

Dominion Energy Kewaunee, Inc.  
N490 Hwy 42, Kewaunee, WI 54216



APR 24 2017

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**DOMINION ENERGY KEWAUNEE, INC.**  
**KEWAUNEE POWER STATION**  
**2016 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT**

Enclosed is the Kewaunee Power Station (KPS) 2016 Annual Radioactive Effluent Release Report for January through December 2016. 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,

Stewart J. Yuen  
Plant Manager, Kewaunee Power Station

Commitments made by this letter: NONE

1E48  
NKR

cc: Regional Administrator, Region III  
U. S. Nuclear Regulatory Commission  
2443 Warrenville Road  
Suite 210  
Lisle, IL 60532-4352

Mr. Ted H. Carter  
NRC Senior Project Manager  
U.S. Nuclear Regulatory Commission  
Two White Flint North, Mail Stop T-8F5  
11555 Rockville Pike  
Rockville, MD 20852-2738

Mr. Robert Busch  
Wisconsin Division of Public Health  
Radiation Protection Section  
Room 150  
Madison, WI 53701-2659

Ms. Deborah Russo  
American Nuclear Insurers  
95 Glastonbury Blvd.  
Glastonbury, CT 06033



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**2016  
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, 2016

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Total (1950)	1,234,567	1,234,567	1,234,567
Total (1951)	1,234,567	1,234,567	1,234,567

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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 2016 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)	1.54E-04	(1 <sup>st</sup> Quarter)
	% of Specification	2.06E-03	
<u>LIQUID:</u>	Ingestion Pathway-Organ	Bone	
	Quarterly Limit (mRem)	5.0	
	Actual Dose (mRem)	4.23E-03	(3 <sup>rd</sup> Quarter)
	% of Limit	8.46E-02	
<u>SOLID:</u>	No upper limit for solid radioactive waste applies.		
	Cubic Meters Shipped	0.00E+00 m <sup>3</sup>	(0.00+00 ft <sup>3</sup> )

## 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, 2016. 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.

10 CFR 20.1301	10 CFR 20.1302	10 CFR 50, Appendix I	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 2016.

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 ( $\mu$ Ci/sec)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Iodines</u>					
Total Activity Released (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Average Release Rate ( $\mu$ Ci/sec)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Particulates</u>					
Total Activity Released (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Average Release Rate ( $\mu$ Ci/sec)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Tritium</u>					
Total Activity Released (Ci)	5.83E+00	5.43E+00	5.41E+00	3.89E+00	2.06E+01
Average Release Rate ( $\mu$ Ci/sec)	7.41E-01	6.90E-01	6.81E-01	4.90E-01	6.50E-01
<u>Gross Alpha Released (Ci)</u>					
	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Carbon-14</u>					
Total Annual Activity Released (Ci)					0.00E+00

**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>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>Total</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>
<u>Iodines</u>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>Total</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>
<u>Particulates</u>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>Total</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>
<u>Gross Alpha</u>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Tritium</u>	5.83E+00	5.43E+00	5.41E+00	3.89E+00	2.06E+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>					
<b>Total</b>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Iodines</u>					
<b>Total</b>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>Particulates</u>					
<b>Total</b>	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 2016.

