this letter. Should you need further information regarding this submittal, please contact Matthew S. Cox, Licensing Section Leader, at (623) 393-5753.

Sincerely,

Dilorenzo, Michael D(Z99838)

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Michael D. DiLorenzo
Department Leader, Regulatory Affairs

MDD/TMJ/mg

Enclosure: Palo Verde Nuclear Generating Station Units 1, 2 & 3
2018 Annual Radioactive Effluent Release Report

cc: S. A. Morris NRC Region IV Regional Administrator
S. P. Lingam NRC NRR Project Manager for PVNGS
C. A. Peabody NRC Senior Resident Inspector for PVNGS
B. Goretzki Arizona Department of Health Services – Bureau of Radiation Control (AZDHS)

Enclosure

Palo Verde Nuclear Generating Station
Units 1, 2 & 3
2018 Annual Radioactive Effluent Release Report

PALO VERDE NUCLEAR GENERATING STATION UNITS 1, 2 AND 3

2018 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

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

RCTSAI 1566

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INTRODUCTION

This report summarizes the 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 2018. The data presented meets the reporting requirements of Regulatory Guide 1.21 (Revision 1, June 1974) of the U.S. Nuclear Regulatory Commission and the PVNGS Technical Specifications.

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APPENDIX A: SOURCE TERMS AND EFFLUENT AND WASTE DISPOSAL REPORTS

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 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 mrem to the total body and to less than or equal to 5 mrem to any organ, and

b. During any calendar year to less than or equal to 3 mrem to the total body and to less than or equal to 10 mrem 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 mrem/yr to the total body and less than or equal to 3,000 mrem/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 1,500 mrem/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 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation and,

b. During any calendar year: Less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad 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 mrem to any organ and,

b. During any calendar year: Less than or equal to 15 mrem 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 mrem to the total body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrem.

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

6.1 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 2018.

7.1 There were no revisions to the Process Control Program (PCP) in 2018.

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 effluents releases beyond the site boundary from PVNGS

8.3 Solid Waste

Solid Waste Shipments are summarized in Appendix A.

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 261 acres which is divided into three segments: Pond 1A (131 acres), Pond 1B (77.5 acres) and Pond 1C (52.5 acres). This equates to 3.22E+11 cc evaporated from Pond One for each of the first and fourth quarters and 8.85E+11 cc evaporated for each of the second and third quarters. Evaporation Pond Two is approximately 232 acres which is divided into three segments: Pond 2A (117 acres), Pond 2B (87 acres) and Pond 2C (30 acres). The amount evaporated from Pond Two is 2.86E+11 cc for each of the first and fourth quarters and 7.87E+11 cc for each of the second and third quarters. Pond 2C is a sludge pond and typically not sampled.

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 2.20E+11 cc for each of the first and fourth quarters and 6.04E+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 set points are based on an assumed one percent failed fuel source term. The current method used for the set point values are more reliable than basing the set points 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).

9.5.1 None.

9.6 Sample results from the 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 (all results below the Lower Limit of Detection).

10.0 DISCUSSION

10.1 Unit One

Unit One operated without a refueling outage.

Maintenance outages:
Unit One had one maintenance outage from February 15 to February 18, 2018.

Estimated number of fuel defects[1]											
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 (2R21) from October 6 to December 3, 2018.

Maintenance outages:
Unit Two had one maintenance outage from May 23 to May 25, 2018.

Estimated number of fuel defects											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	0	0	0	0	0	0	0	0

10.3 Unit Three

Unit Three operated with a refueling outage (3R20) from April 7 to May 5, 2018.

[1] Source: Institute of Nuclear Power (INPO), Consolidated Data Entry (CDE)

Maintenance outages:
Unit 3 had one maintenance outage from June 27 to June 30, 2018.

Estimated number of fuel defects[1]											
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 individuals 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 dose is measured in units of millirem. The average American is exposed to 620 millirem of radiation every year. Approximately 311 millirem of this is attributed to 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[2].

The PVNGS calculated production of carbon-14 is 18.5 Curies per operating cycle (500 days) or 13.5 curies per year. The 13.5 curies will be divided equally between each quarter (3.38 curies per reactor). The estimated C-14 activity is included in all of the inhalation and ingestion dose calculations.

[2] Source: NCRP Report No. 160, Table 1.1

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 2018 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 2018, PVNGS released a total of 2,330 curies of tritium (see Table 39).

10.7 Detailed Release Data

CR 18-06915 was generated and included in the 2017 PVNGS ARERR in order to evaluate the potential releases due to the loss of pressure from the waste gas decay tanks (WGDTs). Annual Site boundary doses were estimated for 2015 through 2018. No significant pressure losses contributing to atmospheric release were suspected in 2015. All estimated calculations below are making the conservative assumption that tanks are leaking to atmosphere. It is suspected, based upon observing tank pressures, that the leak pathway is back to the surge tank and not to atmosphere. Leaks from the Gaseous Radioactive (GR) Waste system are detected via a permanently installed radiation monitor, RU-15. RU-15 measures the ambient air concentration from all cubicles from the GR system. Ambient air from the GR system cubicles are processed through the Plant Vent which is monitored by the Plant Vent monitor, RU-143. None of the radionuclides identified in the WGDTs contribute to critical organ dose, only to external dose. Gamma and Beta external dose due to potential leaking WGDTs for 2016, 2017, and 2018 are listed in the tables below and are determined to be inconsequential (<0.0002% of the ODCM limit for beta and gamma external dose each year). Calculations are based on parameters and methodologies of the ODCM using historical meteorology. Dose is calculated to a hypothetical individual. An Engineering Evaluation (EE 4891667) has been developed in order to detect locations of leaks in the GR system along with an open Action Item (18-13934-003) to fix the leaks as needed.

Radiation Doses At and Beyond the Site Boundary in 2016 from Potential Leaking WGDTs		
	Unit	Year total
Total Activity Released	Ci	1.08E-01
Gamma Air Dose	mrad	1.65E-05
ODCM Req 4.1 Limit	mrad	1.00E+01
% ODCM Limit	%	1.65E-04
Beta Air Dose	mrad	2.78E-05
ODCM Req 4.1 Limit	mrad	2.00E+01
% ODCM Limit	%	1.39E-04

Radiation Doses At and Beyond the Site Boundary in 2017 from Potential Leaking WGDTs		
	Unit	Year total
Total Activity Released	Ci	6.24E-02
Gamma Air Dose	mrad	6.62E-06
ODCM Req 4.1 Limit	mrad	1.00E+01
% ODCM Limit	%	6.62E-05
Beta Air Dose	mrad	2.18E-05
ODCM Req 4.1 Limit	mrad	2.00E+01
% ODCM Limit	%	1.09E-04

Radiation Doses At and Beyond the Site Boundary in 2018 from Potential Leaking WGDTs		
	Unit	Year total
Total Activity Released	Ci	8.09E-04
Gamma Air Dose	mrad	2.68E-07
ODCM Req 4.1 Limit	mrad	1.00E+01
% ODCM Limit	%	2.68E-06
Beta Air Dose	mrad	3.62E-07
ODCM Req 4.1 Limit	mrad	2.00E+01
% ODCM Limit	%	1.81E-06

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)	1.07E-06	1.02E-06	9.30E-07	8.97E-07	
Tritium Curies	3.46E-01	8.99E-01	8.23E-01	2.89E-01	2.36E+00
Evaporation Pond 2 (2A and 2B)	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year
Historical volume of water evaporated (ml)	2.52E+11	6.92E+11	6.92E+11	2.52E+11	
Tritium Concentration (uCi/cc)	6.53E-07	8.74E-07	8.89E-07	8.89E-07	
Tritium curies	1.64E-01	6.05E-01	6.15E-01	2.24E-01	1.61E+00
Evaporation Pond 3 (3A and 3B)	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year
Historical volume of water evaporated (ml)	2.20E+11	6.04E+11	6.04E+11	2.20E+11	
Tritium Concentration (uCi/cc)	5.41E-07	5.41E-07	5.41E-07	4.45E-07	
Tritium curies	1.19E-01	3.27E-01	3.27E-01	9.76E-02	8.70E-01
Dose (mRem)	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year
Pond 1	4.80E-03	1.25E-02	1.14E-02	4.01E-03	3.27E-02
Pond 2	2.28E-03	8.39E-03	8.54E-03	3.10E-03	2.23E-02
Pond 3	1.65E-03	4.53E-03	4.53E-03	1.35E-03	1.21E-02
Total	8.72E-03	2.54E-02	2.45E-02	8.46E-03	6.71E-02

Table 2: Batch Release Data			
All times are in hours	Unit 1	Unit 2	Unit 3
January - December			
Number of batch releases	44	63	81
Total time period for batch releases	595.71	2588.97	2349.57
Maximum time period for a batch release	113.95	168.0	168.0
Average time period for a batch release	13.54	41.09	29.01
Minimum time period for a batch release	0.50	0.07	0.07

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	4.90E-02	5.15E-02	4.51E-02	6.50E-02	2.11E-01	3.54E+01
2. Average Release Rate for Period	µCi/sec	6.31E-03	6.55E-03	5.67E-03	8.17E-03	6.68E-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	NA	NA	NA	NA	NA	
3. Percent of ODCM Requirement Limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
C. Particulates							
1. Particulates with Half Life >8 days	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	3.43E+01
2. Average Release Rate for Period	µCi/sec	NA	NA	NA	NA	NA	
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	1.21E+02	1.09E+02	1.24E+02	2.35E+02	5.88E+02	3.85E+01
2. Average Release Rate for Period	µCi/sec	1.55E+01	1.38E+01	1.56E+01	2.96E+01	1.87E+01	
3. Percent of ODCM Requirement Limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	

(1) Estimated total error methodology is presented in Table 40.
(2) See Table 11 for percent of ODCM Requirement limits.

Table 5: Unit 1 Gaseous Effluents - Ground Level Releases - Continuous - Fission Gases and Iodines						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year Total
1. Fission gases						
Ar-41	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-83m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
2. Iodines						
I-131	Ci	<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 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	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-136	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Os-191	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Rb-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ru-103	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ru-106	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-122	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-124	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-125	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Se-75	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sn-113m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Tc-99m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Te-123m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
4.Tritium						
H-3	Ci	2.23E+01	1.94E+01	2.00E+01	2.19E+01	8.36E+01

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	4.86E-02	5.09E-02	4.46E-02	6.28E-02	2.07E-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	3.83E-04	6.05E-04	4.75E-04	2.20E-03	3.67E-03
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	2.52E-05	<LLD	<LLD	2.52E-05
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	4.90E-02	5.15E-02	4.51E-02	6.50E-02	2.11E-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 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	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-136	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Os-191	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Rb-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ru-103	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ru-106	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-122	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-124	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-125	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Se-75	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sn-113m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	Note 1	Note 1	Note 1	Note 1	Note 1
Sr-90	Ci	Note 1	Note 1	Note 1	Note 1	Note 1
Tc-99m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Te-123m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
4.Tritium						
H-3	Ci	9.85E+01	8.94E+01	1.04E+02	2.13E+02	5.05E+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	4.86E-02	5.09E-02	4.46E-02	6.28E-02	2.07E-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	3.83E-04	6.05E-04	4.75E-04	2.20E-03	3.67E-03
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	2.52E-05	<LLD	<LLD	2.52E-05
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	4.90E-02	5.15E-02	4.51E-02	6.50E-02	2.11E-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 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	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-136	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Os-191	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Rb-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ru-103	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ru-106	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-122	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-124	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-125	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Se-75	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sn-113m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Tc-99m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Te-123m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total > 8 days	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
4. Tritium						
H-3	Ci	1.21E+02	1.09E+02	1.24E+02	2.35E+02	5.88E+02

Table 11: Unit 1 Radiation Doses At And Beyond The Site Boundary						
	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year Total
Gamma Air Dose	mrad	1.07E-04	1.12E-04	9.83E-05	1.38E-04	4.56E-04
ODCM Req 4.1 Limit	mrad	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
% ODCM Limit	%	2.14E-03	2.24E-03	1.97E-03	2.77E-03	4.56E-03
Beta Air Dose	mrad	3.79E-05	3.97E-05	3.48E-05	4.95E-05	1.62E-04
ODCM Req 4.1 Limit	mrad	1.00E+01	1.00E+01	1.00E+01	1.00E+01	2.00E+01
% ODCM Limit	%	3.79E-04	3.97E-04	3.48E-04	4.95E-04	8.10E-04
Maximum Organ Dose (excluding skin)	mrem	4.04E-02	3.67E-02	4.12E-02	7.48E-02	1.93E-01
Age		Child	Child	Teen	Teen	Teen
Organ		Bone	Bone	T. Body	Lung	Lung
ODCM Req. 4.2 Limit	mrem	7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01
% ODCM Limit	%	5.38E-01	4.89E-01	5.49E-01	9.98E-01	1.29E+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.

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	5.77E-02	8.01E-02	4.45E-01	7.54E-01	1.34E+00	3.54E+01
2. Average Release Rate for Period	µCi/sec	7.42E-03	1.02E-02	5.60E-02	9.49E-02	4.24E-02	
3. Percent of ODCM Requirement Limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
B. Iodine 131							
1. Total Iodine 131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	3.32E+01
2. Average Release Rate for Period	µCi/sec	NA	NA	NA	NA	NA	
3. Percent of ODCM Requirement Limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
C. Particulates							
1. Particulates with Half Life >8 days	Ci	4.15E-06	8.61E-07	7.31E-06	2.16E-05	3.39E-05	3.43E+01
2. Average Release Rate for Period	µCi/sec	5.33E-07	1.10E-07	9.19E-07	2.72E-06	1.08E-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	1.50E+02	2.34E+02	3.06E+02	2.19E+02	9.08E+02	3.85E+01
2. Average Release Rate for Period	µCi/sec	1.93E+01	2.98E+01	3.84E+01	2.75E+01	2.88E+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 13: Unit 2 Gaseous Effluents - Ground Level Releases - Continuous - Fission Gases and Iodines						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year Total
1. Fission gases						
Ar-41	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-83m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
2. Iodines						
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-132	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

Table 14: Unit 2 Gaseous Effluents - Ground Level Releases - Continuous - Particulates						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year Total
3. Particulates						
Ag-110m	Ci	<LLD	<LLD	<LLD	3.11E-06	3.11E-06
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	3.32E-06	3.32E-06
Co-60	Ci	4.15E-06	8.61E-07	7.31E-06	1.18E-05	2.41E-05
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	3.96E-07	3.96E-07
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Os-191	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Rb-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ru-103	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ru-106	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-122	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-124	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-125	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Se-75	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sn-113m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
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	1.02E-06	1.02E-06
Total	Ci	4.15E-06	8.61E-07	7.31E-06	1.96E-05	3.19E-05
4. Tritium						
H-3	Ci	3.64E+01	2.13E+01	2.71E+01	1.44E+02	2.28E+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	4.66E-02	6.47E-02	3.77E-01	1.42E-01	6.31E-01
Kr-83m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	<LLD	<LLD	<LLD	5.31E-04	5.31E-04
Xe-133	Ci	1.11E-02	1.51E-02	6.70E-02	6.11E-01	7.04E-01
Xe-133m	Ci	<LLD	<LLD	<LLD	5.81E-04	5.81E-04
Xe-135	Ci	<LLD	2.99E-04	7.90E-04	4.74E-05	1.14E-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	5.77E-02	8.01E-02	4.45E-01	7.54E-01	1.34E+00
2. Iodines						
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-132	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

Table 16: Unit 2 Gaseous Effluents - Ground Level Releases - Batch - Particulates						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year Total
3. Particulates						
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Br-82	Ci	<LLD	<LLD	<LLD	3.97E-07	3.97E-07
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	9.80E-07	9.80E-07
Co-60	Ci	<LLD	<LLD	<LLD	8.03E-07	8.03E-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	5.84E-08	5.84E-08
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	1.64E-07	1.64E-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	<LLD	<LLD	<LLD	2.40E-06	2.40E-06
4. Tritium						
H-3	Ci	1.13E+02	2.13E+02	2.78E+02	7.49E+01	6.79E+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	4.66E-02	6.47E-02	3.77E-01	1.42E-01	6.31E-01
Kr-83m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	<LLD	<LLD	<LLD	5.31E-04	5.31E-04
Xe-133	Ci	1.11E-02	1.51E-02	6.70E-02	6.11E-01	7.04E-01
Xe-133m	Ci	<LLD	<LLD	<LLD	5.81E-04	5.81E-04
Xe-135	Ci	<LLD	2.99E-04	7.90E-04	4.74E-05	1.14E-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	5.77E-02	8.01E-02	4.45E-01	7.54E-01	1.34E+00
2. Iodines						
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-132	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

Table 18: Unit 2 Gaseous Effluents - Continuous and Batch -Particulates						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year Total
3. Particulates						
Ag-110m	Ci	<LLD	<LLD	<LLD	3.11E-06	3.11E-06
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Br-82	Ci	<LLD	<LLD	<LLD	3.97E-07	3.97E-07
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	4.30E-06	4.30E-06
Co-60	Ci	4.15E-06	8.61E-07	7.31E-06	1.26E-05	2.49E-05
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	4.54E-07	4.54E-07
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	1.64E-07	1.64E-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	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
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	1.02E-06	1.02E-06
Total	Ci	4.15E-06	8.61E-07	7.31E-06	2.20E-05	3.43E-05
Total > 8 days	Ci	<LLD	<LLD	<LLD	3.11E-06	3.11E-06
4. Tritium						
H-3	Ci	1.50E+02	2.34E+02	3.06E+02	2.19E+02	9.08E+02

