

Dominion Energy Kewaunee, Inc.
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APR 18 2016

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Docket No.: 50-305
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DOMINION ENERGY KEWAUNEE, INC.
KEWAUNEE POWER STATION
2015 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

Enclosed is the Kewaunee Power Station (KPS) 2015 Annual Radioactive Effluent Release Report for January through December 2015. This report is submitted to meet the requirements of KPS Technical Specification 5.6.2 and 10 CFR 50.36a(a)(2).

If you have questions or require additional information, please feel free to contact Mr. Richard Repshas at 920-388-8217.

Sincerely,

A handwritten signature in black ink, appearing to read "Stewart J. Yuen".

Stewart J. Yuen
Plant Manager, Kewaunee Power Station

Commitments made by this letter: NONE

IE48
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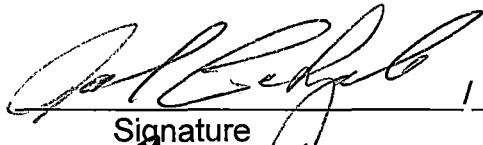
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J. Gadzala

 4/07/2016
Signature Date

J. M. Hale

 4/11/2016
Signature Date

VERIFICATION OF ACCURACY

RP-KW-HSP-HPE-280, Attachment E, Annual Radioactive Effluent Release Report
Preparation Traveler

ACTION PLAN

None

CHANGES TO THE USAR, QA TOPICAL REPORT, OR ISFSI FSAR

None

ATTACHMENT E
Annual Radioactive Effluent Release Report Preparation Traveler
(Page 1 of 1)

Year of Report: <u>2015</u>																	
<p>1. Current ODCM Revision: <u>17</u> Revision Date: <u>9/25/2014</u></p> <p>2. IF Revision Date is prior to the Year of Report, THEN SKIP #3 and GO TO next box.</p> <p>3. REVIEW appropriate procedure database to determine any revisions to the ODCM that occurred in the Year of the Report. LIST all revision numbers below:</p> <p>• <u>NA</u></p> <p>• <u> </u></p> <p>• <u> </u></p>	<p>1. Current REMM Revision: <u>20</u> Revision Date: <u>10/31/2013</u></p> <p>2. IF Revision Date is prior to the Year of Report, THEN SKIP #3 and GO TO next box.</p> <p>3. REVIEW appropriate procedure database to determine any revisions to the ODCM that occurred in the Year of the Report. LIST all revision numbers below:</p> <p>• <u>NA</u></p> <p>• <u> </u></p> <p>• <u> </u></p>																
<p>All radiological releases have been verified, entered, and any long-lead sample results have been returned/completed and entered.</p> <p>Confirmed by: <u>Bart Steckler</u> / <u>[Signature]</u> , <u>3/8/16</u> Print/Sign Date</p>																	
<p>The following list of corrective actions were identified for inclusion in this annual report:</p> <table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 20%;">CA#</th><th>Description of where included in report or how resolved</th></tr></thead><tbody><tr><td><u>204</u></td><td><u>R-13 Monthly Sr flow totalizer zeroed</u></td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr></tbody></table> <p>Report Completed by: <u>Bart Steckler</u> / <u>[Signature]</u> , <u>3/8/16</u> Print/Sign Date</p>		CA#	Description of where included in report or how resolved	<u>204</u>	<u>R-13 Monthly Sr flow totalizer zeroed</u>												
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<u>204</u>	<u>R-13 Monthly Sr flow totalizer zeroed</u>																



Dominion[®]

**2015
Annual
Radioactive
Effluent
Release
Report**
Kewaunee Power Station

Dominion Energy Kewaunee, Inc.

DOCKET 50-305

KEWAUNEE POWER STATION

**ANNUAL RADIOACTIVE
EFFLUENT RELEASE REPORT**

January 1 - December 31, 2015

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0.0 SUMMARY

On October 22, 2012, Dominion made known the decision to permanently shut down the Kewaunee Power Station (KPS). On February 25, 2013, Dominion Energy Kewaunee (DEK) submitted a certification of permanent cessation of power operations pursuant to 10 CFR 50.82(a)(1)(i), stating that DEK has decided to permanently cease power operation of KPS on May 7, 2013. On May 15, 2013 the NRC docketed the certification for permanent removal of fuel from the reactor vessel pursuant to 10 CFR 50.82(a)(1)(ii). Therefore the 10 CFR Part 50 license no longer authorizes KPS to operate the reactor or emplace or retain fuel in the reactor vessel, as specified in 10 CFR 50.82(a)(2).

During 2015 all solid, liquid, and gaseous radioactive effluents from the Kewaunee Power Station were well below regulatory limits. For individual effluent streams, the quarterly limit most closely approached was:

<u>GASEOUS:</u>	Ingestion Pathway-Organ	Total Body	
	Quarterly Limit (mRem)	7.5	
	Actual Dose (mRem)	1.30E-04	(4 th Quarter)
	% of Specification	1.73E-03	
<u>LIQUID:</u>	Ingestion Pathway-Organ	Bone	
	Quarterly Limit (mRem)	5.0	
	Actual Dose (mRem)	3.52E-03	(4 th Quarter)
	% of Limit	7.03E-02	
<u>SOLID:</u>	No upper limit for solid radioactive waste applies.		
	Cubic Meters Shipped	0.00E+00 m ³	(0.00+00 ft ³)

1.0 INTRODUCTION

This report is being submitted in accordance with the requirements of Kewaunee Technical Specifications, Section 5.6.2 and the Offsite Dose Calculation Manual, Section 15.2. It includes data from all effluent releases made from January 1 - December 31, 2015. The report contains summaries of the gaseous and liquid releases made to the environment including the quantity, characterization, time duration and calculated radiation dose at the site boundary resulting from these releases. The report also includes a summation of solid radioactive waste disposal, revisions to the Process Control Program and the Offsite Dose Calculation Manual, major changes to the radioactive liquid and gaseous waste treatment systems, and addresses the cumulative meteorological data. Values indicated as 0 (zero) in this report refer to actual values less than the detection limits. A table of these less than detectable (LLD) values is identified in sections 2.1 and 3.1.

1.1 Effluent Dose Limits

Specifications are set to ensure that offsite doses are maintained as low as reasonably achievable while still allowing for practical and dependable evolutions at the Kewaunee Power Station.

The Kewaunee Offsite Dose Calculation Manual (ODCM) describes the methodology and parameters used in:

- 1.) The calculation of radioactive liquid and gaseous effluent monitoring instrumentation alarm/trip set points.
- 2.) The calculation of radioactive liquid and gaseous concentrations, dose rates and cumulative quarterly and annual doses. The ODCM methodology is acceptable for use in demonstrating compliance with 10 CFR 20.1301/1302; 10 CFR 50, Appendix I; and 40 CFR 190.

2.0 GASEOUS EFFLUENTS

2.1 Lower Limits of Detection (LLD) for Gaseous Effluents

Gaseous radioactive effluents are released in both the continuous mode and the batch mode. The auxiliary building stack is sampled continuously for particulates, halogens and Strontium by an "off-line" sample train. This stack is also grab-sampled weekly for gaseous gamma emitters and monthly for tritium. Batch releases are sampled prior to release for principal gaseous and particulate gamma emitters, halogens and tritium.

The LLD's for gaseous radio-analyses, as listed in Table 13.2.1-1 of the Kewaunee ODCM are:

Analysis	LLD ($\mu\text{Ci/ml}$)
Gaseous Gamma Emitters	1.00E-04
Iodine 131	3.00E-12
Particulate Gamma Emitters	1.00E-11
Particulate Gross Alpha	1.00E-11
Strontium 89, 90	1.00E-11
Noble Gases, Gross Beta or Gamma	1.00E-06
Tritium (H-3)	1.00E-06

The nominal "a priori" LLD values are shown below.