**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 2016 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
<b>1. Gamma- Air Dose</b>					
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
<b>2. Beta- Air Dose</b>					
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
<b>3. Organ Dose</b>					
Specification (mrem)	7.50E+00	7.50E+00	7.50E+00	7.50E+00	1.50E+01
<b>Total Body</b>					
Actual Dose (mrem)	1.54E-04	1.44E-04	1.43E-04	1.03E-04	5.44E-04
% of Specification	2.06E-03	1.91E-03	1.91E-03	1.37E-03	3.63E-03
<b>Bone</b>					
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)	1.54E-04	1.44E-04	1.43E-04	1.03E-04	5.44E-04
% of Specification	2.06E-03	1.91E-03	1.91E-03	1.37E-03	3.63E-03
<u>Thyroid</u>					
Actual Dose (mrem)	1.54E-04	1.44E-04	1.43E-04	1.03E-04	5.44E-04
% of Specification	2.06E-03	1.91E-03	1.91E-03	1.37E-03	3.63E-03
<u>Kidney</u>					
Actual Dose (mrem)	1.54E-04	1.44E-04	1.43E-04	1.03E-04	5.44E-04
% of Specification	2.06E-03	1.91E-03	1.91E-03	1.37E-03	3.63E-03
<u>Lung</u>					
Actual Dose (mrem)	1.54E-04	1.44E-04	1.43E-04	1.03E-04	5.44E-04
% of Specification	2.06E-03	1.91E-03	1.91E-03	1.37E-03	3.63E-03
<u>GI-LLI</u>					
Actual Dose (mrem)	1.54E-04	1.44E-04	1.43E-04	1.03E-04	5.44E-04
% of Specification	2.06E-03	1.91E-03	1.91E-03	1.37E-03	3.63E-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.

Area	Source	Activity	Release	Concentration	Notes
Area 1	Source 1	Activity 1	Release 1	Concentration 1	Notes 1
Area 2	Source 2	Activity 2	Release 2	Concentration 2	Notes 2
Area 3	Source 3	Activity 3	Release 3	Concentration 3	Notes 3
Area 4	Source 4	Activity 4	Release 4	Concentration 4	Notes 4
Area 5	Source 5	Activity 5	Release 5	Concentration 5	Notes 5

### 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 13.14-1 of the Kewaunee ODCM are:

Analysis	LLD ( $\mu\text{Ci/ml}$ )
Principal Gamma Emitters	1.00E-06
Iodine 131	1.00E-06
Tritium (H-3)	1.00E-05
Gross Alpha	5.00E-07
Strontium 89, 90	5.00E-08
Iron 55	1.00E-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 ( $\mu\text{Ci/ml}$ )
Mn-54	9.63E-08	1.70E-08	9.78E-08	1.31E-07	8.55E-08
Fe-59	3.82E-08	3.82E-08	3.90E-08	3.90E-08	3.86E-08
Co-58	1.27E-07	9.45E-08	1.75E-07	9.58E-08	1.23E-07
Co-60	2.55E-08	2.28E-08	2.33E-08	1.32E-07	5.09E-08
Zn-65	4.31E-08	4.31E-08	4.39E-08	2.49E-07	9.48E-08
Mo-99	6.84E-07	1.20E-07	1.21E-07	6.86E-07	4.03E-07
Cs-134	9.98E-08	1.91E-08	1.94E-08	7.48E-08	5.33E-08
Cs-137	9.24E-08	1.24E-07	1.49E-07	9.31E-08	1.15E-07
Ce-141	6.85E-08	1.03E-07	1.04E-07	1.13E-07	9.71E-08
Ce-144	5.70E-07	5.36E-07	4.20E-07	4.20E-07	4.87E-07
I-131	1.34E-07	1.25E-07	5.66E-08	1.03E-07	1.05E-07
H-3	2.80E-06	3.59E-06	2.89E-06	2.72E-06	3.00E-06
Sr-89	NA	8.34E-09	9.81E-09	1.06E-08	9.58E-09
Sr-90	NA	7.09E-09	7.06E-09	9.26E-09	7.80E-09
Gross Alpha	NA	6.54E-09	5.24E-09	5.06E-09	5.61E-09
Fe-55	NA	8.55E-07	8.01E-07	5.72E-07	7.43E-07
Ni-63	NA	1.21E-07	1.13E-07	1.11E-07	1.15E-07