Table 19: Unit 2 Radiation Doses At And Beyond The Site Boundary						
	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year Total
Gamma Air Dose	mrad	1.09E-04	1.52E-04	8.84E-04	3.81E-04	1.53E-03
ODCM Req 4.1 Limit	mrad	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
% ODCM Limit	%	2.19E-03	3.04E-03	1.77E-02	7.63E-03	1.53E-02
Beta Air Dose	mrad	4.24E-05	5.88E-05	3.35E-04	3.44E-04	7.79E-04
ODCM Req 4.1 Limit	mrad	1.00E+01	1.00E+01	1.00E+01	1.00E+01	2.00E+01
% ODCM Limit	%	4.24E-04	5.88E-04	3.35E-03	3.44E-03	3.90E-03
Maximum Organ Dose (excluding skin)	mrem					
Age		Teen	Teen	Child	Child	Teen
Organ		Lung	Thyroid	Bone	Bone	Thyroid
ODCM Req. 4.2 Limit	%	7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01
% ODCM Limit	%	6.92E-01	1.05E+00	1.35E+00	9.85E-01	2.04E+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 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	2.05E-01	1.47E-01	8.48E-02	9.12E-02	5.27E-01	3.54E+01
2. Average Release Rate for Period	µCi/sec	2.63E-02	1.87E-02	1.07E-02	1.15E-02	1.67E-02	
3. Percent of ODCM Requirement Limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
B. Iodine 131							
1. Total Iodine 131	Ci	<LLD	3.23E-05	<LLD	<LLD	3.23E-05	3.32E+01
2. Average Release Rate for Period	µCi/sec	NA	4.10E-06	NA	NA	1.02E-06	
3. Percent of ODCM Requirement Limit	%	NA (2)	NA (2)	NA (2)	NA (2)	NA (2)	
C. Particulates							
1. Particulates with Half Life >8 days	Ci	< LLD	5.02E-04	< LLD	< LLD	5.02E-04	3.43E+01
2. Average Release Rate for Period	µCi/sec	NA	6.38E-05	NA	NA	1.59E-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	4.76E+02	1.14E+02	1.42E+02	1.04E+02	8.37E+02	3.85E+01
2. Average Release Rate for Period	µCi/sec	6.12E+01	1.45E+01	1.79E+01	1.31E+01	2.65E+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 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	3.19E-05	<LLD	<LLD	3.19E-05
I-132	Ci	<LLD	4.84E-04	<LLD	<LLD	4.84E-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	5.16E-04	<LLD	<LLD	5.16E-04

Table 22: Unit 3 Gaseous Effluents - Ground Level Releases - Continuous - Particulates						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year Total
3. Particulates						
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Br-82	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	1.22E-04	<LLD	<LLD	1.22E-04
Co-60	Ci	<LLD	4.86E-05	<LLD	<LLD	4.86E-05
Cr-51	Ci	<LLD	2.23E-04	<LLD	<LLD	2.23E-04
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-136	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	5.78E-06	<LLD	<LLD	5.78E-06
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	8.03E-06	<LLD	<LLD	8.03E-06
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	4.38E-05	<LLD	<LLD	4.38E-05
Os-191	Ci	<LLD	1.12E-05	<LLD	<LLD	1.12E-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	<LLD	<LLD	<LLD	<LLD	<LLD
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	2.37E-05	<LLD	<LLD	2.37E-05
Total	Ci	<LLD	4.86E-04	<LLD	<LLD	4.86E-04
4. Tritium						
H-3	Ci	2.71E+01	2.84E+01	3.23E+01	2.72E+01	1.15E+02

Table 23: Unit 3 Gaseous Effluents - Ground Level Releases - Batch - Fission Gases and Iodines						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year Total
1. Fission gases						
Ar-41	Ci	2.05E-01	1.45E-01	8.46E-02	8.93E-02	5.24E-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	1.49E-03	1.56E-04	1.87E-03	3.51E-03
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	2.05E-01	1.47E-01	8.48E-02	9.12E-02	5.27E-01
2. Iodines						
I-131	Ci	<LLD	3.36E-07	<LLD	<LLD	3.36E-07
I-132	Ci	<LLD	1.15E-05	<LLD	<LLD	1.15E-05
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total	Ci	<LLD	1.19E-05	<LLD	<LLD	1.19E-05

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	2.91E-07	<LLD	<LLD	2.91E-07
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	3.66E-06	<LLD	<LLD	3.66E-06
Co-60	Ci	<LLD	2.00E-06	<LLD	<LLD	2.00E-06
Cr-51	Ci	<LLD	6.96E-06	<LLD	<LLD	6.96E-06
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-136	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	1.67E-08	<LLD	<LLD	1.67E-08
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	3.18E-07	<LLD	<LLD	3.18E-07
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	2.32E-07	<LLD	<LLD	2.32E-07
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	1.68E-06	<LLD	<LLD	1.68E-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	1.15E-06	<LLD	<LLD	1.15E-06
Total	Ci	<LLD	1.63E-05	<LLD	<LLD	1.63E-05
4. Tritium						
H-3	Ci	4.49E+02	8.59E+01	1.10E+02	7.69E+01	7.22E+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	2.05E-01	1.45E-01	8.46E-02	8.93E-02	5.24E-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	1.49E-03	1.56E-04	1.87E-03	3.51E-03
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	2.05E-01	1.47E-01	8.48E-02	9.12E-02	5.27E-01
2. Iodines						
I-131	Ci	<LLD	3.23E-05	<LLD	<LLD	3.23E-05
I-132	Ci	<LLD	4.95E-04	<LLD	<LLD	4.95E-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	5.28E-04	<LLD	<LLD	5.28E-04

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	2.91E-07	<LLD	<LLD	2.91E-07
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	1.25E-04	<LLD	<LLD	1.25E-04
Co-60	Ci	<LLD	5.06E-05	<LLD	<LLD	5.06E-05
Cr-51	Ci	<LLD	2.30E-04	<LLD	<LLD	2.30E-04
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-136	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	1.67E-08	<LLD	<LLD	1.67E-08
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	6.10E-06	<LLD	<LLD	6.10E-06
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	8.26E-06	<LLD	<LLD	8.26E-06
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	4.55E-05	<LLD	<LLD	4.55E-05
Os-191	Ci	<LLD	1.12E-05	<LLD	<LLD	1.12E-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	<LLD	<LLD	<LLD	<LLD	<LLD
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	2.49E-05	<LLD	<LLD	2.49E-05
Total	Ci	<LLD	5.02E-04	<LLD	<LLD	5.02E-04
Total > 8 days	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
4. Tritium						
H-3	Ci	4.76E+02	1.14E+02	1.42E+02	1.04E+02	8.37E+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	5.37E-04	3.82E-04	2.22E-04	2.35E-04	1.38E-03
ODCM Req 4.1 Limit	mrad	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
% ODCM Limit	%	1.07E-02	7.64E-03	4.45E-03	4.69E-03	1.38E-02
Beta Air Dose	mrad	1.90E-04	1.35E-04	7.85E-05	8.35E-05	4.87E-04
ODCM Req 4.1 Limit	mrad	1.00E+01	1.00E+01	1.00E+01	1.00E+01	2.00E+01
% ODCM Limit	%	1.90E-03	1.35E-03	7.85E-04	8.35E-04	2.43E-03
Maximum Organ Dose (excluding skin)	mrem	1.76E-01	4.60E-02	5.59E-02	4.21E-02	3.20E-01
Age		Teen	Teen	Teen	Child	Teen
Organ		Lung	T. Body	Lung	Bone	Lung
ODCM Req. 4.2 Limit	mrem	7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01
% ODCM Limit	%	2.35E+00	6.13E-01	7.45E-01	5.62E-01	2.13E+00

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

Table 28:
Units 1, 2, and 3
Gaseous Effluents - Continuous - Fission Gases and Iodines -
Total By Quarter

Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year Total
1. Fission gases						
Ar-41	Ci	3.00E-01	2.61E-01	5.06E-01	2.94E-01	1.36E+00
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	5.31E-04	5.31E-04
Xe-133	Ci	1.15E-02	1.72E-02	6.76E-02	6.15E-01	7.11E-01
Xe-133m	Ci	<LLD	<LLD	<LLD	5.81E-04	5.81E-04
Xe-135	Ci	<LLD	3.24E-04	7.90E-04	4.74E-05	1.16E-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	3.11E-01	2.78E-01	5.75E-01	9.10E-01	2.07E+00
2. Iodines						
I-131	Ci	<LLD	3.23E-05	<LLD	<LLD	3.23E-05
I-132	Ci	<LLD	4.95E-04	<LLD	<LLD	4.95E-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	5.28E-04	<LLD	<LLD	5.28E-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	3.11E-06	3.11E-06
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Br-82	Ci	<LLD	2.91E-07	<LLD	3.97E-07	6.89E-07
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	1.25E-04	<LLD	4.30E-06	1.30E-04
Co-60	Ci	4.15E-06	5.14E-05	7.31E-06	1.26E-05	7.54E-05
Cr-51	Ci	<LLD	2.30E-04	<LLD	<LLD	2.30E-04
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-136	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	1.67E-08	<LLD	4.54E-07	4.71E-07
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	6.10E-06	<LLD	<LLD	6.10E-06
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	8.26E-06	<LLD	<LLD	8.26E-06
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	4.55E-05	<LLD	1.64E-07	4.57E-05
Os-191	Ci	<LLD	1.12E-05	<LLD	<LLD	1.12E-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	<LLD	<LLD	<LLD	<LLD	<LLD
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	2.49E-05	<LLD	1.02E-06	2.59E-05
Total	Ci	4.15E-06	5.03E-04	7.31E-06	2.20E-05	5.37E-04
4. Tritium						
H-3	Ci	7.47E+02	4.57E+02	5.72E+02	5.58E+02	2.33E+03

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	3.00E-01	2.61E-01	5.06E-01	2.94E-01	1.36E+00
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	5.31E-04	5.31E-04
Xe-133	Ci	1.15E-02	1.72E-02	6.76E-02	6.15E-01	7.11E-01
Xe-133m	Ci	<LLD	<LLD	<LLD	5.81E-04	5.81E-04
Xe-135	Ci	<LLD	3.24E-04	7.90E-04	4.74E-05	1.16E-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	3.11E-01	2.78E-01	5.75E-01	9.10E-01	2.07E+00
2. Iodines						
I-131	Ci	<LLD	3.36E-07	<LLD	<LLD	3.36E-07
I-132	Ci	<LLD	1.15E-05	<LLD	<LLD	1.15E-05
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total	Ci	<LLD	1.19E-05	<LLD	<LLD	1.19E-05

Table 31: Units 1, 2, and 3 Gaseous Effluents - Batch - Particulates - Total By Quarter						
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year Total
3. Particulates						
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Br-82	Ci	<LLD	2.91E-07	<LLD	3.97E-07	6.89E-07
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	3.66E-06	<LLD	9.80E-07	4.64E-06
Co-60	Ci	<LLD	2.00E-06	<LLD	8.03E-07	2.81E-06
Cr-51	Ci	<LLD	6.96E-06	<LLD	<LLD	6.96E-06
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-136	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	1.67E-08	<LLD	5.84E-08	7.51E-08
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	3.18E-07	<LLD	<LLD	3.18E-07
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	2.32E-07	<LLD	<LLD	2.32E-07
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	1.68E-06	<LLD	1.64E-07	1.85E-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	1.15E-06	<LLD	<LLD	1.15E-06
Total	Ci	<LLD	1.63E-05	<LLD	2.40E-06	1.87E-05
4. Tritium						
H-3	Ci	6.61E+02	3.88E+02	4.92E+02	3.65E+02	1.91E+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	3.00E-01	2.61E-01	5.06E-01	2.94E-01	1.36E+00
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	5.31E-04	5.31E-04
Xe-133	Ci	1.15E-02	1.72E-02	6.76E-02	6.15E-01	7.11E-01
Xe-133m	Ci	<LLD	<LLD	<LLD	5.81E-04	5.81E-04
Xe-135	Ci	<LLD	3.24E-04	7.90E-04	4.74E-05	1.16E-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	3.11E-01	2.78E-01	5.75E-01	9.10E-01	2.07E+00
2. Iodines						
I-131	Ci	<LLD	3.23E-05	<LLD	<LLD	3.23E-05
I-132	Ci	<LLD	4.95E-04	<LLD	<LLD	4.95E-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	5.28E-04	<LLD	<LLD	5.28E-04

Table 33:
Units 1, 2, and 3
Gaseous Effluents - Continuous and Batch - Particulates - Total By Quarter

Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year Total
3. Particulates						
Ag-110m	Ci	<LLD	<LLD	<LLD	3.11E-06	3.11E-06
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Br-82	Ci	<LLD	2.91E-07	<LLD	3.97E-07	6.89E-07
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	1.25E-04	<LLD	4.30E-06	1.30E-04
Co-60	Ci	4.15E-06	5.14E-05	7.31E-06	1.26E-05	7.54E-05
Cr-51	Ci	<LLD	2.30E-04	<LLD	<LLD	2.30E-04
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-136	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	1.67E-08	<LLD	4.54E-07	4.71E-07
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	6.10E-06	<LLD	<LLD	6.10E-06
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	8.26E-06	<LLD	<LLD	8.26E-06
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	4.55E-05	<LLD	1.64E-07	4.57E-05
Os-191	Ci	<LLD	1.12E-05	<LLD	<LLD	1.12E-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	<LLD	<LLD	<LLD	<LLD	<LLD
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	2.49E-05	<LLD	1.02E-06	2.59E-05
Total	Ci	4.15E-06	5.03E-04	7.31E-06	2.20E-05	5.37E-04
Total > 8 days	Ci	<LLD	<LLD	<LLD	3.11E-06	3.11E-06
4. Tritium						
H-3	Ci	7.47E+02	4.57E+02	5.72E+02	5.58E+02	2.33E+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	2.07E-01	6.31E-01	5.24E-01	1.36E+00
Kr-83m	Ci	<LLD	<LLD	<LLD	<LLD
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD
Kr-89	Ci	<LLD	<LLD	<LLD	<LLD
Kr-90	Ci	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	<LLD	5.31E-04	<LLD	5.31E-04
Xe-133	Ci	3.67E-03	7.04E-01	3.51E-03	7.11E-01
Xe-133m	Ci	<LLD	5.81E-04	<LLD	5.81E-04
Xe-135	Ci	2.52E-05	1.14E-03	<LLD	1.16E-03
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD
Xe-137	Ci	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	2.11E-01	1.34E+00	5.27E-01	2.07E+00
2. Iodines					
I-131	Ci	<LLD	<LLD	3.23E-05	3.23E-05
I-132	Ci	<LLD	<LLD	4.95E-04	4.95E-04
I-133	Ci	<LLD	<LLD	<LLD	<LLD
I-134	Ci	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	<LLD	<LLD	5.28E-04	5.28E-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	3.11E-06	<LLD	3.11E-06
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD
Br-82	Ci	<LLD	3.97E-07	2.91E-07	6.89E-07
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	4.30E-06	1.25E-04	1.30E-04
Co-60	Ci	<LLD	2.49E-05	5.06E-05	7.54E-05
Cr-51	Ci	<LLD	<LLD	2.30E-04	2.30E-04
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD
Cs-136	Ci	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	4.54E-07	1.67E-08	4.71E-07
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	6.10E-06	6.10E-06
La-140	Ci	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	8.26E-06	8.26E-06
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	1.64E-07	4.55E-05	4.57E-05
Os-191	Ci	<LLD	<LLD	1.12E-05	1.12E-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	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD
Tc-99m	Ci	<LLD	<LLD	<LLD	<LLD
Te-123m	Ci	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	1.02E-06	2.49E-05	2.59E-05
Total	Ci	<LLD	3.43E-05	5.02E-04	5.37E-04
4. Tritium					
H-3	Ci	5.88E+02	9.08E+02	8.37E+02	2.33E+03

Table 36: Units 1, 2 and 3 Gaseous Effluents- Batch - Fission Gases and Iodine - Total By Unit					
Nuclides Released	Unit	Unit 1	Unit 2	Unit 3	Total Units 1, 2 and 3
1. Fission gases					
Ar-41	Ci	2.07E-01	6.31E-01	5.24E-01	1.36E+00
Kr-83m	Ci	<LLD	<LLD	<LLD	<LLD
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD
Kr-89	Ci	<LLD	<LLD	<LLD	<LLD
Kr-90	Ci	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	<LLD	5.31E-04	<LLD	5.31E-04
Xe-133	Ci	3.67E-03	7.04E-01	3.51E-03	7.11E-01
Xe-133m	Ci	<LLD	5.81E-04	<LLD	5.81E-04
Xe-135	Ci	2.52E-05	1.14E-03	<LLD	1.16E-03
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD
Xe-137	Ci	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	2.11E-01	1.34E+00	5.27E-01	2.07E+00
2. Iodines					
I-131	Ci	<LLD	<LLD	3.36E-07	3.36E-07
I-132	Ci	<LLD	<LLD	1.15E-05	1.15E-05
I-133	Ci	<LLD	<LLD	<LLD	<LLD
I-134	Ci	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	<LLD	<LLD	1.19E-05	1.19E-05

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	<LLD	3.97E-07	2.91E-07	6.89E-07
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	9.80E-07	3.66E-06	4.64E-06
Co-60	Ci	<LLD	8.03E-07	2.00E-06	2.81E-06
Cr-51	Ci	<LLD	<LLD	6.96E-06	6.96E-06
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD
Cs-136	Ci	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	5.84E-08	1.67E-08	7.51E-08
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	3.18E-07	3.18E-07
La-140	Ci	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	2.32E-07	2.32E-07
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	1.64E-07	1.68E-06	1.85E-06
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	<LLD	<LLD	1.15E-06	1.15E-06
Total	Ci	<LLD	2.40E-06	1.63E-05	1.87E-05
4. Tritium					
H-3	Ci	5.05E+02	6.79E+02	7.22E+02	1.91E+03
Note 1 - Not required for batch releases					