Isotope	a priori LLD ($\mu\text{Ci/ml}$)
---------	------------------------------------

a. Gaseous emissions:

Kr-87	5.61E-08
Kr-88	1.02E-07
Xe-133	6.68E-08
Xe-133m	2.75E-07
Xe-135	2.99E-08
Xe-138	1.13E-07

b. Particulate emissions:

Mn-54	1.11E-13
Fe-59	2.27E-13
Co-58	2.28E-13
Co-60	3.57E-13
Zn-65	1.68E-13
Mo-99	2.73E-13
Cs-134	4.69E-13
Cs-137	1.68E-13
Ce-141	2.08E-13
Ce-144	1.24E-12

c. Other identifiable gamma emitters:

Ar-41	3.97E-10
Kr-85	8.63E-05
Kr-85m	4.62E-08
Kr-89	2.04E-06
Xe-127	4.20E-08
Xe-131m	1.82E-06
Xe-135m	1.90E-08
Xe-137	2.88E-07
I-131	1.32E-13

d. Composite particulate samples:

Sr-89	1.00E-14
Sr-90	1.00E-14
Gross Alpha	1.00E-14

These "a priori" LLDs represent the capabilities of the counting systems in use, not an after the fact "a posteriori" limit for a particular measurement.

2.2 Gaseous Batch Release Statistics

The following is a summation of all gaseous batch releases made during 2015.

Number of batch releases.....0

Total time for all batch releases (min).....0.0

Maximum time for a batch release (min).....0.0

Average time for a batch release (min).....0.0

Minimum time for a batch release (min).....0.0

2.3 Gaseous Effluent Data

Table 2.1 presents a quarterly summation of the total activity released and average release rates of gaseous effluents. Table 2.2 lists the quarterly sums of individual gaseous radionuclide released by continuous mode. Table 2.3 lists the quarterly sums of individual gaseous radionuclide released by batch mode. Table 2.4 presents the dose limits for gaseous effluents, and the calculated doses this year from gaseous effluents.

Table 2.1
Gaseous Effluents - Summation of all Releases

<u>Fission and Activation Gases</u>	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Total Activity Released (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Average Release Rate (μCi/sec)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Iodines

Total Activity Released (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Average Release Rate (μCi/sec)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Particulates

Total Activity Released (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Average Release Rate (μCi/sec)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Tritium

Total Activity Released (Ci)	4.78E+00	4.12E+00	3.85E+00	4.90E+00	1.77E+01
Average Release Rate (μCi/sec)	6.07E-01	5.22E-01	4.88E-01	6.22E-01	5.60E-01

<u>Gross Alpha Released (Ci)</u>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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Carbon-14

Total Annual Activity Released (Ci)					0.00E+00
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Table 2.2
Gaseous Effluents - Ground Level - Nuclides Released (Ci)
Continuous Mode

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
<u>Fission Gases</u>					
Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Iodines</u>					
Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Particulates</u>					
Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Gross Alpha</u>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Tritium</u>	4.78E+00	4.12E+00	3.85E+00	4.90E+00	1.77E+01

Table 2.3
Gaseous Effluents - Ground Level - Nuclides Released (Ci)
Batch Mode ⁽¹⁾

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
<u>Fission Gases</u>					
Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Iodines</u>					
Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Particulates</u>					
Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Tritium</u>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Gross Alpha</u>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

1 - There were no gaseous batch discharges in 2015.

Table 2.4
Dose from Gaseous Effluents

The offsite dose limits from radioactive materials in gaseous effluents are specified in Section 13.2.2 and 13.2.3 of the Kewaunee ODCM and can be summarized as follows:

Limit	Air Dose Gamma	Air Dose Beta	Organ
Quarterly	5.0 mrad	10.0 mrad	7.5 mrem
Annual	10.0 mrad	20.0 mrad	15.0 mrem

The total releases of gaseous effluents during 2015 for each quarter and for the year were within limits. The following offsite doses were calculated using equations 2.7, 2.8, and 2.11 from the Kewaunee ODCM. Calculated offsite doses versus quarterly and annual limits are shown below:

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Annual
1. <u>Gamma- Air Dose</u>					
Specification (mrad)	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
Actual Dose (mrad)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
% of Specification	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2. <u>Beta- Air Dose</u>					
Specification (mrad)	1.00E+01	1.00E+01	1.00E+01	1.00E+01	2.00E+01
Actual Dose (mrad)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
% of Specification	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3. <u>Organ Dose</u>					
Specification (mrem)	7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01
<u>Total Body</u>					
Actual Dose (mrem)	1.27E-04	1.09E-04	1.02E-04	1.30E-04	4.67E-04
% of Specification	1.69E-03	1.45E-03	1.36E-03	1.73E-03	3.11E-03
<u>Bone</u>					
Actual Dose (mrem)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
% of Specification	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 2.4 (continued)
Dose from Gaseous Effluents

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Annual
<u>Liver</u>					
Actual Dose (mrem)	1.27E-04	1.09E-04	1.02E-04	1.30E-04	4.67E-04
% of Specification	1.69E-03	1.45E-03	1.36E-03	1.73E-03	3.11E-03
<u>Thyroid</u>					
Actual Dose (mrem)	1.27E-04	1.09E-04	1.02E-04	1.30E-04	4.67E-04
% of Specification	1.69E-03	1.45E-03	1.36E-03	1.73E-03	3.11E-03
<u>Kidney</u>					
Actual Dose (mrem)	1.27E-04	1.09E-04	1.02E-04	1.30E-04	4.67E-04
% of Specification	1.69E-03	1.45E-03	1.36E-03	1.73E-03	3.11E-03
<u>Lung</u>					
Actual Dose (mrem)	1.27E-04	1.09E-04	1.02E-04	1.30E-04	4.67E-04
% of Specification	1.69E-03	1.45E-03	1.36E-03	1.73E-03	3.11E-03
<u>GI-LLI</u>					
Actual Dose (mrem)	1.27E-04	1.09E-04	1.02E-04	1.30E-04	4.67E-04
% of Specification	1.69E-03	1.45E-03	1.36E-03	1.73E-03	3.11E-03

2.4 Estimation of Carbon-14 in Gaseous Releases

Due to permanent plant shutdown on May 7, 2013, there were no releases of Carbon-14 from the site.

3.0 LIQUID EFFLUENTS

3.1 Lower Limits of Detection (LLD) for Liquid Effluents

Liquid radioactive effluents are released as both batch releases and continuous releases. Each batch is sampled prior to release and analyzed for gamma emitters and tritium. A fraction of each sample is retained for a monthly proportional composite which is then analyzed for Gross Alpha, Strontium 89, Strontium 90, Iron 55 and Nickel 63.

The LLD's for liquid batch release radio-analyses, as listed in Table 13.1.1-1 of the Kewaunee ODCM are:

<u>Analysis</u>	<u>LLD (μCi/ml)</u>
Principal Gamma Emitters	1.00 E-06
Iodine 131	1.00 E-06
Tritium (H-3)	1.00 E-05
Gross Alpha	5.00 E-07
Strontium 89, 90	5.00 E-08
Iron 55	1.00 E-06

The actual obtained "a priori" LLD values for batch releases are shown below.

Isotope	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Average a priori LLD (μCi/ml)
Mn-54	9.74E-08	1.31E-07	9.63E-08	9.63E-08	1.05E-07
Fe-59	3.89E-08	3.89E-08	3.82E-08	3.82E-08	3.86E-08
Co-58	1.28E-07	1.28E-07	1.51E-07	9.45E-08	1.25E-07
Co-60	1.32E-07	2.33E-08	1.29E-07	2.28E-08	7.68E-08
Zn-65	2.48E-07	2.48E-07	2.44E-07	3.27E-07	2.67E-07
Mo-99	6.83E-07	6.83E-07	1.20E-07	6.78E-07	5.41E-07
Cs-134	1.93E-08	1.09E-07	9.98E-08	9.98E-08	8.20E-08
Cs-137	1.64E-08	1.64E-08	1.24E-07	9.24E-08	6.23E-08
Ce-141	1.12E-07	1.12E-07	1.20E-07	5.10E-08	9.88E-08
Ce-144	5.33E-07	3.63E-07	5.36E-07	4.59E-07	4.73E-07
I-131	1.01E-08	1.25E-07	1.04E-07	5.69E-08	7.40E-08
H-3	3.39E-06	2.65E-06	3.36E-06	3.08E-06	3.12E-06
Sr-89	NA	NA	3.96E-08	9.26E-09	2.44E-08
Sr-90	NA	NA	6.89E-09	5.57E-09	6.23E-09
Gross Alpha	NA	NA	4.82E-09	6.28E-09	5.55E-09
Fe-55	NA	NA	7.21E-07	6.85E-07	7.03E-07
Ni-63	NA	NA	9.62E-08	9.47E-08	9.55E-08

Continuous liquid releases are grab-sampled weekly and analyzed for principal gamma emitters. A fraction of each weekly sample is retained for a monthly proportional composite which is then analyzed for Gross Alpha, Strontium 89, Strontium 90, Iron 55 and Nickel 63.