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 (µCi/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 (µCi/ml)
Mn-54	1.05E-08	9.76E-09	1.11E-08	1.11E-08	1.06E-08
Fe-59	2.89E-08	2.49E-08	2.75E-08	1.80E-08	2.48E-08
Co-58	9.59E-09	9.58E-09	9.75E-09	9.57E-09	9.62E-09
Co-60	9.51E-09	2.49E-08	1.19E-09	1.64E-08	1.30E-08
Zn-65	2.46E-08	2.26E-08	3.23E-08	2.24E-08	2.55E-08
Mo-99	8.77E-08	8.78E-08	8.99E-08	8.35E-08	8.72E-08
Cs-134	1.05E-08	1.01E-08	1.31E-08	1.06E-08	1.11E-08
Cs-137	1.19E-08	9.41E-09	1.20E-08	1.20E-08	1.13E-08
Ce-141	1.61E-08	1.59E-08	1.65E-08	1.51E-08	1.59E-08
Ce-144	7.49E-08	7.49E-08	7.17E-08	7.09E-08	7.31E-08
I-131	8.03E-09	9.59E-09	1.03E-08	8.09E-09	9.00E-09
H-3	2.80E-06	3.59E-06	2.89E-06	2.72E-06	3.00E-06
Sr-89	1.10E-08	8.27E-09	8.72E-09	7.44E-09	8.86E-09
Sr-90	9.09E-09	6.58E-09	6.46E-09	8.19E-09	7.58E-09
Gross Alpha	3.53E-09	1.01E-08	4.96E-09	4.91E-09	5.88E-09
Fe-55	8.63E-07	9.20E-07	7.96E-07	5.64E-07	7.86E-07
Ni-63	1.30E-07	1.42E-07	1.09E-07	9.82E-08	1.20E-07

### 3.2 Liquid Batch Release Statistics

The following is a summation of all liquid batch releases during 2016.

Number of batch releases.....	3
Total time for all batch releases (min).....	4,920
Maximum time for a batch release (min).....	1,690
Minimum time for a batch release (min).....	1,590
Average time for a batch release (min).....	1,640

### 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	2.97E-04	1.48E-03	2.90E-03	4.68E-03
Average Concentration ( $\mu\text{Ci/ml}$ )	0.00E+00	4.46E-10	3.55E-09	6.79E-09	2.46E-09
<u>Tritium</u>					
Total Release (Ci)	0.00E+00	1.12E+00	8.23E-01	5.68E-01	2.52E+00
Average Concentration ( $\mu\text{Ci/ml}$ )	0.00E+00	1.68E-06	1.97E-06	1.33E-06	1.32E-06
% of Tech. Spec. Limit( $3.0\text{E-}3 \mu\text{Ci/ml}$ )	0.00E+00	5.60E-02	6.57E-02	4.43E-02	4.40E-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 ( $\mu\text{Ci/ml}$ )	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
% of Tech. Spec. Limit( $2.0\text{E-}4 \mu\text{Ci/ml}$ )	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)	1.90E+06	2.00E+06	1.78E+06	1.97E+06	7.65E+06
<u>Volume of Dilution Water</u>					
Total (liters)	3.97E+08	6.65E+08	4.16E+08	4.25E+08	1.90E+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>					
Sb-125	NA	4.67E-05	2.98E-04	0.00E+00	3.45E-04
Fe-55	NA	6.79E-05	1.08E-03	2.54E-03	3.69E-03
Co-60	NA	1.62E-04	3.88E-05	3.37E-04	5.38E-04
Ni-63	NA	2.03E-05	6.94E-05	1.96E-05	1.09E-04
<b>Total Release</b>	<b>NA</b>	<b>2.97E-04</b>	<b>1.49E-03</b>	<b>2.90E-03</b>	<b>4.68E-03</b>
<u>Dissolved and Entrained Gases</u>					
<b>Total Release</b>	<b>NA</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>
<u>Tritium</u>					
<b>Total Release</b>	<b>NA</b>	<b>1.12E+00</b>	<b>8.23E-01</b>	<b>5.68E-01</b>	<b>2.52E+00</b>
<u>Gross Alpha Activity</u>					
<b>Total Release</b>	<b>NA</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>