Table 38: Units 1, 2 and 3 Gaseous Effluents- Continuous and Batch - Fission Gases and Iodine - Total By Unit					
Nuclides Released	Unit	Unit 1	Unit 2	Unit 3	Total Units 1, 2 and 3
1. Fission gases					
Ar-41	Ci	2.07E-01	6.31E-01	5.24E-01	1.36E+00
Kr-83m	Ci	<LLD	<LLD	<LLD	<LLD
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD
Kr-89	Ci	<LLD	<LLD	<LLD	<LLD
Kr-90	Ci	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	<LLD	5.31E-04	<LLD	5.31E-04
Xe-133	Ci	3.67E-03	7.04E-01	3.51E-03	7.11E-01
Xe-133m	Ci	<LLD	5.81E-04	<LLD	5.81E-04
Xe-135	Ci	2.52E-05	1.14E-03	<LLD	1.16E-03
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD
Xe-137	Ci	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	2.11E-01	1.34E+00	5.27E-01	2.07E+00
2. Iodines					
I-131	Ci	<LLD	<LLD	3.23E-05	3.23E-05
I-132	Ci	<LLD	<LLD	4.95E-04	4.95E-04
I-133	Ci	<LLD	<LLD	<LLD	<LLD
I-134	Ci	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	<LLD	<LLD	5.28E-04	5.28E-04

Table 39: Units 1, 2 and 3 Gaseous Effluents - Continuous and Batch - Particulates - Total By Unit					
Nuclides Released	Unit	Unit 1	Unit 2	Unit 3	Total Units 1, 2 and 3
3. Particulates					
Ag-110m	Ci	<LLD	3.11E-06	<LLD	3.11E-06
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD
Br-82	Ci	<LLD	3.97E-07	2.91E-07	6.89E-07
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	4.30E-06	1.25E-04	1.30E-04
Co-60	Ci	<LLD	2.49E-05	5.06E-05	7.54E-05
Cr-51	Ci	<LLD	<LLD	2.30E-04	2.30E-04
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD
Cs-136	Ci	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	4.54E-07	1.67E-08	4.71E-07
Cs-138	Ci	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	6.10E-06	6.10E-06
La-140	Ci	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	8.26E-06	8.26E-06
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	1.64E-07	4.55E-05	4.57E-05
Os-191	Ci	<LLD	<LLD	1.12E-05	1.12E-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	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD
Tc-99m	Ci	<LLD	<LLD	<LLD	<LLD
Te-123m	Ci	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	1.02E-06	2.49E-05	2.59E-05
Total	Ci	<LLD	3.43E-05	5.02E-04	5.37E-04
Total > 8 days	Ci	4.15E-06	5.03E-04	7.31E-06	2.16E-05
4. Tritium					
H-3	Ci	5.88E+02	9.08E+02	8.37E+02	2.33E+03

Table 40: Estimation of Total Percent Error				
Fission & Act gases	I-131	Particulates	Tritium	Error
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	Plate-out 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				

The estimated total error is calculated as follows:

Total Percent Error = $(E_1^2 + E_2^2 + E_3^2 + \cdots + E_n^2)^{\frac{1}{2}}$

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 values in Table 40 (%) were used for error calculations.

Table 41: Effluent Monitoring Instrumentation Out of Service Greater Than 30 Days				
Unit	Instrument	Dates of Inoperability	Cause of Inoperability	Explanation
1	Ru-12	2/27/2018-3/29/2018	Microprocessor replacement	Planned maintenance on monitor. Ru-12 is only required during Waste Gas Decay Tank releases. No releases occurred during the dates of inoperability.
3	Ru-12	2/20/2018-3/23/2018	Microprocessor replacement	Planned maintenance on monitor. Ru-12 is only required during Waste Gas Decay Tank releases. No releases occurred during the dates of inoperability.

Table 42:
Solid Waste Summary

1.0 Solid Waste Shipped Offsite in 2017 For Burial or Disposal (not irradiated fuel)

Table 1.a: Volume and Curies Shipped - Spent Resin, Filters, Sludge, Evaporator Bottoms, etc.				
Waste Class	Volume (ft^3)	Volume(m^3)	Curies Shipped	Percent Error
A	1.61E+03	4.56E+01	8.12E+00	2.50E+01
B	6.14E+02	1.74E+01	4.14E+02	2.50E+01
C	0.00E+00	0.00E+00	0.00E+00	N/A
All	2.23E+03	6.30E+01	4.22E+02	2.50E+01

Table 1.b: Volume and Curies Shipped - Dry Active Waste				
Waste Class	Volume (ft^3)	Volume(m^3)	Curies Shipped	Percent Error
A	2.98E+04	8.45E+02	2.62E-01	2.50E+01
B	0.00E+00	0.00E+00	0.00E+00	N/A
C	0.00E+00	0.00E+00	0.00E+00	N/A
All	2.98E+04	8.45E+02	2.62E-01	2.50E+01

Table 1.c: Volume and Curies Shipped - Irradiated Components				
Waste Class	Volume (ft^3)	Volume(m^3)	Curies Shipped	Percent Error
A	0.00E+00	0.00E+00	0.00E+00	N/A
B	0.00E+00	0.00E+00	0.00E+00	N/A
C	0.00E+00	0.00E+00	0.00E+00	N/A
All	0.00E+00	0.00E+00	0.00E+00	N/A

Table 1.d: Volume and Curies Shipped - Other Waste (Oil)				
Waste Class	Volume (ft^3)	Volume(m^3)	Curies Shipped	Percent Error
A	7.49E+02	2.12E+01	2.59E-06	2.50E+01
B	0.00E+00	0.00E+00	0.00E+00	N/A
C	0.00E+00	0.00E+00	0.00E+00	N/A
All	7.49E+02	2.12E+01	2.59E-06	2.50E+01

Table 1.e Summary of All Waste Shipped				
Waste Class	Volume (ft^3)	Volume(m^3))	Curies Shipped	Percent Error
A	3.22E+04	9.12E+02	8.39E+00	2.50E+01
B	6.14E+02	1.74E+01	4.14E+02	2.50E+01
C	0.00E+00	0.00E+00	0.00E+00	N/A
All	3.28E+04	9.29E+02	4.22E+02	2.50E+01

2.0 Estimate of major nuclide composition

Table 2.a Spent Resin, Filters, Sludge, Evaporator bottoms, etc.		
Nuclide	Percent Abundance	Curies
Ag-108m	1.04E-04	4.38E-04
Ag-110m	1.28E-02	5.42E-02
Am-241	2.60E-04	1.10E-03
Am-243	6.18E-06	2.61E-05
Be-7	5.09E-02	2.15E-01
C-14	1.00E-01	4.22E-01
Ce-144	1.38E-02	5.82E-02
Cm-242	7.79E-06	3.29E-05
Cm-243	1.79E-04	7.53E-04
Co-57	4.79E-01	2.02E+00
Co-58	1.64E+01	6.91E+01
Co-60	1.10E+01	4.65E+01
Cr-51	1.74E-05	7.32E-05
Cs-134	2.37E-03	1.00E-02
Cs-137	1.07E+00	4.51E+00
Fe-55	2.63E+01	1.11E+02
Fe-59	4.62E-07	1.95E-06
H-3	8.66E-02	3.66E-01
Mn-54	3.35E+00	1.41E+01
Nb-95	2.11E+00	8.89E+00
Ni-59	7.16E-02	3.02E-01
Ni-63	3.69E+01	1.56E+02
Pu-238	1.58E-04	6.68E-04

Table 2.a Continued		
Nuclide	Percent Abundance	Curies
Pu-239	5.84E-05	2.46E-04
Pu-241	3.41E-03	1.44E-02
Pu-242	3.12E-06	1.32E-05
Sb-124	7.92E-06	3.34E-05
Sb-125	8.06E-01	3.40E+00
Sn-113	5.75E-02	2.42E-01
Sr-89	1.13E-04	4.75E-04
Sr-90	5.01E-02	2.11E-01
Tc-99	2.72E-03	1.15E-02
Zn-65	1.12E-01	4.74E-01
Zr-95	1.05E+00	4.44E+00
	Total	4.22E+02

Table 2.b Dry Active Waste		
Nuclide	Percent Abundance	Curies
Ag-108m	7.71E-02	2.02E-04
Ag-110m	1.04E-01	2.73E-04
Am-241	2.94E-04	7.70E-07
Am-243	2.04E-05	5.33E-08
C-14	4.11E-01	1.08E-03
Ce-144	1.41E-01	3.69E-04
Cm-242	2.90E-04	7.61E-07
Cm-243	2.36E-04	6.18E-07
Co-57	1.19E-01	3.12E-04
Co-58	1.96E+01	5.15E-02
Co-60	2.14E+01	5.60E-02
Cr-51	2.63E+01	6.88E-02
Cs-137	8.45E-02	2.21E-04
Fe-55	8.00E+00	2.10E-02
Fe-59	8.42E-01	2.21E-03
H-3	1.64E-01	4.29E-04
Hf-181	6.37E-02	1.67E-04
I-129	0.00E+00	0.00E+00
Mn-54	3.58E+00	9.39E-03
Nb-95	7.57E+00	1.98E-02
Ni-63	1.77E+00	4.63E-03
Pu-238	1.53E-04	4.02E-07
Pu-239	3.66E-04	9.59E-07
Pu-241	1.62E-03	4.25E-06
Sb-124	1.48E-01	3.87E-04
Sb-125	5.15E-01	1.35E-03
Sc-46	1.07E-02	2.79E-05
Sn-113	2.79E-01	7.31E-04
Sr-89	6.23E-03	1.63E-05
Sr-90	3.72E-02	9.73E-05
Tc-99	0.00E+00	0.00E+00
Te-123m	9.63E-02	2.52E-04
Zn-65	3.51E-01	9.20E-04
Zr-95	8.14E+00	2.13E-02
	Total	2.62E-01

Table 2.c Irradiated Components: None
No Irradiated Components Shipped in 2018

Table 2.d Other Waste: Oil

Nuclide	Percent Abundance	Curies
Co-60	4.93E+01	1.28E-06
Cs-137	5.07E+01	1.31E-06
	Total	2.59E-06

Table 2.e Summary of All Waste Shipped		
Nuclide	Percent Abundance	Curies
Ag-108m	1.52E-04	6.40E-04
Ag-110m	1.29E-02	5.45E-02
Am-241	2.60E-04	1.10E-03
Am-243	6.19E-06	2.61E-05
Be-7	5.09E-02	2.15E-01
C-14	1.00E-01	4.23E-01
Ce-144	1.39E-02	5.85E-02
Cm-242	7.97E-06	3.36E-05
Cm-243	1.78E-04	7.54E-04
Co-57	4.79E-01	2.02E+00
Co-58	1.64E+01	6.92E+01
Co-60	1.10E+01	4.66E+01
Cr-51	1.63E-02	6.89E-02
Cs-134	2.37E-03	1.00E-02
Cs-137	1.07E+00	4.51E+00
Fe-55	2.62E+01	1.11E+02
Fe-59	5.23E-04	2.21E-03
H-3	8.67E-02	3.66E-01
Hf-181	3.95E-05	1.67E-04
Mn-54	3.35E+00	1.41E+01
Nb-95	2.11E+00	8.91E+00
Ni-59	7.15E-02	3.02E-01
Ni-63	3.69E+01	1.56E+02
Pu-238	1.58E-04	6.68E-04
Pu-239	5.86E-05	2.47E-04
Pu-241	3.40E-03	1.44E-02
Pu-242	3.12E-06	1.32E-05
Sb-124	9.97E-05	4.21E-04
Sb-125	8.05E-01	3.40E+00
Sc-46	6.61E-06	2.79E-05
Sn-113	5.76E-02	2.43E-01
Sr-89	1.16E-04	4.92E-04
Sr-90	5.01E-02	2.12E-01
Tc-99	2.72E-03	1.15E-02

Table 2.e Continued			
Nuclide	Percent Abundance	Curies	Estimated Total Percent Error
Te-123m	5.97E-05	2.52E-04	2.50E+01
Zn-65	1.13E-01	4.75E-01	2.50E+01
Zr-95	1.06E+00	4.46E+00	2.50E+01
	Total	4.22E+02	2.50E+01

3.0 Irradiated Fuel Shipments: (NONE)

4.0 Supplemental Information

Table 4.a Shipment Mode and Location		
Number of Shipments	Mode of Transport	Destination
6	Highway	Energy Solutions, UT
41	Highway	Waste Control Specialists, TX

Table 4.b Shipping Container Characteristics			
Number of Containers	Type of Waste	Container Type	Solidification Agent
24	Dry Active Waste	20' Sealand	None
10	Dry Active Waste	20' Intermodal	None
27	Dry Active Waste	Metal Container	None
1	Dry Active Waste	ES-210	None
4	Other: Oil	ES-210	None
4	Concentrates	ES-210	None
2	Filters	CNS-8-120B	None
8	Resin	ES-210	None
3	Resin	Polyethylene Liner	None

Table 4.c Container Volume in m^3 by Waste Class			
Type of waste	Waste Class A	Waste Class B	Waste Class C
Spent Resin, Filters, Sludge, Evaporator bottoms, etc.	4.56E+01	1.74E+01	0.00E+00
Dry Active Waste	8.45E+02	0.00E+00	0.00E+00
Irradiated Components	0.00E+00	0.00E+00	0.00E+00
Other Waste: Oil	2.12E+01	0.00E+00	0.00E+00

Table 4.d Container Activity in Ci by Waste Class			
Type of waste	Waste Class A	Waste Class B	Waste Class C
Spent Resin, Filters, Sludge, Evaporator bottoms, etc.	8.12E+00	4.14E+02	0.00E+00
Dry Active Waste	2.62E-01	0.00E+00	0.00E+00
Irradiated Components	0.00E+00	0.00E+00	0.00E+00
Other Waste: Oil	2.59E-06	0.00E+00	0.00E+00

4.e. Principle Radionuclides: Located in Section 2, Tables 2.a.-2.e.

Table 4.f Source of Waste and Processing Employed	
Type of waste	Source
Spent Resin, Filters, Sludge, Evaporator bottoms, etc.	Mechanical filters-no processing, concentrates as a liquid-no processing, Resin- Dewatered prior to shipment
Dry Active Waste	non-compacted dry active waste - no processing employed
Irradiated Components	N/A
Other Waste: Oil	Oil - no processing employed

Table 4.g Type of Container	
Type of waste	Type of Container
Spent Resin, Filters, Sludge, Evaporator bottoms, etc.	(15) General Design Containers, (2) Type B Containers
Dry Active Waste	(62) General Design Containers
Irradiated Components	N/A
Other Waste: Oil	(4) General Design Container

Table 4.h Solidification Agent or Absorbent	
Type of waste	Solidification Agent/Absorbent
Spent Resin, Filters, Sludge, Evaporator bottoms, etc.	No solidification agents or absorbents used to process material
Dry Active Waste	No solidification agents or absorbents used to process material
Irradiated Components	N/A
Other Waste: Oil	No solidification agents or absorbents used to process material

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 2018. 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. The JFD tables were produced using the wind speed and direction measured at 35 foot elevation. Based on the data collected, the atmospheric stability class corresponding to the seven Pasquill stability categories, as well as the 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 2018 Joint Frequency Distribution (JFD) shows a typical year. Of the 8760 hours available, 207 hours of data were lost due to the meteorological tower being out of service for an equipment upgrade. As a result, the effective data recovery for 2018 was 97.6 percent.

The 35-foot mean wind speed was 6.3 mph. South west winds averaged higher speeds with the most frequent speeds between 8.51-11.50 mph.

Stability class summary:

Stability class E and F, (stable categories) 33%.
Stability class G, (extremely stable) 23.09%.
Stability class A, B, C, (unstable categories) 29.2%.
Stability class D, (neutral category) 14.72%.