The LLD's for liquid continuous release radioanalyses, as listed in Table 13.1.1-1 of the Kewaunee ODCM are:

Analysis	LLD ($\mu\text{Ci/ml}$)
Principal Gamma Emitters	5.00 E-07
Iodine 131	1.00 E-06
Tritium (H-3)	1.00 E-05
Gross Alpha	5.00 E-07
Strontium 89, 90	5.00 E-08
Iron 55	1.00 E-06

The actual obtained "a priori" LLD values for continuous releases are shown below.

Isotope	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Average a priori LLD ($\mu\text{Ci/ml}$)
Mn-54	1.44E-08	1.02E-08	8.98E-09	9.76E-09	1.08E-08
Fe-59	2.64E-08	9.79E-09	2.01E-08	2.49E-08	2.03E-08
Co-58	1.12E-08	7.50E-10	1.09E-08	1.21E-08	8.74E-09
Co-60	2.17E-08	1.05E-08	6.58E-09	1.06E-08	1.23E-08
Zn-65	2.98E-08	2.60E-08	2.04E-08	2.26E-08	2.47E-08
Mo-99	1.33E-07	8.10E-08	6.93E-08	7.42E-08	8.94E-08
Cs-134	1.42E-08	8.89E-08	1.13E-08	9.18E-09	3.09E-08
Cs-137	1.47E-08	1.10E-08	1.30E-08	1.14E-08	1.25E-08
Ce-141	1.83E-08	1.59E-08	1.62E-08	1.92E-08	1.74E-08
Ce-144	8.68E-08	7.68E-08	6.74E-08	7.34E-08	7.61E-08
I-131	1.52E-08	8.44E-08	8.69E-09	9.58E-09	2.95E-08
H-3	3.39E-06	2.65E-06	3.36E-06	3.08E-06	3.12E-06
Sr-89	9.72E-09	7.77E-09	4.39E-08	9.83E-09	1.78E-08
Sr-90	6.20E-09	5.87E-09	7.90E-09	6.20E-09	6.54E-09
Gross Alpha	5.13E-09	4.99E-09	4.62E-09	7.93E-09	5.67E-09
Fe-55	6.68E-07	7.40E-07	7.08E-07	6.57E-07	6.93E-07
Ni-63	1.04E-07	8.96E-07	1.06E-07	1.02E-07	3.02E-07

3.2 Liquid Batch Release Statistics

The following is a summation of all liquid batch releases during 2015.

Number of batch releases.....	2
Total time for all batch releases (min).....	4,370
Maximum time for a batch release (min).....	2,370
Minimum time for a batch release (min).....	2,000
Average time for a batch release (min).....	2,180

3.3 Liquid Effluent Data

The following Table 3.1 presents a quarterly summation of the total activity released and average concentration for all liquid effluents. It also presents the gross alpha activity released, volume of waste released and volume of dilution water used. Table 3.2 contains the quantity of the individual isotopes released to the unrestricted area for batch releases. Table 3.3 contains the quantity of the individual isotopes released to the unrestricted area for continuous releases. Table 3.4 presents the doses from liquid effluents for each quarter and the calculated doses this year from liquid effluents.

Table 3.1
Liquid Effluents - Summation of all Releases

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
<u>Fission and Activation Products</u>					
Total Release (Ci)	0.00E+00	0.00E+00	5.78E-04	1.15E-03	1.73E-03
Average Concentration (μ Ci/ml)	0.00E+00	0.00E+00	1.34E-09	2.67E-09	1.05E-09
<u>Tritium</u>					
Total Release (Ci)	0.00E+00	0.00E+00	2.98E+00	1.80E+00	4.78E+00
Average Concentration (μ Ci/ml)	0.00E+00	0.00E+00	6.91E-06	4.18E-06	2.89E-06
% of Tech. Spec. Limit(3.0E-3 μ Ci/ml)	0.00E+00	0.00E+00	2.30E-01	1.39E-01	9.63E-02
<u>Dissolved and Entrained Gases</u>					
Total Release (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Average Concentration (μ Ci/ml)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
% of Tech. Spec. Limit(2.0E-4 μ Ci/ml)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Gross Alpha Activity</u>					
Total Release (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Volume of Waste Released</u>					
Total (liters)	2.53E+06	2.20E+06	3.91E+06	2.39E+06	1.10E+07
<u>Volume of Dilution Water</u>					
Total (liters)	4.00E+08	3.99E+08	4.31E+08	4.31E+08	1.65E+09

Table 3.2
Liquid Effluents – Nuclides Released (Ci)
Batch Mode

	1st Qtr*	2nd Qtr*	3rd Qtr	4th Qtr	Total
<u>Fission and Activation Products</u>					
Fe-55	NA	NA	2.53E-04	8.66E-04	1.12E-03
Co-60	NA	NA	2.91E-04	2.12E-04	5.03E-04
Ni-63	NA	NA	3.39E-05	7.11E-05	1.05E-04
Total Release	NA	NA	5.78E-04	1.15E-03	1.73E-03
<u>Dissolved and Entrained Gases</u>					
Total Release	NA	NA	0.00E+00	0.00E+00	0.00E+00
<u>Tritium</u>					
Total Release	NA	NA	2.98E+00	1.80E+00	4.78E+00
<u>Gross Alpha Activity</u>					
Total Release	NA	NA	0.00E+00	0.00E+00	0.00E+00

*There were no batch releases in the 1st or 2nd quarter.

Table 3.3
Liquid Effluents — Nuclides Released (Ci)
Continuous Mode

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
<u>Fission and Activation Products</u>					
Total Release	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Dissolved and Entrained Gases</u>					
Total Release	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Tritium</u>					
Total Release	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Gross Alpha Activity</u>					
Total Release	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 3.4
Dose from Liquid Effluents

The dose to a member of the public from total liquid radioactive releases for each quarter was below the Kewaunee ODCM limits of 1.5 mrem to the total body and less than or equal to 5 mrem to any organ. Additionally, the dose to a member of the public from total liquid radioactive releases for the year was below the Kewaunee ODCM limits of 3 mrem to the total body and less than or equal to 10 mrem to any organ.

Instantaneous release concentrations are limited by the individual radionuclide concentrations established in 10 CFR 20, Appendix B, for unrestricted areas. During the report period, none of the isotopes released exceed the concentrations specified in Appendix B. The following offsite doses were calculated using equation 1.7 from the Kewaunee ODCM.

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Annual
<u>Total Body</u>					
Specification (mrem)	1.50E+00	1.50E+00	1.50E+00	1.50E+00	3.00E+00
Actual Dose (mrem)	0.00E+00	0.00E+00	1.27E-03	1.11E-03	2.83E-03
% of Specification	0.00E+00	0.00E+00	8.46E-02	7.39E-02	9.43E-02
<u>Organs</u>					
Specification (mrem)	5.00E+00	5.00E+00	5.00E+00	5.00E+00	1.00E+01
<u>Bone</u>					
Actual Dose (mrem)	0.00E+00	0.00E+00	1.29E-03	3.52E-03	4.80E-03
% of Specification	0.00E+00	0.00E+00	2.57E-02	7.03E-02	4.80E-02
<u>Liver</u>					
Actual Dose (mrem)	0.00E+00	0.00E+00	1.31E-03	1.51E-03	2.82E-03
% of Specification	0.00E+00	0.00E+00	2.61E-02	3.02E-02	2.82E-02
<u>Thyroid</u>					
Actual Dose (mrem)	0.00E+00	0.00E+00	1.03E-03	7.48E-04	1.78E-03
% of Specification	0.00E+00	0.00E+00	2.06E-02	1.50E-02	1.78E-02
<u>Kidney</u>					
Actual Dose (mrem)	0.00E+00	0.00E+00	1.03E-03	7.48E-04	1.78E-03
% of Specification	0.00E+00	0.00E+00	2.06E-02	1.50E-02	1.78E-02