\*There were no batch releases in the 1<sup>st</sup> 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	5.42E-04	7.06E-04	6.55E-04	1.90E-03
% of Specification	0.00E+00	3.61E-02	4.71E-02	4.36E-02	6.34E-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	7.48E-04	4.23E-03	2.24E-03	7.22E-03
% of Specification	0.00E+00	1.50E-02	8.46E-02	4.49E-02	7.22E-02
<u>Liver</u>					
Actual Dose (mrem)	0.00E+00	5.37E-04	1.36E-03	1.45E-03	3.34E-03
% of Specification	0.00E+00	1.07E-02	2.71E-02	2.89E-02	3.34E-02
<u>Thyroid</u>					
Actual Dose (mrem)	0.00E+00	4.08E-04	3.99E-04	1.83E-04	9.90E-04
% of Specification	0.00E+00	8.17E-03	7.98E-03	3.67E-03	9.90E-03
<u>Kidney</u>					
Actual Dose (mrem)	0.00E+00	4.08E-04	3.99E-04	1.83E-04	9.90E-04
% of Specification	0.00E+00	8.17E-03	7.98E-03	3.67E-03	9.90E-03

**Table 3.4 (continued)**  
**Dose from Liquid Effluents**

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Annual
<b>Lung</b>					
Actual Dose (mrem)	0.00E+00	4.28E-04	8.04E-04	8.17E-04	2.05E-03
% of Specification	0.00E+00	8.55E-03	1.61E-02	1.63E-02	2.05E-02
<b>GI-LLI</b>					
Actual Dose (mrem)	0.00E+00	1.31E-03	1.16E-03	2.44E-03	4.91E-03
% of Specification	0.00E+00	2.62E-02	2.33E-02	4.88E-02	4.91E-02

### 3.4 Ground Water Monitoring

Sample Point Sample Date	Tritium pCi/L	Total Gamma Activity μCi/ml
<b>AB-707</b>		
03/08/16	991	None Detected
06/08/16	686	None Detected
08/18/16	984	None Detected
11/16/16	1171	None Detected
<b>AB-708</b>		
03/08/16	641	None Detected
06/09/16	442	None Detected
08/17/16	730	None Detected
11/16/16	704	None Detected
<b>AB-709</b>		
03/09/16	470	None Detected
06/09/16	<334	None Detected
08/18/16	621	None Detected
11/16/16	485	None Detected
<b>AB-710</b>		
03/08/16	888	None Detected
06/08/16	440	None Detected
08/17/16	706	None Detected
11/15/16	895	None Detected
<b>AB-711</b>		
03/08/16	480	None Detected
06/09/16	<334	None Detected
08/17/16	429	None Detected
11/15/16	454	None Detected
<b>AB-712</b>		
03/09/16	350	None Detected
06/09/16	<334	None Detected
08/18/16	406	None Detected
11/16/16	491	None Detected

Sample Point Sample Date	Tritium pCi/L	Total Gamma Activity μCi/ml
<b>AB-715</b>		
03/09/16	<250	None Detected
06/08/16	<334	None Detected
08/17/16	383	None Detected
11/16/16	<261	None Detected
<b>AB-717</b>		
03/09/16	<250	None Detected
06/08/16	<334	None Detected
08/17/16	<235	None Detected
11/16/16	<266	None Detected
<b>MW-701</b>		
03/09/16	<250	None Detected
06/08/16	<267	None Detected
08/18/16	<234	None Detected
11/17/16	<266	None Detected
<b>MW-702</b>		
03/10/16	<250	None Detected
06/10/16	<267	None Detected
08/19/16	<234	None Detected
11/18/16	<266	None Detected
<b>MW-703</b>		
03/10/16	<250	None Detected
06/10/16	<267	None Detected
08/19/16	<234	None Detected
11/18/16	<266	None Detected
<b>MW-704</b>		
03/10/16	<250	None Detected
06/09/16	<267	None Detected
08/18/16	<234	None Detected
11/17/16	<266	None Detected
<b>MW-705</b>		
03/10/16	<250	None Detected
06/09/16	<267	None Detected
08/19/16	<234	None Detected
11/17/16	<266	None Detected
<b>MW-706</b>		
03/10/16	<250	None Detected
06/09/16	<267	None Detected
08/18/16	<234	None Detected
11/17/16	<266	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 2016. 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 2016.