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2018 TO 3/31/2018

*** 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	1	0	0	1
3.51- 4.50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
4.51- 5.50	0	0	0	0	0	0	0	0	1	6	2	2	1	0	1	1	14
5.51- 6.50	0	1	1	0	0	1	1	0	3	0	0	2	0	1	1	0	11
6.51- 8.50	0	0	0	4	2	1	0	2	4	1	4	7	5	0	1	0	31
8.51-11.50	0	0	0	2	0	0	0	0	0	8	13	4	9	4	0	0	40
11.51-14.50	0	0	0	0	0	0	0	0	0	10	7	2	2	0	0	0	21
14.51-20.50	0	0	0	0	0	0	0	0	0	0	6	4	0	0	0	0	10
>20.50	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3
TOTAL	0	1	1	6	2	2	1	2	8	25	32	24	18	6	3	1	132

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	1	0	0	1	0	0	0	0	0	2	0	0	0	0	4
2.51- 3.50	0	2	0	0	0	0	1	0	0	3	2	1	2	0	0	1	12
3.51- 4.50	0	2	1	0	0	1	0	1	3	4	1	0	3	1	2	2	21
4.51- 5.50	0	3	2	3	0	1	1	1	4	2	3	3	1	1	0	2	27
5.51- 6.50	0	0	6	2	2	0	2	1	4	0	2	6	0	0	0	3	28
6.51- 8.50	0	0	6	1	1	3	0	0	4	0	4	3	2	1	0	0	25
8.51-11.50	0	0	1	1	3	0	0	0	0	2	3	1	2	0	1	1	15
11.51-14.50	0	0	0	1	0	0	0	0	0	0	2	3	1	1	1	0	9
14.51-20.50	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
TOTAL	0	7	17	11	6	6	4	3	15	11	17	19	12	4	4	9	145

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	1	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	5
2.51- 3.50	2	1	3	2	1	2	1	0	1	4	2	1	2	2	2	1	27
3.51- 4.50	0	6	4	3	0	0	0	1	5	2	1	0	1	3	1	1	28
4.51- 5.50	0	0	3	2	0	1	0	2	3	6	4	0	0	1	1	1	24
5.51- 6.50	0	2	5	0	0	0	1	0	3	1	3	2	1	0	0	0	18
6.51- 8.50	1	0	4	1	0	4	1	2	1	0	2	1	0	0	2	0	19
8.51-11.50	0	0	1	0	1	2	1	1	0	2	2	4	4	2	0	0	20
11.51-14.50	0	0	0	1	0	0	0	0	0	2	4	0	3	3	0	0	13
14.51-20.50	0	0	0	1	1	0	0	0	0	0	0	2	1	0	0	0	5
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
TOTAL	4	9	20	10	3	9	4	7	13	17	19	10	13	13	6	3	160

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2018 TO 3/31/2018

*** 1ST QRTR ***

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	1	1	0	0	0	2	0	1	0	0	5
1.51- 2.50	1	1	0	1	0	0	1	3	3	3	6	6	5	6	5	4	45
2.51- 3.50	7	4	3	2	0	0	1	3	8	15	6	5	3	7	7	5	76
3.51- 4.50	6	2	0	4	0	2	1	1	6	11	5	1	3	1	4	5	52
4.51- 5.50	2	2	0	1	0	0	0	0	2	7	8	1	1	2	1	3	30
5.51- 6.50	2	2	4	2	0	1	0	2	1	4	1	4	1	2	1	0	27
6.51- 8.50	1	0	3	1	3	1	0	1	1	4	4	2	0	0	1	2	24
8.51-11.50	0	1	1	2	0	7	0	0	0	1	7	6	2	2	0	0	29
11.51-14.50	0	0	0	4	7	1	0	1	0	2	4	0	3	6	2	0	30
14.51-20.50	0	0	0	2	9	0	0	2	1	7	0	1	1	3	1	0	27
>20.50	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
TOTAL	19	12	11	19	19	12	4	14	22	55	41	28	19	30	22	19	346

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	1	0	0	1	0	0	0	0	3
1.51- 2.50	3	3	0	0	0	1	5	1	4	1	2	1	3	1	3	3	31
2.51- 3.50	4	2	2	1	0	0	1	0	4	5	2	5	3	3	5	3	40
3.51- 4.50	4	0	0	0	1	0	1	0	4	1	4	0	2	3	3	4	27
4.51- 5.50	3	2	0	1	0	0	0	0	2	3	3	4	1	1	3	4	27
5.51- 6.50	1	1	1	1	0	0	0	1	3	3	5	5	4	0	3	0	28
6.51- 8.50	0	1	1	0	1	0	0	0	1	5	9	7	5	2	3	0	35
8.51-11.50	1	1	2	5	0	1	1	2	2	7	18	9	6	4	4	0	63
11.51-14.50	0	0	0	1	0	2	1	1	0	6	4	3	2	3	2	0	25
14.51-20.50	0	0	0	0	1	0	0	0	2	0	0	3	0	4	1	0	11
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	16	10	6	9	3	4	10	5	23	31	47	38	26	21	27	14	290

STABILITY CLASS F

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	1	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0	5
1.51- 2.50	4	3	3	1	0	0	0	0	0	0	3	5	5	6	8	5	43
2.51- 3.50	12	3	3	0	0	0	0	1	1	0	7	4	9	7	7	9	63
3.51- 4.50	5	6	5	3	0	0	0	1	0	2	7	5	4	5	4	3	50
4.51- 5.50	3	0	0	1	0	0	0	0	0	2	10	4	2	6	4	3	35
5.51- 6.50	1	1	0	0	0	0	0	0	1	1	2	2	4	3	4	9	28
6.51- 8.50	2	2	1	0	0	0	0	2	2	6	10	6	3	4	11	6	55
8.51-11.50	0	1	2	0	0	0	0	0	0	3	2	2	2	0	2	3	17
11.51-14.50	0	0	0	1	0	0	0	0	0	0	0	1	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	28	17	14	6	0	1	0	4	4	14	41	29	30	32	40	38	298

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2018 TO 3/31/2018

*** 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	1	0	0	0	0	0	0	0	0	0	1	3	1	7
1.51- 2.50	17	5	1	0	0	1	3	0	0	0	1	5	9	13	15	13	83
2.51- 3.50	58	8	4	0	2	0	0	1	0	3	3	5	7	16	36	57	200
3.51- 4.50	75	24	9	0	0	0	0	0	0	0	3	1	3	4	27	57	203
4.51- 5.50	52	16	1	1	0	0	0	0	0	0	2	2	0	2	7	30	113
5.51- 6.50	23	6	4	0	0	0	0	0	0	1	1	1	0	0	2	15	53
6.51- 8.50	22	16	2	0	0	0	0	0	0	0	0	0	0	0	0	7	47
8.51-11.50	6	7	4	0	0	0	0	0	0	0	0	0	0	0	0	3	20
11.51-14.50	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
14.51-20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	254	82	26	2	2	1	3	1	0	4	10	14	19	36	90	183	727

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	1	2	1	1	0	0	3	1	3	3	1	20
1.51- 2.50	26	12	5	2	0	3	9	5	7	4	13	19	23	27	31	25	211
2.51- 3.50	83	20	15	5	3	2	4	5	14	30	22	21	26	36	57	76	419
3.51- 4.50	90	40	19	10	1	3	2	4	18	20	21	7	17	17	41	72	382
4.51- 5.50	60	23	6	9	0	2	1	3	12	26	32	16	6	13	17	44	270
5.51- 6.50	27	13	21	5	2	2	4	4	15	10	14	22	10	6	11	27	193
6.51- 8.50	26	19	17	7	7	9	1	7	13	16	33	26	15	7	18	15	236
8.51-11.50	7	10	11	10	4	10	2	3	2	23	45	26	25	12	7	7	204
11.51-14.50	0	0	1	8	7	3	1	2	0	20	21	9	11	13	5	0	101
14.51-20.50	0	0	0	6	11	0	0	2	3	7	6	10	2	7	2	0	56
>20.50	0	0	0	0	0	0	0	0	0	1	0	3	1	1	0	0	6
TOTAL	321	138	95	63	35	35	26	36	85	157	207	162	137	142	192	267	2098

TOTAL NUMBER OF OBSERVATIONS: 2160
TOTAL NUMBER OF VALID OBSERVATIONS: 2098
TOTAL NUMBER OF MISSING OBSERVATIONS: 62
PERCENT DATA RECOVERY FOR THIS PERIOD: 97.1 %
MEAN WIND SPEED FOR THIS PERIOD: 5.7 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
6.29	6.91	7.63	16.49	13.82	14.20	34.65

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	1	6	2	2	1	2	8	25	32	24	18	6	3	1	0
B	0	7	17	11	6	6	4	3	15	11	17	19	12	4	4	9	0
C	4	9	20	10	3	9	4	7	13	17	19	10	13	13	6	3	0
D	19	12	11	19	19	12	4	14	22	55	41	28	19	30	22	19	0
E	16	10	6	9	3	4	10	5	23	31	47	38	26	21	27	14	0
F	28	17	14	6	0	1	0	4	4	14	41	29	30	32	40	38	0
G	254	82	26	2	2	1	3	1	0	4	10	14	19	36	90	183	0
TOTAL	321	138	95	63	35	35	26	36	85	157	207	162	137	142	192	267	0

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 4/01/2018 TO 6/30/2018

*** 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																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3.51- 4.50	0	0	1	0	0	1	0	2	2	0	1	0	0	0	0	0	7
4.51- 5.50	0	0	1	2	0	1	4	12	15	7	2	1	1	0	2	0	48
5.51- 6.50	1	0	1	0	1	1	6	23	21	14	9	5	5	0	0	0	87
6.51- 8.50	1	0	1	5	2	2	5	15	31	39	29	10	0	1	2	1	144
8.51-11.50	0	0	0	0	3	2	1	5	24	34	52	13	5	1	0	0	140
11.51-14.50	0	2	0	1	3	0	0	0	3	23	38	2	0	3	1	4	80
14.51-20.50	0	0	0	0	0	0	0	0	0	14	37	3	0	2	4	0	60
>20.50	0	0	0	0	0	0	0	0	0	5	0	1	1	1	0	0	8
TOTAL	3	2	4	8	9	7	16	57	96	136	168	35	12	8	9	5	575

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	1	0	0	0	0	1	0	0	0	2
2.51- 3.50	0	0	0	0	1	0	2	2	1	2	2	0	0	0	0	0	10
3.51- 4.50	0	0	0	0	0	0	2	3	10	4	3	3	0	1	0	0	26
4.51- 5.50	1	0	2	1	0	0	3	4	10	4	5	0	0	0	0	0	30
5.51- 6.50	0	0	0	0	0	0	1	6	10	5	7	1	1	0	0	0	31
6.51- 8.50	0	0	0	0	1	1	1	1	4	4	5	5	1	0	1	0	24
8.51-11.50	0	0	0	0	0	0	0	0	1	6	13	5	0	0	0	0	25
11.51-14.50	1	0	0	0	0	0	0	0	0	1	5	0	2	0	0	0	9
14.51-20.50	0	0	0	0	0	0	0	0	0	0	4	1	0	1	0	1	7
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	0	2	1	2	1	9	17	36	26	44	15	5	2	1	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																	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	2	0	1	0	1	0	1	1	2	1	0	0	0	0	9
2.51- 3.50	1	0	0	0	0	2	0	1	6	3	3	0	0	2	1	0	19
3.51- 4.50	0	0	0	0	0	0	6	2	5	2	3	2	0	0	0	0	20
4.51- 5.50	0	1	1	1	1	1	0	1	5	2	4	3	0	0	0	0	20
5.51- 6.50	0	0	0	0	1	0	2	1	2	4	3	1	0	0	0	0	14
6.51- 8.50	0	0	0	0	0	0	0	1	2	1	7	2	2	0	0	0	15
8.51-11.50	0	0	0	0	0	1	0	0	0	1	5	3	0	0	0	0	10
11.51-14.50	0	0	0	0	0	0	0	0	0	2	7	3	0	1	0	0	13
14.51-20.50	0	0	0	0	0	0	0	0	0	3	7	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	1	3	1	3	4	9	6	21	19	41	15	2	3	1	0	130

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 4/01/2018 TO 6/30/2018

*** 2ND QRTR ***

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	3
1.51- 2.50	2	2	0	0	1	2	0	1	2	1	2	1	2	1	1	1	19
2.51- 3.50	4	1	2	0	1	0	0	2	3	1	1	0	1	2	0	0	18
3.51- 4.50	0	0	0	1	0	1	0	1	0	0	3	2	0	2	0	0	10
4.51- 5.50	0	1	1	0	0	0	0	1	1	1	4	2	0	0	0	0	11
5.51- 6.50	0	0	1	0	0	0	0	1	1	1	6	4	0	0	0	0	14
6.51- 8.50	0	0	0	0	1	2	3	4	1	4	7	4	2	0	0	0	28
8.51-11.50	0	0	0	0	0	3	0	0	1	3	19	8	1	0	0	1	36
11.51-14.50	0	0	0	0	0	0	0	0	0	8	15	5	3	1	0	0	32
14.51-20.50	0	0	0	0	0	0	0	0	2	7	13	5	0	1	0	1	29
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
TOTAL	6	4	4	1	3	8	3	10	11	27	70	31	9	8	2	5	202

STABILITY CLASS E

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
1.51- 2.50	3	1	0	0	1	0	1	0	1	3	2	0	1	6	1	2	22
2.51- 3.50	5	3	0	0	0	0	1	0	1	0	4	1	2	2	5	3	27
3.51- 4.50	2	3	0	0	0	0	0	0	2	0	5	5	2	2	2	1	24
4.51- 5.50	0	2	0	1	0	0	0	0	1	6	8	6	2	0	0	0	26
5.51- 6.50	0	0	0	0	0	0	0	0	2	8	16	4	5	0	1	0	36
6.51- 8.50	0	0	0	0	0	1	0	2	5	24	28	28	3	0	1	0	92
8.51-11.50	1	0	0	0	0	1	0	0	1	35	54	23	4	1	2	1	123
11.51-14.50	0	0	0	0	0	3	0	0	0	19	33	2	2	1	2	3	65
14.51-20.50	0	0	0	0	1	0	0	0	0	2	6	0	0	5	0	0	14
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	11	9	0	1	2	5	2	2	13	97	156	69	21	17	14	11	430

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	1	0	1	0	1	0	1	0	4
1.51- 2.50	2	2	0	1	0	0	0	0	1	3	2	2	1	6	4	6	30
2.51- 3.50	5	6	3	0	0	1	0	1	2	2	9	5	9	7	4	11	65
3.51- 4.50	8	1	0	1	0	0	1	1	3	3	14	11	8	9	3	3	66
4.51- 5.50	2	0	2	1	0	0	0	0	0	3	14	6	9	2	1	2	42
5.51- 6.50	0	0	0	0	0	0	0	0	1	2	10	7	6	3	0	0	29
6.51- 8.50	0	1	0	0	0	0	0	0	0	18	36	21	7	4	0	1	88
8.51-11.50	0	0	0	0	0	0	0	0	0	9	20	6	1	0	0	5	41
11.51-14.50	0	0	0	0	0	0	0	0	0	1	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	17	10	5	3	0	1	1	2	8	41	106	58	42	31	13	28	366

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 4/01/2018 TO 6/30/2018

*** 2ND QRTR ***

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
1.51- 2.50	2	1	0	1	0	2	0	0	1	0	1	0	3	2	3	8	24
2.51- 3.50	20	8	0	2	0	0	0	0	0	1	1	2	5	6	11	13	69
3.51- 4.50	49	7	2	0	0	0	2	0	0	3	2	3	3	6	4	16	97
4.51- 5.50	25	7	0	0	1	0	1	0	1	0	2	0	0	4	2	13	56
5.51- 6.50	9	13	1	0	0	0	0	0	0	2	1	0	0	0	0	4	30
6.51- 8.50	0	6	2	0	0	0	0	0	0	1	1	0	0	0	0	0	10
8.51-11.50	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3
11.51-14.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14.51-20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	107	42	5	3	1	2	3	0	2	7	8	5	11	19	21	54	290

STABILITY CLASS ALL

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	3	9
1.51- 2.50	9	6	2	2	3	4	2	2	6	8	9	4	8	15	9	17	106
2.51- 3.50	36	18	5	2	2	3	3	6	13	9	20	8	17	19	21	27	209
3.51- 4.50	59	11	3	2	0	2	11	9	22	12	31	26	13	20	9	20	250
4.51- 5.50	28	11	7	6	2	2	8	18	33	23	39	18	12	6	5	15	233
5.51- 6.50	10	13	3	0	2	1	9	31	37	36	52	22	17	3	1	4	241
6.51- 8.50	1	7	3	5	4	6	9	23	43	91	113	70	15	5	4	2	401
8.51-11.50	3	0	0	0	3	7	1	5	27	88	163	58	11	2	3	7	378
11.51-14.50	1	2	0	1	3	3	0	0	3	54	98	12	7	6	3	7	200
14.51-20.50	0	0	0	0	1	0	0	0	2	26	67	9	0	9	4	2	120
>20.50	0	0	0	0	0	0	0	0	0	5	0	1	1	2	1	0	10
TOTAL	147	68	23	18	20	28	43	94	187	353	593	228	102	88	61	104	2157

TOTAL NUMBER OF OBSERVATIONS: 2184
TOTAL NUMBER OF VALID OBSERVATIONS: 2157
TOTAL NUMBER OF MISSING OBSERVATIONS: 27
PERCENT DATA RECOVERY FOR THIS PERIOD: 98.8 %
MEAN WIND SPEED FOR THIS PERIOD: 7.5 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
26.66	7.60	6.03	9.36	19.94	16.97	13.44

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	2	4	8	9	7	16	57	96	136	168	35	12	8	9	5	0
B	2	0	2	1	2	1	9	17	36	26	44	15	5	2	1	1	0
C	1	1	3	1	3	4	9	6	21	19	41	15	2	3	1	0	0
D	6	4	4	1	3	8	3	10	11	27	70	31	9	8	2	5	0
E	11	9	0	1	2	5	2	2	13	97	156	69	21	17	14	11	0
F	17	10	5	3	0	1	1	2	8	41	106	58	42	31	13	28	0
G	107	42	5	3	1	2	3	0	2	7	8	5	11	19	21	54	0
TOTAL	147	68	23	18	20	28	43	94	187	353	593	228	102	88	61	104	0

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2018 TO 6/30/2018

*** 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																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.51- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.51- 3.50	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
3.51- 4.50	0	0	1	0	0	1	0	2	2	0	1	0	1	0	0	0	8
4.51- 5.50	0	0	1	2	0	1	4	12	16	13	4	3	2	0	3	1	62
5.51- 6.50	1	1	2	0	1	2	7	23	24	14	9	7	5	1	1	0	98
6.51- 8.50	1	0	1	9	4	3	5	17	35	40	33	17	5	1	3	1	175
8.51-11.50	0	0	0	2	3	2	1	5	24	42	65	17	14	5	0	0	180
11.51-14.50	0	2	0	1	3	0	0	0	3	33	45	4	2	3	1	4	101
14.51-20.50	0	0	0	0	0	0	0	0	0	14	43	7	0	2	4	0	70
>20.50	0	0	0	0	0	0	0	0	0	5	0	4	1	1	0	0	11
TOTAL	3	3	5	14	11	9	17	59	104	161	200	59	30	14	12	6	707

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	1	0	0	1	0	1	0	0	0	2	1	0	0	0	6
2.51- 3.50	0	2	0	0	1	0	3	2	1	5	4	1	2	0	0	1	22
3.51- 4.50	0	2	1	0	0	1	2	4	13	8	4	3	3	2	2	2	47
4.51- 5.50	1	3	4	4	0	1	4	5	14	6	8	3	1	1	0	2	57
5.51- 6.50	0	0	6	2	2	0	3	7	14	5	9	7	1	0	0	3	59
6.51- 8.50	0	0	6	1	2	4	1	1	8	4	9	8	3	1	1	0	49
8.51-11.50	0	0	1	1	3	0	0	0	1	8	16	6	2	0	1	1	40
11.51-14.50	1	0	0	1	0	0	0	0	0	1	7	3	3	1	1	0	18
14.51-20.50	0	0	0	3	0	0	0	0	0	0	4	1	0	1	0	1	10
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
TOTAL	2	7	19	12	8	7	13	20	51	37	61	34	17	6	5	10	309