Table 3.4 (continued)
Dose from Liquid Effluents

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Annual
Lung					
Actual Dose (mrem)	0.00E+00	0.00E+00	1.10E-03	1.03E-03	2.12E-03
% of Specification	0.00E+00	0.00E+00	2.20E-02	2.05E-02	2.12E-02
GI-LLI					
Actual Dose (mrem)	0.00E+00	0.00E+00	2.60E-03	2.37E-03	4.96E-03
% of Specification	0.00E+00	0.00E+00	5.19E-02	4.73E-02	4.96E-02

3.4 Ground Water Monitoring

Sample Point Sample Date	Tritium pCi/L	Total Gamma Activity μCi/ml
AB-707		
03/10/15	1226	None Detected
06/03/15	1591	None Detected
09/10/15	500	None Detected
11/04/15	664	None Detected
AB-708		
03/10/15	825	None Detected
06/03/15	797	None Detected
09/09/15	264	None Detected
11/04/15	653	None Detected
AB-709		
03/11/15	513	None Detected
06/03/15	690	None Detected
09/10/15	<254	None Detected
11/05/15	675	None Detected
AB-710		
03/09/15	813	None Detected
06/03/15	854	None Detected
09/09/15	307	None Detected
11/04/15	709	None Detected
AB-711		
03/09/15	615	None Detected
06/02/15	540	None Detected
09/09/15	<254	None Detected
11/04/15	419	None Detected
AB-712		
03/11/15	386	None Detected
06/03/15	578	None Detected
09/10/15	<254	None Detected
11/05/15	537	None Detected

Sample Point Sample Date	Tritium pCi/L	Total Gamma Activity µCi/ml
AB-715		
03/10/15	390	None Detected
06/03/15	<321	None Detected
09/09/15	<254	None Detected
11/04/15	<287	None Detected
AB-717		
03/10/15	<264	None Detected
06/05/15	<321	None Detected
09/10/15	<254	None Detected
11/05/15	<287	None Detected
MW-701		
03/11/15	<248	None Detected
06/05/15	<247	None Detected
09/10/15	<267	None Detected
11/05/15	<287	None Detected
MW-702		
03/12/15	<248	None Detected
06/10/15	<247	None Detected
09/10/15	<267	None Detected
11/05/15	<287	None Detected
MW-703		
03/12/15	<248	None Detected
06/11/15	<247	None Detected
09/10/15	<267	None Detected
11/05/15	<287	None Detected
MW-704		
03/11/15	<248	None Detected
06/10/15	<247	None Detected
09/10/15	<267	None Detected
11/05/15	<287	None Detected
MW-705		
03/11/15	<248	None Detected
06/10/15	<247	None Detected
09/09/15	<267	None Detected
11/05/15	<287	None Detected
MW-706		
03/11/15	<248	None Detected
06/10/15	<247	None Detected
09/09/15	<267	None Detected
11/05/15	<287	None Detected

4.0 METEOROLOGICAL DATA

See Appendix A for missing meteorological data and the joint frequency distribution tables for the report period.

5.0 SOLID WASTE DISPOSAL

Table 5.1 is a summation of solid radioactive waste shipped during 2015. Presented are the types of waste, major nuclide composition, disposition of the waste and shipping containers used. Table 5.1 also contains the radionuclide content (curies) and percent abundance for each type of waste.

There was no solid radioactive waste shipped in 2015.

Table 5.1
Solid Waste and Irradiated Fuel Shipments

A. Solid Radioactive Waste Shipped Off-Site for Burial or Disposal

1. Type of Waste with Estimate of Major Nuclide Composition

Resins, Filters, and Evaporator Bottoms	Volume		Curies Shipped
Waste Class	ft ³	m ³	Curies
A	0.00E+00	0.00E+00	0.00E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
All	0.00E+00	0.00E+00	0.00E+00

Estimate of Major Nuclides for Resins, Filters, and Evaporator Bottoms:

<u>Nuclide</u>	<u>% Abundance</u>	<u>Curies</u>
None	NA	NA

Dry Active Waste	Volume		Curies Shipped
Waste Class	ft ³	m ³	Curies
A	0.00E+00	0.00E+00	0.00E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
All	0.00E+00	0.00E+00	0.00E+00

Estimate of Major Nuclides for Dry Active Waste:

<u>Nuclide</u>	<u>% Abundance</u>	<u>Curies</u>
None	NA	NA

Table 5.1 (continued)
Solid Waste and Irradiated Fuel Shipments

Irradiated Components	Volume		Curies Shipped
Waste Class	ft³	m³	Curies
A	0.00E+00	0.00E+00	0.00E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
All	0.00E+00	0.00E+00	0.00E+00

Estimate of Major Nuclides for Irradiated Components:

<u>Nuclide</u>	<u>% Abundance</u>	<u>Curies</u>
None	NA	NA

Other Waste (DAW-Asbestos)	Volume		Curies Shipped
Waste Class	ft³	m³	Curies
A	0.00E+00	0.00E+00	0.00E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
All	0.00E+00	0.00E+00	0.00E+00

Estimate of Major Nuclides for Other Waste:

<u>Nuclide</u>	<u>% Abundance</u>	<u>Curies</u>
None	NA	NA

Sum of All Low-Level Waste	Volume		Curies Shipped
Waste Class	ft³	m³	Curies
A	0.00E+00	0.00E+00	0.00E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
All	0.00E+00	0.00E+00	0.00E+00

Estimate of Major Nuclides for All Low-Level Waste:

<u>Nuclide</u>	<u>% Abundance</u>	<u>Curies</u>
None	NA	NA

Solid Waste and Irradiated Fuel Shipments

2. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
None	NA	NA

B. Irradiated Fuel Shipments

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
None	NA	NA

No irradiated fuel shipments were made from the Kewaunee Power Station during 2015.

6.0 SUPPLEMENTAL INFORMATION

6.1 Abnormal Releases or Abnormal Discharges

No abnormal releases or abnormal discharges were made from the Kewaunee Power Station during the report period.

6.2 Non-routine Planned Discharges

No non-routine planned discharges were made from the Kewaunee Power Station during the reporting period.

6.3 Program Revisions

In accordance with Technical Specification 5.6.2, the revisions to the Process Control Program, Offsite Dose Calculation Manual, Radiological Environmental Monitoring Program and radioactive waste treatment systems are listed below.

6.3.1 Process Control Program

There were no revisions made to the Process Control Program during this report period.

6.3.2 Offsite Dose Calculation Manual

The Kewaunee Power Station Offsite Dose Calculation Manual (ODCM) was not revised during this report period.

6.3.3 Radiological Environmental Monitoring Manual

The Kewaunee Power Station Radiological Environmental Monitoring Manual (REMM) was not revised during this report period.

6.4 Major Changes to the Radioactive Liquid, Gaseous and Solid Waste Treatment Systems

There were no changes made to the radioactive waste systems (liquid, gaseous or solids) during this report period.

6.5 Effluent Monitoring System Inoperability

6.5.1 There were no effluent radiation monitors inoperable for the consecutive time period listed in the ODCM for this report period.

6.6 Corrections to Previous Reports

6.6.1 None.

6.7 Other

- 6.7.1 The sample pump flow totalizer used for strontium sampling of the effluent from the auxiliary ventilation stack was found to be at zero flow on 5/31/2015. Sample flow volume was calculated manually using the start and stop time of the sample collection and then multiplying this value by the pump flow rate. The probable cause of the totalizer reading a zero value was loss of power due to electrical breaker cycling activities occurring five days earlier. CR581117.

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Appendix A

Kewaunee Power Station

2015 Meteorological Data

Missing Data

First Quarter: 2.75 hours
Second Quarter: 95.75 hours
Third Quarter: 20.75 hours
Fourth Quarter: 105.50 hours

Note: A total of 224.75 hours of data is missing or otherwise unavailable. This represents the availability of 97.43% of the data for the year.