Waste Type	Major Nuclide	Disposition	Shipping Container	Radionuclide Content (Curies)	Percent Abundance
				0	0
				0	0
				0	0
				0	0

**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
	ft <sup>3</sup>	m <sup>3</sup>	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
	ft <sup>3</sup>	m <sup>3</sup>	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
	ft <sup>3</sup>	m <sup>3</sup>	
Waste Class			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
	ft <sup>3</sup>	m <sup>3</sup>	
Waste Class			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
	ft <sup>3</sup>	m <sup>3</sup>	
Waste Class			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

**Table 5.1 (continued)  
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 2016.

Year	Mode of Transportation	Destination
2016	NA	NA
2015	NA	NA
2014	NA	NA
2013	NA	NA
2012	NA	NA
2011	NA	NA
2010	NA	NA
2009	NA	NA
2008	NA	NA
2007	NA	NA
2006	NA	NA
2005	NA	NA
2004	NA	NA
2003	NA	NA
2002	NA	NA
2001	NA	NA
2000	NA	NA
1999	NA	NA
1998	NA	NA
1997	NA	NA
1996	NA	NA
1995	NA	NA
1994	NA	NA
1993	NA	NA
1992	NA	NA
1991	NA	NA
1990	NA	NA
1989	NA	NA
1988	NA	NA
1987	NA	NA
1986	NA	NA
1985	NA	NA
1984	NA	NA
1983	NA	NA
1982	NA	NA
1981	NA	NA
1980	NA	NA
1979	NA	NA
1978	NA	NA
1977	NA	NA
1976	NA	NA
1975	NA	NA
1974	NA	NA
1973	NA	NA
1972	NA	NA
1971	NA	NA
1970	NA	NA
1969	NA	NA
1968	NA	NA
1967	NA	NA
1966	NA	NA
1965	NA	NA
1964	NA	NA
1963	NA	NA
1962	NA	NA
1961	NA	NA
1960	NA	NA
1959	NA	NA
1958	NA	NA
1957	NA	NA
1956	NA	NA
1955	NA	NA
1954	NA	NA
1953	NA	NA
1952	NA	NA
1951	NA	NA
1950	NA	NA
1949	NA	NA
1948	NA	NA
1947	NA	NA
1946	NA	NA
1945	NA	NA
1944	NA	NA
1943	NA	NA
1942	NA	NA
1941	NA	NA
1940	NA	NA
1939	NA	NA
1938	NA	NA
1937	NA	NA
1936	NA	NA
1935	NA	NA
1934	NA	NA
1933	NA	NA
1932	NA	NA
1931	NA	NA
1930	NA	NA
1929	NA	NA
1928	NA	NA
1927	NA	NA
1926	NA	NA
1925	NA	NA
1924	NA	NA
1923	NA	NA
1922	NA	NA
1921	NA	NA
1920	NA	NA
1919	NA	NA
1918	NA	NA
1917	NA	NA
1916	NA	NA
1915	NA	NA
1914	NA	NA
1913	NA	NA
1912	NA	NA
1911	NA	NA
1910	NA	NA
1909	NA	NA
1908	NA	NA
1907	NA	NA
1906	NA	NA
1905	NA	NA
1904	NA	NA
1903	NA	NA
1902	NA	NA
1901	NA	NA
1900	NA	NA



## **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 Condition Report CR536 was submitted on 3/15/2016 when it was identified during the monthly auxiliary building vent stack Sr-89/90 sample retrieval, that the flow totalizer sample volume was not similar to prior month values. The flow meter was reading 3.8 lpm versus the normal flow of 10 lpm. Upon further investigation the tygon tubing used for sampling were found to be degraded. This issue did not affect the function of the auxiliary building vent stack monitor. The lower volume noted on the totalizer was used for the sample taken for analyzing for Sr-89/90. The tubing was replaced and the flow meter reading returned to normal. In addition a yearly check of the tubing and other associated sample media was placed on the radiation protection duties list.