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	1	0	2	0	1	0	1	1	1	1	3	1	1	1	0	0	14
2.51- 3.50	3	1	3	2	1	4	1	1	7	7	5	1	2	4	3	1	46
3.51- 4.50	0	6	4	3	0	0	6	3	10	4	4	2	1	3	1	1	48
4.51- 5.50	0	1	4	3	1	2	0	3	8	8	8	3	0	1	1	1	44
5.51- 6.50	0	2	5	0	1	0	3	1	5	5	6	3	1	0	0	0	32
6.51- 8.50	1	0	4	1	0	4	1	3	3	1	9	3	2	0	2	0	34
8.51-11.50	0	0	1	0	1	3	1	1	0	3	7	7	4	2	0	0	30
11.51-14.50	0	0	0	1	0	0	0	0	0	4	11	3	3	4	0	0	26
14.51-20.50	0	0	0	1	1	0	0	0	0	3	7	2	1	0	0	0	15
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
TOTAL	5	10	23	11	6	13	13	13	34	36	60	25	15	16	7	3	290

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2018 TO 6/30/2018

*** 1ST SEMI ***

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	1	1	0	1	0	2	0	1	0	2	8
1.51- 2.50	3	3	0	1	1	2	1	4	5	4	8	7	7	7	6	5	64
2.51- 3.50	11	5	5	2	1	0	1	5	11	16	7	5	4	9	7	5	94
3.51- 4.50	6	2	0	5	0	3	1	2	6	11	8	3	3	3	4	5	62
4.51- 5.50	2	3	1	1	0	0	0	1	3	8	12	3	1	2	1	3	41
5.51- 6.50	2	2	5	2	0	1	0	3	2	5	7	8	1	2	1	0	41
6.51- 8.50	1	0	3	1	4	3	3	5	2	8	11	6	2	0	1	2	52
8.51-11.50	0	1	1	2	0	10	0	0	1	4	26	14	3	2	0	1	65
11.51-14.50	0	0	0	4	7	1	0	1	0	10	19	5	6	7	2	0	62
14.51-20.50	0	0	0	2	9	0	0	2	3	14	13	6	1	4	1	1	56
>20.50	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	3
TOTAL	25	16	15	20	22	20	7	24	33	82	111	59	28	38	24	24	548

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	1	0	0	1	0	0	0	1	4
1.51- 2.50	6	4	0	0	1	1	6	1	5	4	4	1	4	7	4	5	53
2.51- 3.50	9	5	2	1	0	0	2	0	5	5	6	6	5	5	10	6	67
3.51- 4.50	6	3	0	0	1	0	1	0	6	1	9	5	4	5	5	5	51
4.51- 5.50	3	4	0	2	0	0	0	0	3	9	11	10	3	1	3	4	53
5.51- 6.50	1	1	1	1	0	0	0	1	5	11	21	9	9	0	4	0	64
6.51- 8.50	0	1	1	0	1	1	0	2	6	29	37	35	8	2	4	0	127
8.51-11.50	2	1	2	5	0	2	1	2	3	42	72	32	10	5	6	1	186
11.51-14.50	0	0	0	1	0	5	1	1	0	25	37	5	4	4	4	3	90
14.51-20.50	0	0	0	0	2	0	0	0	2	2	6	3	0	9	1	0	25
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	27	19	6	10	5	9	12	7	36	128	203	107	47	38	41	25	720

STABILITY CLASS F

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	1	1	0	0	0	1	0	0	1	0	1	0	2	1	1	0	9
1.51- 2.50	6	5	3	2	0	0	0	0	1	3	5	7	6	12	12	11	73
2.51- 3.50	17	9	6	0	0	1	0	2	3	2	16	9	18	14	11	20	128
3.51- 4.50	13	7	5	4	0	0	1	2	3	5	21	16	12	14	7	6	116
4.51- 5.50	5	0	2	2	0	0	0	0	0	5	24	10	11	8	5	5	77
5.51- 6.50	1	1	0	0	0	0	0	0	2	3	12	9	10	6	4	9	57
6.51- 8.50	2	3	1	0	0	0	0	2	2	24	46	27	10	8	11	7	143
8.51-11.50	0	1	2	0	0	0	0	0	0	12	22	8	3	0	2	8	58
11.51-14.50	0	0	0	1	0	0	0	0	0	1	0	1	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	45	27	19	9	0	2	1	6	12	55	147	87	72	63	53	66	664

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2018 TO 6/30/2018

*** 1ST SEMI ***

STABILITY CLASS G
STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	1	0	0	1	0	0	0	0	0	0	0	0	0	2	3	1	8
1.51- 2.50	19	6	1	1	0	3	3	0	1	0	2	5	12	15	18	21	107
2.51- 3.50	78	16	4	2	2	0	0	1	0	4	4	7	12	22	47	70	269
3.51- 4.50	124	31	11	0	0	0	2	0	0	3	5	4	6	10	31	73	300
4.51- 5.50	77	23	1	1	1	0	1	0	1	0	4	2	0	6	9	43	169
5.51- 6.50	32	19	5	0	0	0	0	0	0	3	2	1	0	0	2	19	83
6.51- 8.50	22	22	4	0	0	0	0	0	0	1	1	0	0	0	0	7	57
8.51-11.50	8	7	4	0	0	0	0	0	0	0	0	0	0	0	1	3	23
11.51-14.50	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
14.51-20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	361	124	31	5	3	3	6	1	2	11	18	19	30	55	111	237	1017

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	1	2	1	2	1	1	3	2	4	4	4	29
1.51- 2.50	35	18	7	4	3	7	11	7	13	12	22	23	31	42	40	42	317
2.51- 3.50	119	38	20	7	5	5	7	11	27	39	42	29	43	55	78	103	628
3.51- 4.50	149	51	22	12	1	5	13	13	40	32	52	33	30	37	50	92	632
4.51- 5.50	88	34	13	15	2	4	9	21	45	49	71	34	18	19	22	59	503
5.51- 6.50	37	26	24	5	4	3	13	35	52	46	66	44	27	9	12	31	434
6.51- 8.50	27	26	20	12	11	15	10	30	56	107	146	96	30	12	22	17	637
8.51-11.50	10	10	11	10	7	17	3	8	29	111	208	84	36	14	10	14	582
11.51-14.50	1	2	1	9	10	6	1	2	3	74	119	21	18	19	8	7	301
14.51-20.50	0	0	0	6	12	0	0	2	5	33	73	19	2	16	6	2	176
>20.50	0	0	0	0	0	0	0	0	0	6	0	4	2	3	1	0	16
TOTAL	468	206	118	81	55	63	69	130	272	510	800	390	239	230	253	371	4255

TOTAL NUMBER OF OBSERVATIONS: 4344
TOTAL NUMBER OF VALID OBSERVATIONS: 4255
TOTAL NUMBER OF MISSING OBSERVATIONS: 89
PERCENT DATA RECOVERY FOR THIS PERIOD: 98.0 %
MEAN WIND SPEED FOR THIS PERIOD: 6.6 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
16.62	7.26	6.82	12.88	16.92	15.61	23.90

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	3	3	5	14	11	9	17	59	104	161	200	59	30	14	12	6	0
B	2	7	19	12	8	7	13	20	51	37	61	34	17	6	5	10	0
C	5	10	23	11	6	13	13	13	34	36	60	25	15	16	7	3	0
D	25	16	15	20	22	20	7	24	33	82	111	59	28	38	24	24	0
E	27	19	6	10	5	9	12	7	36	128	203	107	47	38	41	25	0
F	45	27	19	9	0	2	1	6	12	55	147	87	72	63	53	66	0
G	361	124	31	5	3	3	6	1	2	11	18	19	30	55	111	237	0
TOTAL	468	206	118	81	55	63	69	130	272	510	800	390	239	230	253	371	0

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2018 TO 9/30/2018

*** 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	1	0	0	0	0	0	2	1	1	2	1	0	1	1	1	2	13
4.51- 5.50	3	0	0	1	1	3	1	7	12	2	3	4	0	2	3	1	43
5.51- 6.50	2	0	2	1	2	2	6	6	21	13	7	9	3	1	0	0	75
6.51- 8.50	2	0	0	1	3	2	2	10	23	36	31	17	8	0	0	1	136
8.51-11.50	0	0	1	3	5	4	4	5	7	22	41	27	6	1	0	0	126
11.51-14.50	0	0	0	0	4	0	0	1	1	6	8	3	0	0	0	0	23
14.51-20.50	0	0	0	0	5	0	0	0	1	3	4	0	0	0	0	0	13
>20.50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	8	0	3	6	21	11	15	30	66	84	95	60	18	5	4	4	430

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	1	0	0	0	0	0	1
2.51- 3.50	0	0	1	0	0	1	0	2	0	0	2	2	1	0	1	0	10
3.51- 4.50	3	0	0	1	0	1	0	1	1	2	4	2	2	0	0	1	18
4.51- 5.50	0	0	2	0	1	2	2	5	12	10	4	1	3	4	2	1	49
5.51- 6.50	2	1	1	1	0	0	1	3	10	6	3	4	2	0	1	0	35
6.51- 8.50	0	1	0	1	2	2	4	2	4	10	13	2	5	0	1	0	47
8.51-11.50	0	0	0	1	1	1	0	1	1	3	13	10	2	0	0	0	33
11.51-14.50	0	0	0	1	5	0	0	0	0	0	2	2	1	0	0	0	11
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	5	2	4	5	9	7	7	14	28	31	42	23	16	4	5	2	204

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	1	0	1	0	0	0	1	3
2.51- 3.50	1	0	1	0	1	0	1	1	1	0	0	0	0	0	2	1	9
3.51- 4.50	0	1	1	0	0	0	1	2	3	0	6	2	2	0	0	0	18
4.51- 5.50	0	1	1	2	1	1	0	0	7	5	4	1	1	0	0	0	24
5.51- 6.50	1	1	1	0	2	1	0	2	4	3	5	3	1	1	0	0	25
6.51- 8.50	0	0	1	1	0	0	0	3	4	7	11	7	1	1	0	0	36
8.51-11.50	0	0	1	0	3	1	0	0	0	5	8	3	1	0	0	0	22
11.51-14.50	0	1	1	0	1	1	0	0	0	1	6	0	0	0	0	0	11
14.51-20.50	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	3
>20.50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	2	4	7	3	10	4	2	8	19	23	41	17	6	2	2	2	152

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2018 TO 9/30/2018

*** 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	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	4
1.51- 2.50	3	1	0	1	0	2	1	0	0	1	3	2	3	2	0	3	22
2.51- 3.50	4	1	0	0	0	2	0	2	2	1	2	4	1	1	0	2	22
3.51- 4.50	3	2	1	1	0	0	0	1	6	3	5	1	2	0	0	3	28
4.51- 5.50	2	2	2	0	0	0	1	1	4	8	6	1	2	0	0	1	30
5.51- 6.50	1	1	2	0	1	1	0	4	0	4	10	7	1	1	1	1	35
6.51- 8.50	2	1	3	3	1	10	2	1	2	7	11	8	3	0	0	1	55
8.51-11.50	0	2	2	5	4	4	3	1	1	11	43	11	4	0	0	1	92
11.51-14.50	2	3	1	4	6	2	1	1	1	1	21	4	2	1	1	1	52
14.51-20.50	1	1	1	1	5	0	0	1	1	4	9	0	0	1	1	0	26
>20.50	0	1	0	1	2	1	0	0	1	0	1	0	0	0	0	0	7
TOTAL	19	15	12	16	19	22	8	13	18	41	111	39	18	6	3	13	373

STABILITY CLASS E

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
1.51- 2.50	1	2	2	1	0	0	1	1	2	0	1	3	5	6	4	3	32
2.51- 3.50	3	2	3	0	0	0	0	0	0	3	3	5	4	4	8	4	39
3.51- 4.50	2	1	1	0	0	1	0	2	2	7	3	5	5	3	5	1	38
4.51- 5.50	4	6	0	1	1	2	1	0	2	10	18	6	3	1	2	3	60
5.51- 6.50	5	4	3	5	1	2	0	0	2	15	19	7	3	1	1	3	71
6.51- 8.50	5	4	5	3	3	2	4	7	6	23	42	19	8	1	1	0	133
8.51-11.50	1	0	3	12	9	6	5	3	5	13	54	22	0	1	0	0	134
11.51-14.50	1	4	1	8	3	1	3	0	0	2	14	0	0	0	0	0	37
14.51-20.50	0	1	1	1	3	1	1	1	0	1	1	0	0	0	0	0	11
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	22	24	19	31	20	15	15	14	19	75	155	67	28	17	21	14	556

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	0	0	2	1	4
1.51- 2.50	4	2	1	1	0	0	0	0	1	1	1	3	2	0	3	7	26
2.51- 3.50	3	4	0	0	1	0	0	0	2	2	4	3	4	2	6	3	34
3.51- 4.50	8	1	1	1	0	0	0	0	1	2	3	3	7	4	3	1	35
4.51- 5.50	1	3	1	0	0	0	0	1	5	2	7	4	3	3	2	2	34
5.51- 6.50	1	3	1	1	0	0	0	0	2	1	5	6	4	2	0	1	27
6.51- 8.50	0	6	5	0	0	0	0	0	2	6	15	14	1	0	1	1	51
8.51-11.50	1	0	1	0	0	0	1	0	0	2	2	3	1	0	0	1	12
11.51-14.50	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
14.51-20.50	0	0	0	0	0	0	0	0	1	0	0	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	18	19	10	6	1	0	1	1	14	16	37	36	23	11	17	17	227

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2018 TO 9/30/2018

*** 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																	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	3	0	1	0	0	0	0	0	0	0	0	2	1	0	1	4	12
2.51- 3.50	16	2	1	0	0	0	0	0	0	0	1	2	3	6	5	12	48
3.51- 4.50	20	6	3	1	0	0	0	0	0	2	0	1	1	1	4	13	52
4.51- 5.50	15	5	2	0	0	0	0	1	0	0	0	1	1	0	3	4	32
5.51- 6.50	6	8	1	0	0	0	0	0	0	0	1	0	0	0	2	1	19
6.51- 8.50	1	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
8.51-11.50	0	0	1	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	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	61	29	9	1	0	0	0	1	0	2	2	6	6	7	15	34	174

STABILITY CLASS ALL

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	0	0	1	0	0	0	1	0	2	0	1	0	0	2	1	9
1.51- 2.50	11	5	4	3	0	2	2	1	3	3	6	11	11	8	8	18	96
2.51- 3.50	27	9	6	0	2	3	1	5	5	6	12	16	13	13	22	22	162
3.51- 4.50	37	11	7	4	0	2	3	7	14	18	22	14	20	9	13	21	202
4.51- 5.50	25	17	8	4	4	8	5	15	42	37	42	18	13	10	12	12	272
5.51- 6.50	18	18	11	8	6	6	7	15	39	42	50	36	14	6	5	6	287
6.51- 8.50	10	20	14	9	9	16	12	23	41	89	123	67	26	2	3	3	467
8.51-11.50	2	2	9	21	22	16	13	10	14	56	161	76	14	2	0	2	420
11.51-14.50	3	8	3	15	19	4	4	2	2	10	51	9	3	1	1	1	136
14.51-20.50	1	2	2	2	14	1	1	2	3	9	15	0	1	1	1	0	55
>20.50	0	1	0	1	4	1	0	0	1	0	1	0	0	0	0	0	9
TOTAL	135	93	64	68	80	59	48	81	164	272	483	248	115	52	67	86	2116

TOTAL NUMBER OF OBSERVATIONS: 2208
TOTAL NUMBER OF VALID OBSERVATIONS: 2116
TOTAL NUMBER OF MISSING OBSERVATIONS: 92
PERCENT DATA RECOVERY FOR THIS PERIOD: 95.8 %
MEAN WIND SPEED FOR THIS PERIOD: 7.2 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
20.32	9.64	7.18	17.63	26.28	10.73	8.22

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	8	0	3	6	21	11	15	30	66	84	95	60	18	5	4	4	0
B	5	2	4	5	9	7	7	14	28	31	42	23	16	4	5	2	0
C	2	4	7	3	10	4	2	8	19	23	41	17	6	2	2	2	0
D	19	15	12	16	19	22	8	13	18	41	111	39	18	6	3	13	0
E	22	24	19	31	20	15	15	14	19	75	155	67	28	17	21	14	0
F	18	19	10	6	1	0	1	1	14	16	37	36	23	11	17	17	0
G	61	29	9	1	0	0	0	1	0	2	2	6	6	7	15	34	1
TOTAL	135	93	64	68	80	59	48	81	164	272	483	248	115	52	67	86	1

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 10/01/2018 TO 12/31/2018

*** 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	1	0	0	0	0	0	1	0	0	0	0	0	2
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	0	0	0	0	0	0	0	0	1
5.51- 6.50	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
6.51- 8.50	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	3
8.51-11.50	0	0	0	3	1	0	0	0	0	0	0	1	0	0	0	0	5
11.51-14.50	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	4
14.51-20.50	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
>20.50	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
TOTAL	0	2	3	5	5	0	1	0	2	0	1	1	0	0	0	0	20

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	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
2.51- 3.50	0	0	0	0	0	0	2	0	1	2	1	2	0	0	0	0	8
3.51- 4.50	1	2	1	1	1	0	1	0	4	2	1	0	0	0	1	0	15
4.51- 5.50	0	2	5	5	2	1	0	3	1	3	3	0	0	1	0	1	27
5.51- 6.50	1	1	2	1	4	3	1	1	1	3	0	1	1	0	0	0	20
6.51- 8.50	2	1	1	8	12	2	1	1	6	1	0	2	1	1	0	0	39
8.51-11.50	2	0	3	2	4	2	0	1	1	2	1	3	1	1	1	1	25
11.51-14.50	0	0	1	3	2	0	0	0	1	0	0	0	0	0	0	0	7
14.51-20.50	0	0	0	1	1	0	0	0	0	1	0	0	0	0	2	0	5
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7	6	13	21	27	8	5	6	15	14	6	8	3	3	4	2	148