APPENDIX A
Kewaunee Power Station 2015 Meteorological Data

First Quarter 2015

Stability Class A

Wind Direction		Wind Speed						
	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.75	20.5	24.25	19.25	0.25	0	65
NNE	0	0.5	8.5	15.75	18.75	6.75	3.25	53.5
NE	0	2	13.25	5.25	11.75	1	0	33.25
ENE	0	0	13.25	18.75	1	0	0	33
E	0	0.75	7.25	6.75	0	0	0	14.75
ESE	0	1.5	6	5.25	1.25	0	0	14
SE	0	1.5	4.75	7.75	3	0	0	17
SSE	0	0.75	1	4.25	18.25	6.5	4	34.75
S	0	0.5	9	27.25	12.75	2.25	0	51.75
SSW	0	0.25	14	20.25	2.75	0	0	37.25
SW	0	1.5	21.75	36	10.75	0	0	70
WSW	0	1.25	26.5	28.75	17.75	0.25	0	74.5
W	0	0.5	27.25	17	6.75	0	0	51.5
WNW	0	0.75	17.25	20	4.5	0	0	42.5
NW	0	1	14	36.25	22	0.25	0	73.5
NNW	0	1.25	20.5	32.25	19.75	6.75	0.25	80.75
TOTAL	0	14.75	224.75	305.75	170.25	24	7.5	747

Stability Class B

Wind Direction		Wind Speed						
	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1.25	0.75	5	8.5	1	0	16.5
NNE	0	0.25	0.5	0.5	1	0.5	0	2.75
NE	0	0	1.75	1	0	0	0	2.75
ENE	0	0.25	2.25	0.5	0	0	0	3
E	0	0	1.5	0.25	0	0	0	1.75
ESE	0	0	1.5	0.25	0	0	0	1.75
SE	0	0	3.25	0.75	0	0	0	4
SSE	0	0	1.5	1	0.5	3.25	0.25	6.5
S	0	0	1	5.25	1.75	0.5	0	8.5
SSW	0	0.25	3.5	3	0.5	0	0	7.25
SW	0	0	2.75	5.75	3.75	0	0	12.25
WSW	0	1	2.75	7.75	2.25	0	0	13.75
W	0	1.75	6	6.75	4.25	0.25	0	19
WNW	0	1.25	2.75	7.5	3.5	0	0	15
NW	0	0.25	2.75	4.5	2	0	0	9.5
NNW	0	0.25	2	7.25	7.25	0.75	0	17.5
TOTAL	0	6.5	36.5	57	35.25	6.25	0.25	141.75

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Kewaunee Power Station 2015 Meteorological Data

Stability Class C

Wind Direction		Wind Speed						
		CALM	1-3	4-7	8-12	13-18	19-24	>24
N	0	0	0.5	1.5	2.25	5	0	0
NNE	0	0	0	0.5	1	2	1	0
NE	0	0	0	3.75	3.25	2.25	0	0
ENE	0	0	0	1.75	7.25	0	0	0
E	0	0	0	1.5	0.5	0	0	0
ESE	0	0	0	3.25	0.25	0	0	0
SE	0	0	0.5	2.5	1.5	0.25	0	0
SSE	0	0	0	0.25	2.25	1.5	0.5	0
S	0	0	0	1.25	2.5	1	0	0
SSW	0	0	0.25	5.25	5	0.75	0	0
SW	0	0	0.25	3	7.5	8.5	0	0
WSW	0	0	0	6.25	14.25	1.5	0	0
W	0	0	0.25	4	17.75	5.25	0	0
WNW	0	0	0.25	3.5	11.75	6.75	0	0
NW	0	0	0	1.25	5.25	5.25	0	0
NNW	0	0	0.75	3.25	6.75	10	0.5	0
TOTAL	0	0	2.75	42.75	89	50	2	0

Stability Class D

Wind Direction		Wind Speed						
		CALM	1-3	4-7	8-12	13-18	19-24	>24
N	0	0	1	9.75	7.5	4.25	0	0
NNE	0	0	0.75	2.75	2	2.5	1	0
NE	0	0	1.25	3.5	1	0.25	0	0
ENE	0	0	0.5	1.25	1.75	0	0	0
E	0	0	0.5	2.5	0.25	0	0	0
ESE	0	0	1	2.75	2.25	0	0	0
SE	0	0	0.5	2	8.5	1	0	0
SSE	0	0	0.25	1.25	6.5	5.75	0	0
S	0	0	0.25	4.5	9.25	0.5	0	0
SSW	0	0	0.75	19	12.25	2	0	0
SW	0	0	1.25	13.5	12.5	4.25	0	0
WSW	0	0	1.75	13.75	9.5	4	0.5	0
W	0	0	1.25	22	34.25	4.75	2.25	0
WNW	0	0	3.25	11.25	17.75	11	0	0
NW	0	0	3.5	13.75	32.5	18.25	0	0
NNW	0	0	2.25	8.5	30.25	16.5	0	0
TOTAL	0	0	20	132	188	75	3.75	0

APPENDIX A
Kewaunee Power Station 2015 Meteorological Data

Stability Class E

Wind Direction		Wind Speed						
	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1.75	8.75	2	0	0	0	12.5
NNE	0	1	2	3.5	1	0	0	7.5
NE	0	1	2.75	0	0	0	0	3.75
ENE	0.25	0.25	4.25	0	0	0	0	4.75
E	0	0	0.5	0	0	0	0	0.5
ESE	0	0.25	1.25	0	0	0	0	1.5
SE	0	0.5	5	2.5	0	0	0	8
SSE	0	0.25	2	4.75	4.25	0	0	11.25
S	0	1.75	3.75	1.25	0.25	0	0	7
SSW	0	3	17.75	3.5	0	0	0	24.25
SW	0	4.25	14	10.5	0.25	0	0	29
WSW	0.25	4	18.5	13.75	1.25	0	0	37.75
W	0	4.5	17.5	26.25	1.75	0	0	50
WNW	0	2.25	13.75	16.75	7.5	0	0	40.25
NW	0	5.5	8.5	9.5	2	0	0	25.5
NNW	0	4	14.5	5.25	0	0	0	23.75
TOTAL	0.5	34.25	134.75	99.5	18.25	0	0	287.25

Stability Class F

Wind Direction		Wind Speed						
	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1.25	2.5	0	0	0	0	3.75
NNE	0	0.75	1.25	0.25	0.25	0	0	2.5
NE	0	0.5	0.25	0.25	0	0	0	1
ENE	0	0	0.75	0	0	0	0	0.75
E	0	0.25	0	0	0	0	0	0.25
ESE	0	0	0.5	0	0	0	0	0.5
SE	0	0.5	2.5	0	0	0	0	3
SSE	0	0	0.75	3	1.25	0	0	5
S	0	0.25	2.75	1	0	0	0	4
SSW	0	1.75	12.75	2.5	0	0	0	17
SW	0	4.25	15.75	2.75	0	0	0	22.75
WSW	0	4.5	8.75	7	0.5	0	0	20.75
W	0	2.5	18.75	7.5	1.25	0	0	30
WNW	0	5	19.75	1.75	0	0	0	26.5
NW	0	5	15.75	1.75	0.25	0	0	22.75
NNW	0	3	7.5	1.75	0	0	0	12.25
TOTAL	0	29.5	110.25	29.5	3.5	0	0	172.75

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Kewaunee Power Station 2015 Meteorological Data

Stability Class G

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0.75	3	0	0	0	0	3.75
NNE	0	0	1.25	0.25	0	0	0	1.5
NE	0	0.25	0.25	0.5	0	0	0	1
ENE	0	0	0.5	0	0	0	0	0.5
E	0	0	0.75	0	0	0	0	0.75
ESE	0	0	2.25	0.25	0	0	0	2.5
SE	0	0.25	1.5	0	0	0	0	1.75
SSE	0	0.5	4.5	4.75	1.25	0	0	11
S	0	1	1	1.5	0	0	0	3.5
SSW	0	1.75	6	1.25	0	0	0	9
SW	0	4	15.75	2	0	0	0	21.75
WSW	0	4.5	33.25	4.5	0	0	0	42.25
W	0	5	34	5.75	0	0	0	44.75
WNW	0	4	10.75	2.75	0	0	0	17.5
NW	0	4	20	1.75	0	0	0	25.75
NNW	0	3.5	11.5	1.25	0	0	0	16.25
TOTAL	0	29.5	146.25	26.5	1.25	0	0	203.5

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Kewaunee Power Station 2015 Meteorological Data