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	1	0	1
1.51- 2.50	1	3	0	1	1	1	1	1	0	3	1	2	0	1	0	0	16
2.51- 3.50	2	5	0	2	3	3	2	1	4	7	7	2	2	0	1	0	41
3.51- 4.50	2	1	5	7	5	0	3	4	6	9	4	2	0	3	1	0	52
4.51- 5.50	2	1	2	5	4	1	0	3	5	3	4	1	1	0	0	3	35
5.51- 6.50	1	2	8	4	6	0	1	2	3	4	1	0	1	0	0	0	33
6.51- 8.50	0	3	4	2	4	1	0	2	2	1	5	0	2	1	0	0	27
8.51-11.50	0	2	2	1	7	1	0	0	2	1	3	0	2	0	0	0	21
11.51-14.50	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	5
14.51-20.50	0	0	0	1	5	0	0	0	0	0	0	0	0	0	0	0	6
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8	18	22	24	36	7	7	13	22	29	25	7	8	5	3	3	237

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 10/01/2018 TO 12/31/2018

*** 4TH QRTR ***

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	0	0	0	0	1	0	1	1	0	0	1	2	1	1	0	0	8
1.51- 2.50	5	1	2	1	1	2	1	2	7	4	4	7	3	3	5	1	49
2.51- 3.50	2	2	1	0	1	2	3	3	12	7	4	1	3	4	2	8	55
3.51- 4.50	2	4	7	5	3	2	0	4	7	5	6	3	1	1	3	4	57
4.51- 5.50	1	1	6	6	4	0	1	2	4	4	4	1	1	0	0	3	38
5.51- 6.50	2	4	2	1	3	3	1	0	3	1	1	2	0	0	2	1	26
6.51- 8.50	1	3	2	2	6	3	1	1	1	3	4	0	5	0	0	2	34
8.51-11.50	3	8	4	3	15	8	1	1	0	1	4	1	0	1	0	0	50
11.51-14.50	1	1	0	2	2	0	0	0	1	5	1	0	1	0	1	1	16
14.51-20.50	0	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	4
>20.50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	17	25	24	21	38	20	9	14	35	30	29	17	15	11	13	20	338

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	1	0	0	0	0	1	0	2	2	0	0	1	1	8
1.51- 2.50	6	1	3	2	0	2	1	2	2	1	8	5	1	6	1	2	43
2.51- 3.50	4	7	4	7	2	1	0	3	4	3	3	9	5	7	4	4	67
3.51- 4.50	7	3	1	1	0	0	0	3	1	4	7	2	5	4	2	1	41
4.51- 5.50	3	2	2	5	2	2	0	0	2	7	2	0	0	2	1	3	33
5.51- 6.50	3	1	4	0	1	0	0	4	0	5	4	1	2	2	1	1	29
6.51- 8.50	0	4	4	1	3	2	0	1	0	6	10	3	4	2	5	1	46
8.51-11.50	0	6	2	2	15	7	0	1	1	5	4	1	1	7	4	3	59
11.51-14.50	0	0	0	1	12	2	0	0	0	0	0	1	0	2	2	1	21
14.51-20.50	0	0	1	0	3	0	0	0	0	0	0	0	0	0	3	0	7
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	23	24	21	20	38	16	1	14	11	31	40	24	18	32	24	17	354

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	2	0	0	0	0	0	1	0	0	2	0	2	0	2	2	11
1.51- 2.50	3	5	1	4	1	1	1	2	0	2	1	3	5	4	6	12	51
2.51- 3.50	13	6	1	3	0	0	0	0	1	0	5	2	7	6	12	17	73
3.51- 4.50	7	6	0	0	0	0	0	0	1	1	2	1	0	6	3	7	34
4.51- 5.50	5	3	1	0	0	0	0	0	2	1	4	3	3	5	3	8	38
5.51- 6.50	3	5	1	1	1	0	0	0	1	2	5	2	2	2	4	5	34
6.51- 8.50	12	7	2	1	0	1	0	0	1	2	5	1	2	3	1	4	42
8.51-11.50	2	6	0	0	1	0	0	0	0	0	3	0	0	0	1	2	15
11.51-14.50	0	1	0	1	0	1	0	0	0	0	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	45	41	6	10	3	3	1	3	6	8	27	12	21	26	32	57	301

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 10/01/2018 TO 12/31/2018

*** 4TH QRTR ***

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	2	2	1	0	1	0	0	0	0	1	1	1	2	3	4	2	20
1.51- 2.50	33	16	7	4	0	1	2	0	3	1	2	2	8	8	25	30	142
2.51- 3.50	81	25	6	2	1	0	0	0	0	0	2	6	8	14	19	59	223
3.51- 4.50	82	17	5	0	0	1	0	0	0	1	1	3	1	4	15	40	170
4.51- 5.50	61	23	0	0	0	0	0	0	0	0	1	1	1	0	9	17	113
5.51- 6.50	26	12	0	0	0	0	0	0	0	0	0	0	0	2	4	9	53
6.51- 8.50	19	11	0	1	0	0	0	0	0	0	0	0	0	0	4	5	40
8.51-11.50	5	13	2	0	0	0	0	0	0	0	0	0	0	0	0	2	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	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	309	120	21	7	2	2	2	0	3	3	7	13	20	31	80	164	784

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	4	1	1	2	0	1	2	1	1	6	5	5	4	8	5	48
1.51- 2.50	49	26	13	12	5	7	6	7	12	11	17	19	17	22	37	45	305
2.51- 3.50	102	45	12	14	7	6	7	7	22	19	22	22	25	31	38	88	467
3.51- 4.50	101	33	19	14	9	3	4	11	19	22	21	11	7	18	25	52	369
4.51- 5.50	72	32	16	21	12	4	2	8	14	18	18	6	6	8	13	35	285
5.51- 6.50	36	25	17	7	15	6	3	7	9	15	11	6	6	6	11	16	196
6.51- 8.50	34	29	13	16	26	9	2	5	11	13	24	6	14	7	10	12	231
8.51-11.50	12	35	13	11	43	18	1	3	4	9	15	6	4	9	6	8	197
11.51-14.50	1	5	2	9	19	3	0	0	2	6	1	1	1	2	3	2	57
14.51-20.50	0	2	2	3	10	0	0	0	0	1	0	0	0	1	5	0	24
>20.50	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	3
TOTAL	409	236	110	108	149	56	26	50	94	115	135	82	85	108	156	263	2182

TOTAL NUMBER OF OBSERVATIONS: 2208
TOTAL NUMBER OF VALID OBSERVATIONS: 2182
TOTAL NUMBER OF MISSING OBSERVATIONS: 26
PERCENT DATA RECOVERY FOR THIS PERIOD: 98.8 %
MEAN WIND SPEED FOR THIS PERIOD: 5.1 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
.92	6.78	10.86	15.49	16.22	13.79	35.93

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	2	3	5	5	0	1	0	2	0	1	1	0	0	0	0	0
B	7	6	13	21	27	8	5	6	15	14	6	8	3	3	4	2	0
C	8	18	22	24	36	7	7	13	22	29	25	7	8	5	3	3	0
D	17	25	24	21	38	20	9	14	35	30	29	17	15	11	13	20	0
E	23	24	21	20	38	16	1	14	11	31	40	24	18	32	24	17	0
F	45	41	6	10	3	3	1	3	6	8	27	12	21	26	32	57	0
G	309	120	21	7	2	2	2	0	3	3	7	13	20	31	80	164	0
TOTAL	409	236	110	108	149	56	26	50	94	115	135	82	85	108	156	263	0

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2018 TO 12/31/2018

*** 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	1	0	0	0	0	0	1	0	0	0	0	0	2
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	2	1	1	2	1	0	1	1	1	2	13
4.51- 5.50	3	0	0	1	1	3	2	7	12	2	3	4	0	2	3	1	44
5.51- 6.50	2	0	2	1	2	2	6	6	22	13	7	9	3	1	0	0	76
6.51- 8.50	2	0	0	2	4	2	2	10	24	36	31	17	8	0	0	1	139
8.51-11.50	0	0	1	6	6	4	4	5	7	22	41	28	6	1	0	0	131
11.51-14.50	0	1	0	1	6	0	0	1	1	6	8	3	0	0	0	0	27
14.51-20.50	0	1	1	0	5	0	0	0	1	3	4	0	0	0	0	0	15
>20.50	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	3
TOTAL	8	2	6	11	26	11	16	30	68	84	96	61	18	5	4	4	450

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	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	3
2.51- 3.50	0	0	1	0	0	1	2	2	1	2	3	4	1	0	1	0	18
3.51- 4.50	4	2	1	2	1	1	1	1	5	4	5	2	2	0	1	1	33
4.51- 5.50	0	2	7	5	3	3	2	8	13	13	7	1	3	5	2	2	76
5.51- 6.50	3	2	3	2	4	3	2	4	11	9	3	5	3	0	1	0	55
6.51- 8.50	2	2	1	9	14	4	5	3	10	11	13	4	6	1	1	0	86
8.51-11.50	2	0	3	3	5	3	0	2	2	5	14	13	3	1	1	1	58
11.51-14.50	0	0	1	4	7	0	0	0	1	0	2	2	1	0	0	0	18
14.51-20.50	0	0	0	1	1	0	0	0	0	1	0	0	0	0	2	0	5
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	12	8	17	26	36	15	12	20	43	45	48	31	19	7	9	4	352

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	1	0	1
1.51- 2.50	1	3	0	1	1	1	1	1	0	4	1	3	0	1	0	1	19
2.51- 3.50	3	5	1	2	4	3	3	2	5	7	7	2	2	0	3	1	50
3.51- 4.50	2	2	6	7	5	0	4	6	9	9	10	4	2	3	1	0	70
4.51- 5.50	2	2	3	7	5	2	0	3	12	8	8	2	2	0	0	3	59
5.51- 6.50	2	3	9	4	8	1	1	4	7	7	6	3	2	1	0	0	58
6.51- 8.50	0	3	5	3	4	1	0	5	6	8	16	7	3	2	0	0	63
8.51-11.50	0	2	3	1	10	2	0	0	2	6	11	3	3	0	0	0	43
11.51-14.50	0	2	2	1	2	1	0	0	0	2	6	0	0	0	0	0	16
14.51-20.50	0	0	0	1	6	0	0	0	0	1	1	0	0	0	0	0	9
>20.50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	10	22	29	27	46	11	9	21	41	52	66	24	14	7	5	5	389

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2018 TO 12/31/2018

*** 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	0	0	1	0	1	2	0	1	1	3	1	1	0	0	12
1.51- 2.50	8	2	2	2	1	4	2	2	7	5	7	9	6	5	5	4	71
2.51- 3.50	6	3	1	0	1	4	3	5	14	8	6	5	4	5	2	10	77
3.51- 4.50	5	6	8	6	3	2	0	5	13	8	11	4	3	1	3	7	85
4.51- 5.50	3	3	8	6	4	0	2	3	8	12	10	2	3	0	0	4	68
5.51- 6.50	3	5	4	1	4	4	1	4	3	5	11	9	1	1	3	2	61
6.51- 8.50	3	4	5	5	7	13	3	2	3	10	15	8	8	0	0	3	89
8.51-11.50	3	10	6	8	19	12	4	2	1	12	47	12	4	1	0	1	142
11.51-14.50	3	4	1	6	8	2	1	1	2	6	22	4	3	1	2	2	68
14.51-20.50	1	2	1	2	6	0	0	1	1	4	9	0	0	2	1	0	30
>20.50	0	1	0	1	3	1	0	0	1	0	1	0	0	0	0	0	8
TOTAL	36	40	36	37	57	42	17	27	53	71	140	56	33	17	16	33	711

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	1	0	0	0	0	1	1	2	2	0	0	1	1	9
1.51- 2.50	7	3	5	3	0	2	2	3	4	1	9	8	6	12	5	5	75
2.51- 3.50	7	9	7	7	2	1	0	3	4	6	6	14	9	11	12	8	106
3.51- 4.50	9	4	2	1	0	1	0	5	3	11	10	7	10	7	7	2	79
4.51- 5.50	7	8	2	6	3	4	1	0	4	17	20	6	3	3	3	6	93
5.51- 6.50	8	5	7	5	2	2	0	4	2	20	23	8	5	3	2	4	100
6.51- 8.50	5	8	9	4	6	4	4	8	6	29	52	22	12	3	6	1	179
8.51-11.50	1	6	5	14	24	13	5	4	6	18	58	23	1	8	4	3	193
11.51-14.50	1	4	1	9	15	3	3	0	0	2	14	1	0	2	2	1	58
14.51-20.50	0	1	2	1	6	1	1	1	0	1	1	0	0	0	3	0	18
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	45	48	40	51	58	31	16	28	30	106	195	91	46	49	45	31	910

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	2	0	1	0	0	0	1	0	0	2	0	2	0	4	3	15
1.51- 2.50	7	7	2	5	1	1	1	2	1	3	2	6	7	4	9	19	77
2.51- 3.50	16	10	1	3	1	0	0	0	3	2	9	5	11	8	18	20	107
3.51- 4.50	15	7	1	1	0	0	0	0	2	3	5	4	7	10	6	8	69
4.51- 5.50	6	6	2	0	0	0	0	1	7	3	11	7	6	8	5	10	72
5.51- 6.50	4	8	2	2	1	0	0	0	3	3	10	8	6	4	4	6	61
6.51- 8.50	12	13	7	1	0	1	0	0	3	8	20	15	3	3	2	5	93
8.51-11.50	3	6	1	0	1	0	1	0	0	2	5	3	1	0	1	3	27
11.51-14.50	0	1	0	3	0	1	0	0	0	0	0	0	0	0	0	0	5
14.51-20.50	0	0	0	0	0	0	0	0	1	0	0	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	63	60	16	16	4	3	2	4	20	24	64	48	44	37	49	74	528

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 7/01/2018 TO 12/31/2018

*** 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																	1
.76- 1.50	2	2	1	0	1	0	0	0	0	1	1	1	2	3	4	2	20
1.51- 2.50	36	16	8	4	0	1	2	0	3	1	2	4	9	8	26	34	154
2.51- 3.50	97	27	7	2	1	0	0	0	0	0	3	8	11	20	24	71	271
3.51- 4.50	102	23	8	1	0	1	0	0	0	3	1	4	2	5	19	53	222
4.51- 5.50	76	28	2	0	0	0	0	1	0	0	1	2	2	0	12	21	145
5.51- 6.50	32	20	1	0	0	0	0	0	0	0	1	0	0	2	6	10	72
6.51- 8.50	20	19	0	1	0	0	0	0	0	0	0	0	0	0	4	5	49
8.51-11.50	5	13	3	0	0	0	0	0	0	0	0	0	0	0	0	2	23
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	370	149	30	8	2	2	2	1	3	5	9	19	26	38	95	198	958

STABILITY CLASS ALL

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
.76- 1.50	3	4	1	2	2	0	1	3	1	3	6	6	5	4	10	6	57
1.51- 2.50	60	31	17	15	5	9	8	8	15	14	23	30	28	30	45	63	401
2.51- 3.50	129	54	18	14	9	9	8	12	27	25	34	38	38	44	60	110	629
3.51- 4.50	138	44	26	18	9	5	7	18	33	40	43	25	27	27	38	73	571
4.51- 5.50	97	49	24	25	16	12	7	23	56	55	60	24	19	18	25	47	557
5.51- 6.50	54	43	28	15	21	12	10	22	48	57	61	42	20	12	16	22	483
6.51- 8.50	44	49	27	25	35	25	14	28	52	102	147	73	40	9	13	15	698
8.51-11.50	14	37	22	32	65	34	14	13	18	65	176	82	18	11	6	10	617
11.51-14.50	4	13	5	24	38	7	4	2	4	16	52	10	4	3	4	3	193
14.51-20.50	1	4	4	5	24	1	1	2	3	10	15	0	1	2	6	0	79
>20.50	0	1	2	1	5	1	0	0	1	0	1	0	0	0	0	0	12
TOTAL	544	329	174	176	229	115	74	131	258	387	618	330	200	160	223	349	4298

TOTAL NUMBER OF OBSERVATIONS: 4416
TOTAL NUMBER OF VALID OBSERVATIONS: 4298
TOTAL NUMBER OF MISSING OBSERVATIONS: 118
PERCENT DATA RECOVERY FOR THIS PERIOD: 97.3 %
MEAN WIND SPEED FOR THIS PERIOD: 6.1 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
10.47	8.19	9.05	16.54	21.17	12.28	22.29

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	8	2	6	11	26	11	16	30	68	84	96	61	18	5	4	4	0
B	12	8	17	26	36	15	12	20	43	45	48	31	19	7	9	4	0
C	10	22	29	27	46	11	9	21	41	52	66	24	14	7	5	5	0
D	36	40	36	37	57	42	17	27	53	71	140	56	33	17	16	33	0
E	45	48	40	51	58	31	16	28	30	106	195	91	46	49	45	31	0
F	63	60	16	16	4	3	2	4	20	24	64	48	44	37	49	74	0
G	370	149	30	8	2	2	2	1	3	5	9	19	26	38	95	198	1
TOTAL	544	329	174	176	229	115	74	131	258	387	618	330	200	160	223	349	1

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2018 TO 12/31/2018

*** 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																	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	1	0	0	0	0	0	1	0	0	0	0	0	2
2.51- 3.50	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
3.51- 4.50	1	0	1	0	0	1	2	3	3	2	2	0	2	1	1	2	21
4.51- 5.50	3	0	1	3	1	4	6	19	28	15	7	7	2	2	6	2	106
5.51- 6.50	3	1	4	1	3	4	13	29	46	27	16	16	8	2	1	0	174
6.51- 8.50	3	0	1	11	8	5	7	27	59	76	64	34	13	1	3	2	314
8.51-11.50	0	0	1	8	9	6	5	10	31	64	106	45	20	6	0	0	311
11.51-14.50	0	3	0	2	9	0	0	1	4	39	53	7	2	3	1	4	128
14.51-20.50	0	1	1	0	5	0	0	0	1	17	47	7	0	2	4	0	85
>20.50	0	0	2	0	1	0	0	0	0	5	0	4	1	1	0	0	14
TOTAL	11	5	11	25	37	20	33	89	172	245	296	120	48	19	16	10	1157

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	1	0	1	0	1	1	0	1	0	0	1	2	1	0	0	0	9
2.51- 3.50	0	2	1	0	1	1	5	4	2	7	7	5	3	0	1	1	40
3.51- 4.50	4	4	2	2	1	2	3	5	18	12	9	5	5	2	3	3	80
4.51- 5.50	1	5	11	9	3	4	6	13	27	19	15	4	4	6	2	4	133
5.51- 6.50	3	2	9	4	6	3	5	11	25	14	12	12	4	0	1	3	114
6.51- 8.50	2	2	7	10	16	8	6	4	18	15	22	12	9	2	2	0	135
8.51-11.50	2	0	4	4	8	3	0	2	3	13	30	19	5	1	2	2	98
11.51-14.50	1	0	1	5	7	0	0	0	1	1	9	5	4	1	1	0	36
14.51-20.50	0	0	0	4	1	0	0	0	0	1	4	1	0	1	2	1	15
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
TOTAL	14	15	36	38	44	22	25	40	94	82	109	65	36	13	14	14	661

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	1	0	1
1.51- 2.50	2	3	2	1	2	1	2	2	1	5	4	4	1	2	0	1	33
2.51- 3.50	6	6	4	4	5	7	4	3	12	14	12	3	4	4	6	2	96
3.51- 4.50	2	8	10	10	5	0	10	9	19	13	14	6	3	6	2	1	118
4.51- 5.50	2	3	7	10	6	4	0	6	20	16	16	5	2	1	1	4	103
5.51- 6.50	2	5	14	4	9	1	4	5	12	12	12	6	3	1	0	0	90
6.51- 8.50	1	3	9	4	4	5	1	8	9	9	25	10	5	2	2	0	97
8.51-11.50	0	2	4	1	11	5	1	1	2	9	18	10	7	2	0	0	73
11.51-14.50	0	2	2	2	2	1	0	0	0	6	17	3	3	4	0	0	42
14.51-20.50	0	0	0	2	7	0	0	0	0	4	8	2	1	0	0	0	24
>20.50	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2
TOTAL	15	32	52	38	52	24	22	34	75	88	126	49	29	23	12	8	679

ARIZONA PUBLIC SERVICE CO. - PALO VERDE NUCLEAR GENERATING STATION

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2018 TO 12/31/2018

*** ANNUAL ***

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 200.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: .75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	1	0	0	0	1	0	2	3	0	2	1	5	1	2	0	2	20
1.51- 2.50	11	5	2	3	2	6	3	6	12	9	15	16	13	12	11	9	135
2.51- 3.50	17	8	6	2	2	4	4	10	25	24	13	10	8	14	9	15	171
3.51- 4.50	11	8	8	11	3	5	1	7	19	19	19	7	6	4	7	12	147
4.51- 5.50	5	6	9	7	4	0	2	4	11	20	22	5	4	2	1	7	109
5.51- 6.50	5	7	9	3	4	5	1	7	5	10	18	17	2	3	4	2	102
6.51- 8.50	4	4	8	6	11	16	6	7	5	18	26	14	10	0	1	5	141
8.51-11.50	3	11	7	10	19	22	4	2	2	16	73	26	7	3	0	2	207
11.51-14.50	3	4	1	10	15	3	1	2	2	16	41	9	9	8	4	2	130
14.51-20.50	1	2	1	4	15	0	0	3	4	18	22	6	1	6	2	1	86
>20.50	0	1	0	1	3	1	0	0	1	1	1	0	0	1	1	0	11
TOTAL	61	56	51	57	79	62	24	51	86	153	251	115	61	55	40	57	1259

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	1	0	0	1	0	2	1	2	3	0	0	1	2	13
1.51- 2.50	13	7	5	3	1	3	8	4	9	5	13	9	10	19	9	10	128
2.51- 3.50	16	14	9	8	2	1	2	3	9	11	12	20	14	16	22	14	173
3.51- 4.50	15	7	2	1	1	1	1	5	9	12	19	12	14	12	12	7	130
4.51- 5.50	10	12	2	8	3	4	1	0	7	26	31	16	6	4	6	10	146
5.51- 6.50	9	6	8	6	2	2	0	5	7	31	44	17	14	3	6	4	164
6.51- 8.50	5	9	10	4	7	5	4	10	12	58	89	57	20	5	10	1	306
8.51-11.50	3	7	7	19	24	15	6	6	9	60	130	55	11	13	10	4	379
11.51-14.50	1	4	1	10	15	8	4	1	0	27	51	6	4	6	6	4	148
14.51-20.50	0	1	2	1	8	1	1	1	2	3	7	3	0	9	4	0	43
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	72	67	46	61	63	40	28	35	66	234	398	198	93	87	86	56	1630

STABILITY CLASS F

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 1.50	1	3	0	1	0	1	0	1	1	0	3	0	4	1	5	3	24
1.51- 2.50	13	12	5	7	1	1	1	2	2	6	7	13	13	16	21	30	150
2.51- 3.50	33	19	7	3	1	1	0	2	6	4	25	14	29	22	29	40	235
3.51- 4.50	28	14	6	5	0	0	1	2	5	8	26	20	19	24	13	14	185
4.51- 5.50	11	6	4	2	0	0	0	1	7	8	35	17	17	16	10	15	149
5.51- 6.50	5	9	2	2	1	0	0	0	5	6	22	17	16	10	8	15	118
6.51- 8.50	14	16	8	1	0	1	0	2	5	32	66	42	13	11	13	12	236
8.51-11.50	3	7	3	0	1	0	1	0	0	14	27	11	4	0	3	11	85
11.51-14.50	0	1	0	4	0	1	0	0	0	1	0	1	0	0	0	0	8
14.51-20.50	0	0	0	0	0	0	0	0	1	0	0	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	108	87	35	25	4	5	3	10	32	79	211	135	116	100	102	140	1192

JOINT FREQUENCY DISTRIBUTION FOR THE PERIOD 1/01/2018 TO 12/31/2018

*** 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																	1
.76- 1.50	3	2	1	1	1	0	0	0	0	1	1	1	2	5	7	3	28
1.51- 2.50	55	22	9	5	0	4	5	0	4	1	4	9	21	23	44	55	261
2.51- 3.50	175	43	11	4	3	0	0	1	0	4	7	15	23	42	71	141	540
3.51- 4.50	226	54	19	1	0	1	2	0	0	6	6	8	8	15	50	126	522
4.51- 5.50	153	51	3	1	1	0	1	1	1	0	5	4	2	6	21	64	314
5.51- 6.50	64	39	6	0	0	0	0	0	0	3	3	1	0	2	8	29	155
6.51- 8.50	42	41	4	1	0	0	0	0	0	1	1	0	0	0	4	12	106
8.51-11.50	13	20	7	0	0	0	0	0	0	0	0	0	0	0	1	5	46
11.51-14.50	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
14.51-20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>20.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	731	273	61	13	5	5	8	2	5	16	27	38	56	93	206	435	1975

STABILITY CLASS ALL

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
.76- 1.50	5	5	1	3	2	1	3	4	3	4	7	9	7	8	14	10	86
1.51- 2.50	95	49	24	19	8	16	19	15	28	26	45	53	59	72	85	105	718
2.51- 3.50	248	92	38	21	14	14	15	23	54	64	76	67	81	99	138	213	1257
3.51- 4.50	287	95	48	30	10	10	20	31	73	72	95	58	57	64	88	165	1203
4.51- 5.50	185	83	37	40	18	16	16	44	101	104	131	58	37	37	47	106	1060
5.51- 6.50	91	69	52	20	25	15	23	57	100	103	127	86	47	21	28	53	917
6.51- 8.50	71	75	47	37	46	40	24	58	108	209	293	169	70	21	35	32	1335
8.51-11.50	24	47	33	42	72	51	17	21	47	176	384	166	54	25	16	24	1199
11.51-14.50	5	15	6	33	48	13	5	4	7	90	171	31	22	22	12	10	494
14.51-20.50	1	4	4	11	36	1	1	4	8	43	88	19	3	18	12	2	255
>20.50	0	1	2	1	5	1	0	0	1	6	1	4	2	3	1	0	28
TOTAL	1012	535	292	257	284	178	143	261	530	897	1418	720	439	390	476	720	8553

TOTAL NUMBER OF OBSERVATIONS: 8760
TOTAL NUMBER OF VALID OBSERVATIONS: 8553
TOTAL NUMBER OF MISSING OBSERVATIONS: 207
PERCENT DATA RECOVERY FOR THIS PERIOD: 97.6 %
MEAN WIND SPEED FOR THIS PERIOD: 6.3 MPH
TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
13.53	7.73	7.94	14.72	19.06	13.94	23.09

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM		
A	11	5	11	25	37	20	33	89	172	245	296	120	48	19	16	10	0		
B	14	15	36	38	44	22	25	40	94	82	109	65	36	13	14	14	0		
C	15	32	52	38	52	24	22	34	75	88	126	49	29	23	12	8	0		
D	61	56	51	57	79	62	24	51	86	153	251	115	61	55	40	57	0		
E	72	67	46	61	63	40	28	35	66	234	398	198	93	87	86	56	0		
F	108	87	35	25	4	5	3	10	32	79	211	135	116	100	102	140	0		
G	731	273	61	13	5	5	8	2	5	16	27	38	56	93	206	435	1		
		TOTAL	1012	535	292	257	284	178	143	261	530	897	1418	720	439	390	476	720	1

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 has been removed as the Energy Information Center (EIC) has been moved offsite.

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 2018 Land Use Census.

0 to 10 mile population from the PVNGS Emergency Plan, Rev 60.

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 eight (8) 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 2018

NA

ENERGY INFORMATION CENTER (EIC) was relocated to an offsite location in 2011.

Table 44:
Integrated Population Dose for 2018

January to March

Pathway	Total Body	GI-Tract	Bone	Liver	Kidney	Thyroid	Lung	Skin
Plume	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	2.4E-04
	0.00%	0.00%	100%	0.00%	0.00%	0.00%	0.00%	0.00%
Ground	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05	5.18E-05
	0.00%	0.00%	26.8%	0.00%	0.00%	0.00%	0.00%	0.00%
Inhalation	3.06E+00	3.06E+00	0.00E+00	3.06E+00	3.06E+00	3.06E+00	3.06E+00	3.06E+00
	27.24%	27.24%	0.00%	27.24%	27.24%	27.24%	27.24%	27.24%
Vegetation	7.01E+00	7.01E+00	0.00E+00	7.01E+00	7.01E+00	7.01E+00	7.01E+00	7.01E+00
	62.44%	62.44%	0.00%	62.44%	62.44%	62.44%	62.44%	62.44%
Cow Milk	8.19E-01	8.19E-01	0.00E+00	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01
	7.30%	7.30%	0.00%	7.30%	7.30%	7.30%	7.30%	7.29%
Meat	3.40E-01	3.40E-01	0.00E+00	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01
	3.03%	3.03%	0.00%	3.03%	3.03%	3.03%	3.03%	3.03%
Total	1.12E+01	1.12E+01	1.64E-04	1.12E+01	1.12E+01	1.12E+01	1.12E+01	1.12E+01
Per Capita Dose (rem) (1)	5.72E-06	5.72E-06	8.37E-11	5.72E-06	5.72E-06	5.72E-06	5.72E-06	5.72E-06

April through June

Pathway	Total Body	GI-Tract	Bone	Liver	Kidney	Thyroid	Lung	Skin
Plume	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	2.17E-04
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
Ground	6.68E-04	6.68E-04	6.68E-04	6.68E-04	6.68E-04	6.68E-04	6.68E-04	7.86E-04
	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
Inhalation	1.14E+00	1.14E+00	5.40E-06	1.14E+00	1.14E+00	1.14E+00	1.14E+00	1.14E+00
	33.23%	33.22%	0.68%	33.23%	33.23%	33.23%	33.24%	33.22%
Vegetation	1.90E+00	1.90E+00	2.43E-06	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00
	55.38%	55.38%	0.31%	55.38%	55.38%	55.38%	55.38%	55.38%
Cow Milk	3.06E-01	3.06E-01	3.22E-07	3.06E-01	3.06E-01	3.06E-01	3.06E-01	3.06E-01
	8.93%	8.93%	0.04%	8.93%	8.93%	8.93%	8.93%	8.93%
Meat	8.38E-02	8.38E-02	2.19E-08	8.38E-02	8.38E-02	8.38E-02	8.38E-02	8.38E-02
	2.44%	2.44%	0.00%	2.44%	2.44%	2.44%	2.44%	2.44%
Total	3.43E+00	3.43E+00	7.93E-04	3.43E+00	3.43E+00	3.43E+00	3.43E+00	3.43E+00
Per Capita Dose (rem) (1)	1.75E-06	1.75E-06	4.05E-10	1.75E-06	1.75E-06	1.75E-06	1.75E-06	1.75E-06

Table 44: (continued)
Integrated Population Dose for 2018

January through June

Pathway	Total Body	GI-Tract	Bone	Liver	Kidney	Thyroid	Lung	Skin
Plume	2.37E-04	2.37E-04	2.37E-04	2.37E-04	2.37E-04	2.37E-04	2.37E-04	4.45E-04
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Ground	7.12E-04	7.12E-04	7.12E-04	7.12E-04	7.12E-04	7.12E-04	7.12E-04	8.37E-04
	0.00%	0.00%	74.36%	0.00%	0.00%	0.00%	0.00%	0.01%
Inhalation	4.20E+00	4.20E+00	5.40E-06	4.20E+00	4.20E+00	4.20E+00	4.20E+00	4.20E+00
	28.64%	28.64%	0.56%	28.64%	28.64%	28.64%	28.64%	28.64%
Vegetation	8.91E+00	8.91E+00	2.43E-06	8.91E+00	8.91E+00	8.91E+00	8.91E+00	8.91E+00
	60.79%	60.79%	0.25%	60.79%	60.79%	60.79%	60.79%	60.79%
Cow Milk	1.13E+00	1.13E+00	3.22E-07	1.13E+00	1.13E+00	1.13E+00	1.13E+00	1.13E+00
	7.68%	7.68%	0.03%	7.68%	7.68%	7.68%	7.68%	7.68%
Meat	4.24E-01	4.24E-01	2.19E-08	4.24E-01	4.24E-01	4.24E-01	4.24E-01	4.24E-01
	2.89%	2.89%	0.00%	2.89%	2.89%	2.89%	2.89%	2.89%
Total	1.47E+01	1.47E+01	9.57E-04	1.47E+01	1.47E+01	1.47E+01	1.47E+01	1.47E+01
Per Capita Dose (rem) (1)	7.50E-06	7.50E-06	4.89E-10	7.50E-06	7.50E-06	7.50E-06	7.50E-06	7.50E-06

July through September

Pathway	Total Body	GI-Tract	Bone	Liver	Kidney	Thyroid	Lung	Skin
Plume	1.62E-04	1.62E-04	1.62E-04	1.62E-04	1.62E-04	1.62E-04	1.62E-04	3.09E-04
	0.01%	0.01%	63.34%	0.01%	0.01%	0.01%	0.01%	0.01%
Ground	9.36E-05	9.36E-05	9.36E-05	9.36E-05	9.36E-05	9.36E-05	9.36E-05	1.10E-04
	0.00%	0.00%	36.66%	0.00%	0.00%	0.00%	0.00%	0.00%
Inhalation	1.00E+00	1.00E+00	0.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
	34.67%	34.67%	0.00%	34.67%	34.67%	34.67%	34.67%	34.66%
Vegetation	1.57E+00	1.57E+00	0.00E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00
	54.18%	54.18%	0.00%	54.18%	54.18%	54.18%	54.18%	54.17%
Cow Milk	2.55E-01	2.55E-01	0.00E+00	2.55E-01	2.55E-01	2.55E-01	2.55E-01	2.55E-01
	8.79%	8.79%	0.00%	8.79%	8.79%	8.79%	8.79%	8.79%
Meat	6.84E-02	6.84E-02	0.00E+00	6.84E-02	6.84E-02	6.84E-02	6.84E-02	6.84E-02
	2.36%	2.36%	0.00%	2.36%	2.36%	2.36%	2.36%	2.36%
Total	2.90E+00	2.90E+00	2.55E-04	2.90E+00	2.90E+00	2.90E+00	2.90E+00	2.90E+00
Per Capita Dose (rem) (1)	1.48E-06	1.48E-06	1.30E-10	1.48E-06	1.48E-06	1.48E-06	1.48E-06	1.48E-06

Table 44: (continued)
Integrated Population Dose for 2018

October through December

Pathway	Total Body	GI-Tract	Bone	Liver	Kidney	Thyroid	Lung	Skin
Plume	5.13E-04	5.13E-04	5.13E-04	5.13E-04	5.13E-04	5.13E-04	5.13E-04	1.33E-03
	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%
Ground	8.78E-05	8.78E-05	8.78E-05	8.78E-05	8.78E-05	8.78E-05	8.78E-05	1.03E-04
	0.00%	0.00%	14.54%	0.00%	0.00%	0.00%	0.00%	0.00%
Inhalation	2.17E+00	2.17E+00	6.61E-07	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00
	25.58%	25.58%	0.11%	25.58%	25.58%	25.58%	25.58%	25.58%
Vegetation	5.48E+00	5.48E+00	2.11E-06	5.48E+00	5.48E+00	5.48E+00	5.48E+00	5.48E+00
	64.44%	64.44%	0.50%	64.44%	64.44%	64.44%	64.44%	64.43%
Cow Milk	5.93E-01	5.93E-01	3.39E-07	5.93E-01	5.93E-01	5.93E-01	5.93E-01	5.93E-01
	6.98%	6.98%	0.06%	6.98%	6.98%	6.98%	6.98%	6.98%
Meat	2.54E-01	2.54E-01	2.75E-08	2.54E-01	2.54E-01	2.54E-01	2.54E-01	2.54E-01
	2.99%	2.99%	0.00%	2.99%	2.99%	2.99%	2.99%	2.99%
Total	8.50E+00	8.50E+00	6.04E-04	8.50E+00	8.50E+00	8.50E+00	8.50E+00	8.50E+00
Per Capita Dose (rem) (1)	4.34E-06	4.34E-06	3.08E-10	4.34E-06	4.34E-06	4.34E-06	4.34E-06	4.34E-06