Second Quarter 2015

Stability Class A

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0.5	0.25	2.5	1.25	0	0	4.5
NNE	0	0.25	7.25	34	40	28.75	0.25	110.5
NE	0	0.25	16.25	31.25	4.75	0	0	52.5
ENE	0	1	10.75	3.25	0.25	0	0	15.25
E	0	1.75	10.75	0.5	0.75	0	0	13.75
ESE	0	2.25	4.75	0.75	0.25	0	0	8
SE	0	1.5	7	1.5	0.5	0	0	10.5
SSE	0	0	5.75	10.25	2.25	0	0	18.25
S	0	0	6.25	4.25	2	0	0	12.5
SSW	0	0.25	4.5	0	0	0	0	4.75
SW	0.25	0	2.25	1.5	1.75	0	0	5.75
WSW	0	0	9.5	11.75	3.25	0.5	0	25
W	0	0	4	9.25	10.5	0	0.5	24.25
WNW	0.25	0	1.5	12.25	5	0	0.25	19.25
NW	0	0.25	1.75	14.75	4.75	0	0	21.5
NNW	0	0.5	0.5	3.75	1.5	0	0	6.25
TOTAL	0.5	8.5	93	141.5	78.75	29.25	1	352.5

Stability Class B

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	3	0.5	0	0	3.5
NNE	0	0	5	7.25	5	1.5	0	18.75
NE	0	0.25	3.5	4.5	0	0	0	8.25
ENE	0	0	2.5	1.25	0	0	0	3.75
E	0	0.75	1.25	1.25	0.25	0	0	3.5
ESE	0	0.75	0.75	0.25	0	0	0	1.75
SE	0	0	0.75	0.25	0	0	0	1
SSE	0	0.25	1.25	0.5	0.25	0	0	2.25
S	0	0	1.5	2.5	0.25	0	0	4.25
SSW	0	0	2	0.25	0	0	0	2.25
SW	0	0	0.5	0.5	0.25	0	0	1.25
WSW	0	0	0.75	0.75	1	0	0	2.5
W	0	0	1.25	4.25	3.25	0	0	8.75
WNW	0	0	0.5	6.25	1.5	0	0	8.25
NW	0	0	0.25	1.5	0.75	0	0	2.5
NNW	0	0	0	0.75	0.25	0	0	1
TOTAL	0	2	21.75	35	13.25	1.5	0	73.5

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Stability Class C

Wind Direction		Wind Speed						TOTAL
		CALM	1-3	4-7	8-12	13-18	19-24	
N	0	0	0	0.75	3.25	0.75	0	4.75
NNE	0	0	0	5.75	10.25	8	0.75	24.75
NE	0	0	0	6.5	5.75	0	0	12.25
ENE	0	1	2.5	0.25	0	0	0	3.75
E	0	1	4.75	0.75	0	0	0	6.5
ESE	0	1.25	4.5	0.25	0	0	0	6
SE	0	0	1	1	0	0	0	2
SSE	0	0.5	1.5	0.75	0.75	0	0	3.5
S	0	0	0.25	2.5	0	0	0	2.75
SSW	0	0	1.75	1	0	0	0	2.75
SW	0	0	1.25	0.75	0.5	0	0	2.5
WSW	0	0	0.25	4.75	4	0	0	9
W	0	0	0.25	9	7	0	0	16.25
WNW	0	0	1.25	4.25	5.25	0	0	10.75
NW	0	0	0	1.5	0.75	0	0	2.25
NNW	0	0	1	1	1	0	0	3
TOTAL	0	3.75	33.25	47	28	0.75	0	112.75

Stability Class D

Wind Direction		Wind Speed						TOTAL
		CALM	1-3	4-7	8-12	13-18	19-24	
N	0	0	0.75	5.25	9.75	0.5	0	16.25
NNE	0	0	0.75	16	67.5	34	11.25	129.5
NE	0	0	2	18.5	10.75	0	0	31.25
ENE	0	0	2.5	6.25	1.75	0	0	10.5
E	0	0	1.25	5.5	0.5	0	0	7.25
ESE	0	0	1.75	3.75	0.25	0	0	5.75
SE	0	0	1.25	3.25	0.75	0	0	5.25
SSE	0	0	0	5.5	3.75	1.25	0	10.5
S	0	0	1.25	7.25	7.75	1.25	0.25	17.75
SSW	0	0	0.75	5.25	3.25	0	0	9.25
SW	0	0	0.25	3.25	1.25	1.5	0	6.25
WSW	0	0	0	4	4	0.5	0	8.5
W	0	0	0.5	1	8	3.25	0	12.75
WNW	0.25	0.25	0.5	1.75	9.25	4.75	0	16.5
NW	0	0	0.5	0.75	2	3.25	0	6.5
NNW	0	0	0.5	2.75	5	0	0	8.25
TOTAL	0.25	0.25	14.5	90	135.5	50.25	11.5	302

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Stability Class E

		Wind Speed						TOTAL
Wind Direction								
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	3.75	5	5.25	0.25	0	0	14.25
NNE	0	4	17	46.25	18.25	0.75	0	86.25
NE	0	2.75	19.25	7	0	0	0	29
ENE	0.25	5.75	7.75	0.5	0	0	0	14.25
E	0.25	7	5.25	0	0	0	0	12.5
ESE	0	4.75	8.25	0	0.25	0	0	13.25
SE	0.25	4.75	5	1	0	0	0	11
SSE	0.25	2	8.5	5.75	1.25	0	0	17.75
S	0.25	5.5	24	17	1.5	0	0	48.25
SSW	0	4.75	13.75	10	0.5	0	0	29
SW	0.25	1.75	2.5	3.5	1.75	0	0	9.75
WSW	0	1	0.75	8.25	4.25	0	0	14.25
W	0	1.75	3.25	3.75	0.5	0	0	9.25
WNW	0	1.5	5.25	12.75	0.75	0	0	20.25
NW	0	1.75	1.5	9	1.75	0	0	14
NNW	0	2.75	7.5	6.5	0.25	0	0	17
TOTAL	1.5	55.5	134.5	136.5	31.25	0.75	0	360

Stability Class F

		Wind Speed						TOTAL
Wind Direction								
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0.25	4	6	0.25	0.25	0	0	10.75
NNE	0	3.5	7.5	10.5	3	0	0	24.5
NE	0.25	6.25	17.75	3.75	0	0	0	28
ENE	0.25	4.25	6.75	1	0	0	0	12.25
E	0.5	3.5	4.25	0.25	0	0	0	8.5
ESE	0	5	3.75	0	0	0	0	8.75
SE	0	2.25	7	0.75	0	0	0	10
SSE	0.25	3.5	10.5	8.25	4	0	0	26.5
S	0	4.25	24	16	1.75	0	0	46
SSW	0	4.75	14	9.25	0.25	0	0	28.25
SW	0.5	2.75	2.25	1.5	0.75	0	0	7.75
WSW	0	3.5	1.25	1.25	0.25	0	0	6.25
W	0.25	2.25	2.25	3	0.25	0	0	8
WNW	0.5	3	6	2.25	0	0	0	11.75
NW	0	1	2	0.5	0.25	0	0	3.75
NNW	0.5	5	8.75	8.25	0	0	0	22.5
TOTAL	3.25	58.75	124	66.75	10.75	0	0	263.5

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Stability Class G

Wind Direction		Wind Speed						
	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.5	7.75	13.75	1.5	0.75	0	0.25	24.5
NNE	0.5	7	8.25	2.75	0.5	0	0	19
NE	0.25	8.75	31.75	6.25	0	0	0	47
ENE	0.25	6.5	9.25	1.75	0	0	0	17.75
E	0.75	7	4.75	0.25	0	0	0	12.75
ESE	0.5	8.75	5.75	0.25	0	0	0	15.25
SE	0.5	6	10.25	3.5	0	0	0	20.25
SSE	0.25	12.25	62	43.25	7.75	0	0	125.5
S	0.25	9.5	58.75	37	1.25	0	0	106.75
SSW	1	18.75	25.25	3.75	0	0	0	48.75
SW	0.5	12.25	24.25	1.75	0	0	0	38.75
WSW	1.25	11.5	20.75	2	0	0	0	35.5
W	1	10.5	21	1.75	0	0	0.5	34.75
WNW	0.75	10.25	9.25	1	0	0	0	21.25
NW	0	14	15.75	0.5	0	0	0	30.25
NNW	0.75	13	11.25	1	0	0	0	26
TOTAL	9	163.75	332	108.25	10.25	0	0.75	624