July through December

Pathway	Total Body	GI-Tract	Bone	Liver	Kidney	Thyroid	Lung	Skin
Plume	6.75E-04	6.75E-04	6.75E-04	6.75E-04	6.75E-04	6.75E-04	6.75E-04	1.64E-03
	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Ground	1.81E-04	1.81E-04	1.81E-04	1.81E-04	1.81E-04	1.81E-04	1.81E-04	2.13E-04
	0.00%	0.00%	21.12%	0.00%	0.00%	0.00%	0.00%	0.00%
Inhalation	3.18E+00	3.18E+00	6.61E-07	3.18E+00	3.18E+00	3.18E+00	3.18E+00	3.18E+00
	27.89%	27.89%	0.08%	27.89%	27.89%	27.89%	27.89%	27.89%
Vegetation	7.05E+00	7.05E+00	2.11E-06	7.05E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00
	61.83%	61.83%	0.25%	61.83%	61.83%	61.83%	61.83%	61.83%
Cow Milk	8.47E-01	8.47E-01	3.39E-07	8.47E-01	8.47E-01	8.47E-01	8.47E-01	8.47E-01
	7.44%	7.44%	0.04%	7.44%	7.44%	7.44%	7.44%	7.44%
Meat	3.23E-01	3.23E-01	2.75E-08	3.23E-01	3.23E-01	3.23E-01	3.23E-01	3.23E-01
	2.83%	2.83%	0.00%	2.83%	2.83%	2.83%	2.83%	2.83%
Total	1.14E+01	1.14E+01	8.59E-04	1.14E+01	1.14E+01	1.14E+01	1.14E+01	1.14E+01
Per Capita Dose (rem) (1)	5.82E-06	5.82E-06	4.38E-10	5.82E-06	5.82E-06	5.82E-06	5.82E-06	5.82E-06

Table 44: (continued)
Integrated Population Dose for 2018

January through December

Pathway	Total Body	GI-Tract	Bone	Liver	Kidney	Thyroid	Lung	Skin
Plume	9.12E-04	9.12E-04	9.12E-04	9.12E-04	9.12E-04	9.12E-04	9.12E-04	2.09E-03
	0.00%	0.00%	50.20%	0.00%	0.00%	0.00%	0.00%	0.01%
Ground	8.93E-04	8.93E-04	8.93E-04	8.93E-04	8.93E-04	8.93E-04	8.93E-04	1.05E-03
	0.00%	0.00%	49.17%	0.00%	0.00%	0.00%	0.00%	0.00%
Inhalation	7.38E+00	7.38E+00	6.06E-06	7.38E+00	7.38E+00	7.38E+00	7.38E+00	7.38E+00
	28.31%	28.31%	0.33%	28.31%	28.31%	28.31%	28.31%	28.31%
Vegetation	1.60E+01	1.60E+01	4.54E-06	1.60E+01	1.60E+01	1.60E+01	1.60E+01	1.60E+01
	61.24%	61.24%	0.25%	61.24%	61.24%	61.24%	61.24%	61.24%
Cow Milk	1.97E+00	1.97E+00	6.61E-07	1.97E+00	1.97E+00	1.97E+00	1.97E+00	1.97E+00
	7.57%	7.57%	0.04%	7.57%	7.57%	7.57%	7.57%	7.57%
Meat	7.46E-01	7.46E-01	4.93E-08	7.46E-01	7.46E-01	7.46E-01	7.46E-01	7.46E-01
	2.87%	2.87%	0.00%	2.87%	2.87%	2.87%	2.87%	2.87%
Total	2.61E+01	2.61E+01	1.82E-03	2.61E+01	2.61E+01	2.61E+01	2.61E+01	2.61E+01
Per Capita Dose (rem) (1)	1.33E-05	1.33E-05	9.29E-10	1.33E-05	1.33E-05	1.33E-05	1.33E-05	1.33E-05

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

Table 45:
Summary of Individual Doses for 2018
Radiation Doses At And Beyond The Site Boundary

	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year total
Gamma Air Dose	mrad	5.68E-04	1.91E-04	2.65E-04	1.70E-03	2.65E-03
ODCM Req 4.1 Limit	mrad	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
% ODCM Limit	%	1.14E-02	3.82E-03	5.30E-03	3.40E-02	2.65E-02
Beta Air Dose	mrad	2.06E-04	6.90E-05	9.73E-05	7.60E-04	1.10E-03
ODCM Req 4.1 Limit	mrad	1.00E+01	1.00E+01	1.00E+01	1.00E+01	2.00E+01
% ODCM Limit	%	2.06E-03	6.90E-04	9.73E-04	7.60E-03	5.50E-03
Maximum Individual						
Total Body	mrem	3.78E-04	1.27E-04	1.76E-04	1.12E-03	1.75E-03
Skin	mrem	6.07E-04	2.04E-04	2.83E-04	1.84E-03	2.85E-03
Location						
Unit 1	miles	1.70 SSE	2.84 S	1.40 SSW	2.84 S	1.70 SSE
Unit 2	miles	1.88 SSE	2.66 S	1.14 SSW	2.66 S	1.88 SSE
Unit 3	miles	1.73 SSE	2.45 S	1.00 SSW	2.45 S	1.73 SSE
Maximum Organ Dose(1) From All Radionuclides						
	Age	Infant	Child	Child	Infant	Child
	Organ	Bone	Bone	Bone	Bone	Bone
	mrem	2.24E+00	9.07E-01	5.00E-01	2.05E+00	5.27E+00
ODCM Req. 4.2 Limit	mrem	7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01
% ODCM Limit(2)	%	2.99E+01	1.21E+01	6.67E+00	2.73E+01	3.51E+01
Location						
Unit 1	miles	4.19 SE	3.11 ESE	2.61 NNE	4.19 SE	4.19 SE
Unit 2	miles	4.19 SE	3.15 ESE	2.81 NNE	4.19 SE	4.19 SE
Unit 3	miles	4.13 SE	3.13 ESE	3.04 NNE	4.13 SE	4.13 SE
Maximum Organ Dose(1) From All Radionuclides Excluding C-14						
	Age	Infant	Child	Child	Infant	Infant
	Organ	Thyroid	Thyroid	Thyroid	Thyroid	Thyroid
	mrem	3.65E-01	9.04E-02	6.19E-02	2.49E-01	7.23E-01
ODCM Req. 4.2 Limit	mrem	7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01
% ODCM Limit(2)	%	4.87E+00	1.21E+00	8.25E-01	3.32E+00	4.82E+00
Organ Dose from tritium only for Unit 2 location above	mrem	3.79E-01	9.00E-02	6.19E-02	2.49E-01	7.37E-01
Fraction of organ dose from tritum only for Unit 2 location above	%	100	99.56	100	100	100
X/Q for Unit 2 location above	sec/m^3	2.12E-06	8.59E-07	4.77E-07	1.95E-06	1.25E-06
D/Q for Unit 2 location above	m-2	5.54E-10	4.44E-10	2.11E-09	4.32E-10	3.37E-10
(1) Excluding skin						
(2) 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						

APPENDIX D: NEI 07-07 GROUNDWATER PROTECTION INITIATIVE SAMPLING

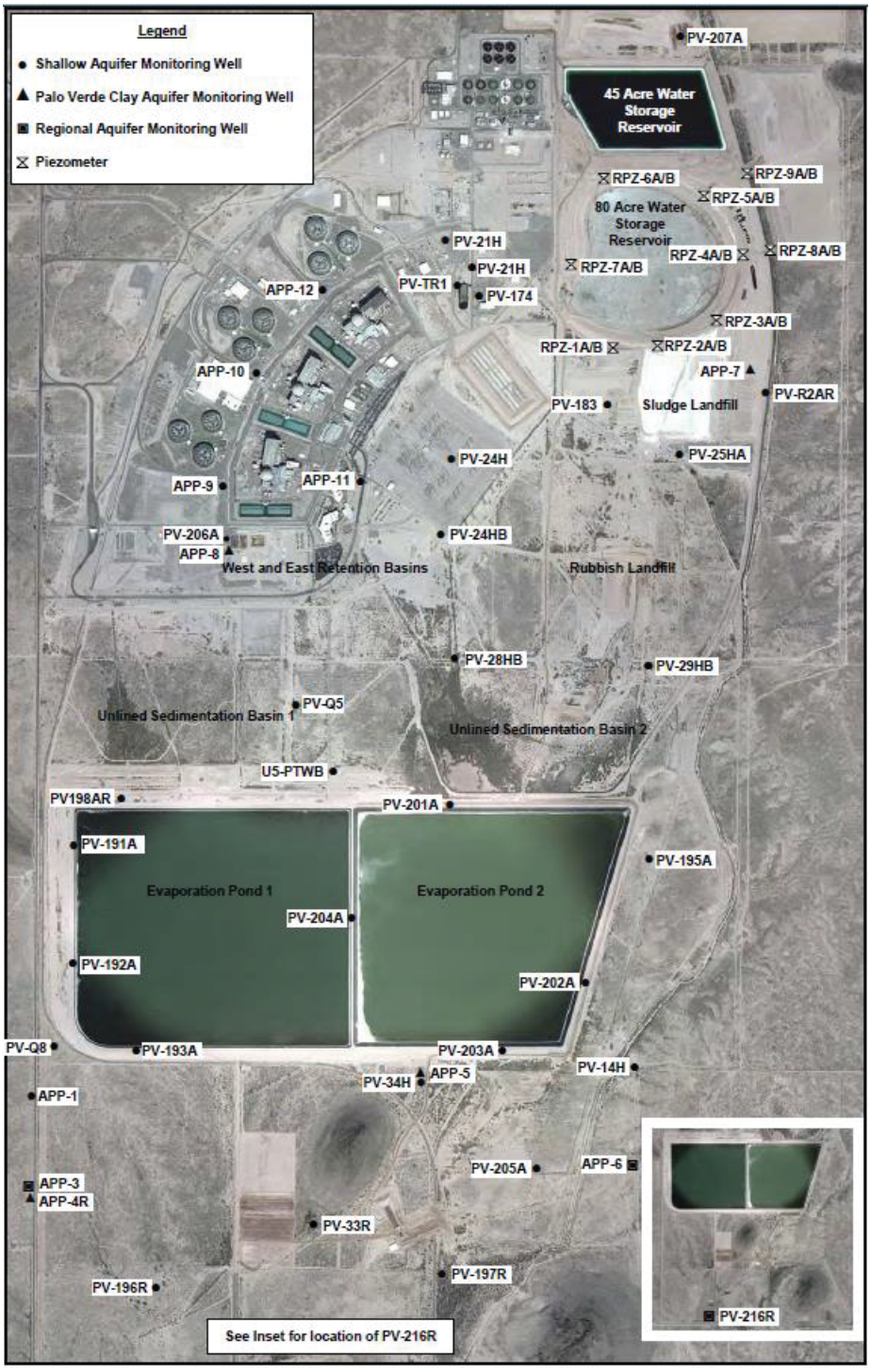

Figure 1. Onsite Well Locations.

Table 46: 2018 NEI 07-07 Ground Water Protection Initiative PVNGS Well Data			
Monitoring Well ID	**Sample Date**	**Radionuclide**	**Concentration (pCi/L)**
APP-10	3/7/2018	Tritium	≤454
APP-10	3/7/2018	Cesium 134	≤2.59
APP-10	3/7/2018	Cesium 137	≤2.91
APP-10	3/7/2018	Cobalt 60	≤2.98
APP-10	6/18/2018	Tritium	≤451
APP-10	6/18/2018	Cesium 134	≤6.85
APP-10	6/18/2018	Cesium 137	≤8.52
APP-10	6/18/2018	Cobalt 60	≤7.98
APP-10	9/5/2018	Tritium	≤441
APP-10	9/5/2018	Cesium 134	≤5.85
APP-10	9/5/2018	Cesium 137	≤8.83
APP-10	9/5/2018	Cobalt 60	≤8.82
APP-10	11/14/2018	Tritium	≤435
APP-10	11/14/2018	Cesium 134	≤3.68
APP-10	11/14/2018	Cesium 137	≤5.27
APP-10	11/14/2018	Cobalt 60	≤5.27
APP-10	3/7/2018	Tritium	≤454
APP-10	3/7/2018	Cesium 134	≤2.59
APP-10	3/7/2018	Cesium 137	≤2.91
APP-10	3/7/2018	Cobalt 60	≤2.98
APP-10	6/18/2018	Tritium	≤451
APP-10	6/18/2018	Cesium 134	≤6.85
APP-10	6/18/2018	Cesium 137	≤8.52
APP-10	6/18/2018	Cobalt 60	≤7.98
APP-12	3/7/2018	Tritium	≤454
APP-12	3/7/2018	Cesium 134	≤1.82
APP-12	3/7/2018	Cesium 137	≤2.76
APP-12	3/7/2018	Cobalt 60	≤2.95
APP-12	6/18/2018	Tritium	≤451
APP-12	6/18/2018	Cesium 134	≤7.94
APP-12	6/18/2018	Cesium 137	≤9.05
APP-12	6/18/2018	Cobalt 60	≤5.55

APP-12	9/5/2018	Tritium	≤441
APP-12	9/5/2018	Cesium 134	≤10.9
APP-12	9/5/2018	Cesium 137	≤18.7
APP-12	9/5/2018	Cobalt 60	≤17.2
APP-12	11/14/2018	Tritium	≤435
APP-12	11/14/2018	Cesium 134	≤8.57
APP-12	11/14/2018	Cesium 137	≤10.8
APP-12	11/14/2018	Cobalt 60	≤6.78
APP-15	11/3/2018	Tritium	≤435
APP-15	11/3/2018	Cesium 134	≤8.12
APP-15	11/3/2018	Cesium 137	≤10.8
APP-15	11/3/2018	Cobalt 60	≤9.83
APP-22	11/3/2018	Tritium	≤435
APP-22	11/3/2018	Cesium 134	≤8.55
APP-22	11/3/2018	Cesium 137	≤9.88
APP-22	11/3/2018	Cobalt 60	≤10.9
APP-4R	11/13/2018	Tritium	≤435
APP-4R	11/13/2018	Cesium 134	≤9.01
APP-4R	11/13/2018	Cesium 137	≤10.1
APP-4R	11/13/2018	Cobalt 60	≤11.5
APP-9	3/7/2018	Tritium	≤454
APP-9	3/7/2018	Cesium 134	≤3.44
APP-9	3/7/2018	Cesium 137	≤4.18
APP-9	3/7/2018	Cobalt 60	≤4.07
APP-9	6/18/2018	Tritium	≤451
APP-9	6/18/2018	Cesium 134	≤2.98
APP-9	6/18/2018	Cesium 137	≤6.35
APP-9	6/18/2018	Cobalt 60	≤5.87
APP-9	9/5/2018	Tritium	≤441
APP-9	9/5/2018	Cesium 134	≤5.97
APP-9	9/5/2018	Cesium 137	≤9.47
APP-9	9/5/2018	Cobalt 60	≤9.57
APP-9	11/14/2018	Tritium	≤435
APP-9	11/14/2018	Cesium 134	≤3.82
APP-9	11/14/2018	Cesium 137	≤5.94
APP-9	11/14/2018	Cobalt 60	≤5.66

APP-14H	11/13/2018	Tritium	≤435
APP-14H	11/13/2018	Cesium 134	≤11.9
APP-14H	11/13/2018	Cesium 137	≤14.2
APP-14H	11/13/2018	Cobalt 60	≤12.8
APP-34H	11/3/2018	Tritium	≤435
APP-34H	11/3/2018	Cesium 134	≤11.2
APP-34H	11/3/2018	Cesium 137	≤13.8
APP-34H	11/3/2018	Cobalt 60	≤12.6
PV-R2AR	6/18/2018	Tritium	≤451
PV-R2AR	6/18/2018	Cesium 134	≤11.4
PV-R2AR	6/18/2018	Cesium 137	≤13.8
PV-R2AR	6/18/2018	Cobalt 60	≤11.5
PV-R2AR	11/15/2018	Tritium	≤435
PV-R2AR	11/15/2018	Cesium 134	≤1.17
PV-R2AR	11/15/2018	Cesium 137	≤2.05
PV-R2AR	11/15/2018	Cobalt 60	≤1.78

APPENDIX E: PERMITS ADJUSTED IN 2018

20183059 Tritium was removed due to activity being accounted for on the Plant Ventilation permit 20183056 and 20183061. Plant Ventilation activities were the conservative of the two activities.

20183066 and 20183069 Plant Ventilation Tritium was removed as it was accounted for on Refuel Permit 20183062.

20182091 Plant Ventilation Tritium was removed due to activity already accounted for on Boric Acid Concentrator Permit 20182089.

Refuel Purge Permit 20182122 Co-60 and Tritium, Refuel Purge Permit 20182125 and 20182134 Tritium removed due to being accounted for on Plant Ventilation Permit 20182124

BAC Permit 20182137 and Refuel Purge Permit 20182137 removed due to being accounted for on Plant ventilation Permit 20182141. Plant Ventilation Tritium activity highest of the three premits.

Refuel Purge permit 20182146 Tritium removed, accounted for on Plant Ventilation Permit 20182145.