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Third Quarter 2015

Stability Class A

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0.5	8.25	0.5	0	0	9.25
NNE	0	0.25	7.5	5.25	6	0	0	19
NE	0	0	15	2.5	0	0	0	17.5
ENE	0	1	8.75	0	0	0	0	9.75
E	0	1.5	12.5	1.25	0	0	0	15.25
ESE	0	1.5	4.75	0	0	0	0	6.25
SE	0	1.75	8.75	0	0	0	0	10.5
SSE	0	0.25	4.5	7	3.25	0	0	15
S	0	0	5.25	2.5	2.25	0	0	10
SSW	0	0.75	3	3.75	0	0	0	7.5
SW	0	0.25	3.5	5.5	0	0	0	9.25
WSW	0	0.75	8.25	9.5	2.25	0	0	20.75
W	0	0.75	5.25	17	4	0	0	27
WNW	0	1	15.5	21.75	2.75	0	0	41
NW	0	0	8.75	16.75	0	0	0	25.5
NNW	0	0	8.25	13.25	0	0	0	21.5
TOTAL	0	9.75	120	114.25	21	0	0	265

Stability Class B

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0.25	0.75	0	0	0	0	1
NNE	0	0	2.75	0.5	1.5	0	0	4.75
NE	0	0.25	3	0	0	0	0	3.25
ENE	0	0.25	1.5	0	0	0	0	1.75
E	0	1.5	0.5	0	0	0	0	2
ESE	0	1.25	1	0	0	0	0	2.25
SE	0	0.25	0.25	0	0	0	0	0.5
SSE	0	0	1.25	0	0	0	0	1.25
S	0	0	0.5	1.5	0	0	0	2
SSW	0	0	0.75	0	0	0	0	0.75
SW	0	0	0.25	0	0	0	0	0.25
WSW	0	0	1	4.25	0.25	0	0	5.5
W	0	0.25	0.75	3.75	0.25	0	0	5
WNW	0	0.25	4.75	1	0	0	0	6
NW	0	0	2.75	1	0.25	0	0	4
NNW	0	0	1.25	1.75	0	0	0	3
TOTAL	0	4.25	23	13.75	2.25	0	0	43.25

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Stability Class C

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0.25	0.25	0.75	0.5	0	0	1.75
NNE	0	0	3	0.75	0.25	0	0	4
NE	0	0	9	0	0	0	0	9
ENE	0	0	1.5	0	0	0	0	1.5
E	0	0.5	2	0	0	0	0	2.5
ESE	0	0.5	0.25	0	0	0	0	0.75
SE	0	1	1	0.5	0	0	0	2.5
SSE	0	0	0.5	0.5	0	0	0	1
S	0	0	1.5	1	0	0	0	2.5
SSW	0	0	0.25	0	0	0	0	0.25
SW	0	0.25	0.25	0.5	0	0	0	1
WSW	0	0	1.25	2	0.75	0	0	4
W	0	0	0.5	3.5	0.25	0	0	4.25
WNW	0	0.25	3.5	3	0	0	0	6.75
NW	0.25	0	1.75	2	0	0	0	4
NNW	0	0.25	0.5	0.25	0	0	0	1
TOTAL	0.25	3	27	14.75	1.75	0	0	46.75

Stability Class D

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	4.5	9	1.75	0	0	16.25
NNE	0	0.75	14	11	7.5	0	0	33.25
NE	0	1.75	7	1	0	0	0	9.75
ENE	0	1.75	2.75	0.25	0	0	0	4.75
E	0	0.75	3	3.5	0.75	0	0	8
ESE	0	2.25	1	1.75	3.5	0	0	8.5
SE	0	1.5	8	0	0.75	0	0	10.25
SSE	0	0.5	3.75	3	2.75	0	0	10
S	0.25	0.75	7	6.75	0.75	0	0	15.5
SSW	0	0.5	3	0.75	0	0	0	4.25
SW	0	2.5	1.5	1.75	0	0	0	5.75
WSW	0	0.25	4.5	5.5	0.25	0	0	10.5
W	0	0.75	4.75	5	0.5	0	0	11
WNW	0	0.25	8	6.25	0.5	0	0	15
NW	0	0.75	3	3	0.25	0	0	7
NNW	0	1.25	4.5	1.5	1	0	0	8.25
TOTAL	0.25	17.25	80.25	60	20.25	0	0	178

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Stability Class E

Wind Direction		Wind Speed						TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0.25	2.75	11.25	14.5	1.5	0	0	30.25
NNE	0	4.25	19.75	22.5	5.25	1	0	52.75
NE	1.25	5	11.75	1.75	0	0	0	19.75
ENE	0.5	4.75	3.75	1.75	0	0	0	10.75
E	1.5	5.5	4.5	2.5	0	0	0	14
ESE	0	7.25	4.75	1.75	1	0	0	14.75
SE	0.25	9	11	0	0.75	0	0	21
SSE	0.25	6.75	13.25	8.25	1.75	0	0	30.25
S	0	4.75	27.75	26.75	2	0	0	61.25
SSW	0	4.75	28.75	9.5	0	0	0	43
SW	0	2	5.25	1.75	0	0	0	9
WSW	0	2	13.75	6.5	0.75	0	0	23
W	0	2.5	14.75	4.25	0.25	0	0	21.75
WNW	0	6.25	18.5	8	1	0	0	33.75
NW	0	4.25	9.5	4	0	0	0.25	18
NNW	0	3.75	18.5	4.5	0.75	0	0	27.5
TOTAL	4	75.5	216.75	118.25	15	1	0.25	430.75

Stability Class F

Wind Direction		Wind Speed						TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0.75	4.5	7	0.5	0.75	0	0	13.5
NNE	0.5	2.75	9.25	3	0.5	0	0	16
NE	0.25	3.5	9	0.5	0	0	0	13.25
ENE	0.5	4	4.25	0	0	0	0	8.75
E	0.25	4	3.25	0.5	0	0	0	8
ESE	0.75	3.25	2.5	0	0	0	0	6.5
SE	0.25	6	8.25	0	0	0	0	14.5
SSE	0	4.75	13.25	4.75	0.25	0	0	23
S	0.25	8.75	32.25	14.75	0.25	0	0	56.25
SSW	0.75	13.5	37.75	3.25	0	0	0	55.25
SW	0	7	8	0.25	0	0	0	15.25
WSW	0.25	6	15.75	2.5	0	0	0	24.5
W	0.25	4.75	17.75	0.75	0	0.25	0	23.75
WNW	0.25	4.5	9.75	2.75	0.5	0	0	17.75
NW	0	4.5	3.75	0.75	0	0.25	0	9.25
NNW	0	3	15.25	1.75	0.75	0	0	20.75
TOTAL	5	84.75	197	36	3	0.5	0	326.25

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Stability Class G

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	1	5	5	0.25	1.25	0.75	0	13.25
NNE	0.5	4	3.25	1.75	0.25	0	0	9.75
NE	1	5.5	10.75	0.5	0	0	0	17.75
ENE	0.5	1.75	2.75	0	0	0	0	5
E	0.75	4.75	3.25	1.25	0	0	0	10
ESE	0.75	7	1.5	0.75	0	0	0	10
SE	1	8	7.75	0.75	0	0	0	17.5
SSE	0.25	15.25	77.5	33.75	0	0	0	126.75
S	0.5	27.25	105.75	65.75	0.25	0	0	199.5
SSW	0.25	57.25	39.25	0.25	0	0	0	97
SW	1	52.75	23.5	0.5	0	0	0	77.75
WSW	1.75	36.5	54	0	0	0	0	92.25
W	1.75	23	60	0.25	0	0	0	85
WNW	0.75	20.5	31.75	0.75	0	0	0	53.75
NW	0.75	25	19	1	0	0	0	45.75
NNW	1	21.5	13	0.25	0.5	0	0	36.25
TOTAL	13.5	315	458	107.75	2.25	0.75	0	897.25

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Fourth Quarter 2015

Stability Class A

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0.5	0.25	2.75	2.75	0	0	6.25
NNE	0	0	0.75	4.5	3.75	1	0	10
NE	0	0	2.75	4.75	1	0	0	8.5
ENE	0	0.25	2.25	8	1.5	0	0	12
E	0	1.5	1.5	0.25	0.25	3.75	0	7.25
ESE	0	3.75	3.25	0	0	0	0	7
SE	0	0.25	0.75	0.25	0	0	0	1.25
SSE	0	0	0.5	1.5	1.5	1	0	4.5
S	0	0.25	1.5	5.75	1.25	1.5	0	10.25
SSW	0	0	6	7.5	0.75	0	0	14.25
SW	0	0.25	2	16.5	3.75	0	0	22.5
WSW	0	0.25	7.25	12	5.25	1.75	0.25	26.75
W	0	0.5	11	20.75	15.75	0.75	0	48.75
WNW	0	0	5.5	12	10	0	0	27.5
NW	0	0.5	0.75	6.5	2.5	0	0	10.25
NNW	0	0	0.75	8.5	0.5	0	0	9.75
TOTAL	0	8	46.75	111.5	50.5	9.75	0.25	226.75

Stability Class B

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0.5	0.5	0	0	1
NNE	0	0	0	0.25	0.25	0	0	0.5
NE	0	0	3	0.75	0	0	0	3.75
ENE	0	0	0.75	1	2	0	0	3.75
E	0	0	0	0.25	1	2.75	0	4
ESE	0	0	0.25	0.25	0	0	0	0.5
SE	0	0	0	0.25	0	0	0	0.25
SSE	0	0	0.25	0	0.25	0.25	0	0.75
S	0	0	2	4.25	0.25	0	0	6.5
SSW	0	0	4	7	0	0	0	11
SW	0	0	2.5	2.75	0.25	0	0	5.5
WSW	0	0.25	1.25	2	0.25	0.25	0.25	4.25
W	0	0.25	1.25	3.75	2.25	0	0	7.5
WNW	0	0	1.5	2.25	1.5	0	0	5.25
NW	0	0.5	0	1	0.5	0	0	2
NNW	0	0	0.5	2.75	0	0	0	3.25
TOTAL	0	1	17.25	29	9	3.25	0.25	59.75

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Stability Class C

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	1	1	0	0	2
NNE	0	0	0.25	0.75	1	0	0	2
NE	0	0	1.75	0.75	0	0	0	2.5
ENE	0	0	2.75	1.25	1	0	0	5
E	0	0.5	0.25	0.25	1.25	0.75	0	3
ESE	0	0.25	1	0.5	0	0	0	1.75
SE	0	0	0.5	1.75	0.25	0	0	2.5
SSE	0	0	0.25	0.25	0	0.25	0	0.75
S	0	0.75	2.25	2.75	0.25	0.75	0	6.75
SSW	0	0.25	4.25	4.75	0.5	0	0	9.75
SW	0	0	2	2	0	0	0	4
WSW	0	0.25	0.5	2.25	0.5	0	0	3.5
W	0	0.75	1.5	2.25	2.5	0	0	7
WNW	0	0.75	2.75	1.5	3.5	0	0	8.5
NW	0	0	0.25	0	0.25	0	0	0.5
NNW	0	0	0.5	3.75	0	0	0	4.25
TOTAL	0	3.5	20.75	25.75	12	1.75	0	63.75

Stability Class D

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0.75	5.75	19.25	2.5	0	0	28.25
NNE	0	0	3.75	7.75	5.75	0.25	0	17.5
NE	0	0.25	5.5	2.75	6.25	3.75	0.5	19
ENE	0	1.25	8.5	8.5	5.5	2.75	0.25	26.75
E	0	4	6.5	18	13.25	3.25	0	45
ESE	0.25	2.75	6	5	1.5	3.5	0.25	19.25
SE	0	0.25	3	8	7.5	2.75	0.5	22
SSE	0	0	2	4.75	10.25	7.75	0	24.75
S	0	0.25	8	18	4	2	0.25	32.5
SSW	0	0.75	20.25	16	0.75	0	0	37.75
SW	0	0.5	6.75	5.5	3.75	0	0	16.5
WSW	0	3.75	4.25	12.75	7.5	2.25	0.5	31
W	0	2.5	9.75	19.75	11	0.75	0	43.75
WNW	0	2.25	5.75	10.25	11	0	0	29.25
NW	0	1.25	7	3	0.5	0	0	11.75
NNW	0	0.75	13	23.5	4.25	0	0	41.5
TOTAL	0.25	21.25	115.75	182.75	95.25	29	2.25	446.5

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Stability Class E

Wind Direction		Wind Speed						TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	7.25	17.75	10	0	0	36
NNE	0	0.75	8.5	7.25	5.5	0	0	22
NE	0.25	1.5	4	1.5	0.5	0	0	7.75
ENE	0	0.25	3.75	5	4.5	0.25	0	13.75
E	0.25	0.5	6.5	7.5	3	0	0	17.75
ESE	0	0.75	3.5	5	1	0.25	0	10.5
SE	0.25	0.5	4.25	7.25	1.75	0.5	0	14.5
SSE	0	1.25	7.75	16.25	12	5	0.25	42.5
S	0.25	3.5	31.75	28.25	9.5	2.5	0	75.75
SSW	0	7.5	60.5	33	0.5	0	0	101.5
SW	0.25	5.75	25.25	15.75	6	0.25	0	53.25
WSW	0.25	7.5	17.5	38.75	27	5.75	2	98.75
W	0	11	18.75	44.25	14	1	0	89
WNW	0.25	3.75	22.75	23.25	11.25	0	0	61.25
NW	0.25	7.5	12.25	16	1.25	0.25	0	37.5
NNW	0.25	3.5	17.5	8.5	1.5	0	0	31.25
TOTAL	2.25	56.5	251.75	275.25	109.25	15.75	2.25	713

Stability Class F

Wind Direction		Wind Speed						TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0.25	1	1.25	0	0	0	0	2.5
NNE	0	1.5	0.75	1.5	0	0	0	3.75
NE	0	1	10.75	0	0	0	0	11.75
ENE	0.25	1.5	4.25	0.5	0	0	0	6.5
E	0	1.25	1.5	1.75	0	0	0	4.5
ESE	0.25	1	1	1.25	0.25	0	0	3.75
SE	0.25	0.5	2.75	2.75	1.25	0	0	7.5
SSE	0	3	15.75	20.5	9.75	2.5	0.25	51.75
S	0	4	17.75	5.25	3.5	0.25	0	30.75
SSW	0	6.75	22.5	2.75	0	0	0	32
SW	0	4.25	8.5	1	0.25	0	0	14
WSW	0	7	11.25	7.5	0	0.25	0	26
W	0	6.5	17.25	4.5	0	0	0	28.25
WNW	0.25	7.25	33	2.25	0	0	0	42.75
NW	0	5.75	8	1.5	0.25	0	0	15.5
NNW	0	2	6.25	0.75	0	0	0	9
TOTAL	1.25	54.25	162.5	53.75	15.25	3	0.25	290.25

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Stability Class G

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0.25	1.75	0.75	0	0	0	0	2.75
NNE	0	1	0	0.25	2	0.25	0	3.5
NE	0.25	0.25	1.25	0	0	0	0	1.75
ENE	0.25	0.25	1.25	0	0	0	0	1.75
E	0.25	0.5	0	1.5	0	0	0	2.25
ESE	0	0.5	0	0.25	1	0	0	1.75
SE	0	0.5	0.5	0.75	1.5	0	0	3.25
SSE	0	1	18.5	13	3	0	0	35.5
S	0.25	6.75	15.75	6.5	0.75	0	0	30
SSW	0.25	11.5	29.25	0	0	0	0	41
SW	0	10.75	27.25	1.25	0	0	0	39.25
WSW	0.25	9	46.25	5.5	0	0	0	61
W	0.25	2.5	28.75	2.25	0	0	0	33.75
WNW	0	3	18.25	0.5	0	0	0	21.75
NW	0	5	9.5	0	0	0	0	14.5
NNW	0	1.5	7.25	0	0	0	0	8.75
TOTAL	2	55.75	204.5	31.75	8.25	0.25	0	302.5

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