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# Appendix A

## Kewaunee Power Station

### 2016 Meteorological Data

#### Missing Data

First Quarter: 53.75 hours  
Second Quarter: 77.00 hours  
Third Quarter: 189.75 hours  
Fourth Quarter: 9.75 hours

Note: A total of 330.25 hours of data is missing or otherwise unavailable. This represents the availability of 96.24% of the data for the year.

**APPENDIX A**  
**Kewaunee Power Station 2016 Meteorological Data**

**First Quarter 2016**

**Stability Class A**

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0.25	1.75	0.75	0.25	0	4.75
NNE	0.25	0	0.1	5.75	0	0	0	7
NE	0	0	3.5	7.5	1.25	0	0	12.25
ENE	0	0	3.75	0.25	0.5	0	0	4.5
E	0	0	2	2.5	0	0.25	0.25	5
ESE	0	0	0.1	0	0	0	0	1
SE	0	1.75	1.25	2	0	0	0	5
SSE	0.25	0.5	3.75	4	1	9	0	18.5
S	0	0.25	2.75	7.75	1.5	2.25	0.25	14.75
SSW	0	0.75	2.75	4.5	0.25	0	0	8.25
SW	0	0.25	4.75	4.5	0.25	0.5	0	10.25
WSW	0.5	1.25	9.75	5.5	4.5	0.75	0	22.25
W	0.25	0.5	15.25	7.75	6.5	0.25	0.5	31
WNW	0	0.5	11.25	6.75	4.5	0	0	23
NW	0	0.5	3.75	12.5	9.75	0	0	26.5
NNW	0	0.75	3.25	3.5	12.25	1.5	0	21.25
TOTAL	1.25	7	71.75	76.5	43	14.75	1	215.25

**Stability Class B**

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0.5	1	0.75	0.25	0	2.5
NNE	0	0	0.5	1.25	0.75	0	0	2.5
NE	0	0	0.75	0	3.25	0	0	4
ENE	0	0.25	1.25	0.25	0	0.25	0	2
E	0	0	1	1	0	0.5	0.25	2.75
ESE	0	0.75	0.75	0	0	0	0	1.5
SE	0	0.25	0	0	0.25	0	0	0.5
SSE	0	0.5	0.75	0.25	0.5	1	0	3
S	0	0.25	2	0.75	2.75	0.75	0	6.5
SSW	0	0.25	1.5	2.75	0	0	0	4.5
SW	0	0.5	1.25	1	0	0	0	2.75
WSW	0	0.75	2.5	2.5	0.25	0.25	0	6.25
W	0	0.25	2.75	1.75	1.75	0	0	6.5
WNW	0	0	4.5	2.25	5.5	0	0	12.25
NW	0	0	1	1.25	2	0	0	4.25
NNW	0	0	1.25	1.5	2.5	0.5	0	5.75
TOTAL	0	3.75	22.25	17.5	20.25	3.5	0.25	67.5

APPENDIX A  
Kewaunee Power Station 2016 Meteorological Data

Stability Class C

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0.25	1.25	1.75	0.75	0.25	0	4.25
NNE	0	0	1.75	4.25	0.5	0	0	6.5
NE	0	0.25	2.75	0.75	0.5	0	0	4.25
ENE	0	0	1.75	1	0.25	0	0	3
E	0	0	0.25	0.75	0	0	0.25	1.25
ESE	0	0	0.75	0	0	0	0	0.75
SE	0	0.75	0.25	0	0	0	0	1
SSE	0	0.5	1.25	1	1.25	1	0	5
S	0	0	0.75	1.5	1.75	0.25	0	4.25
SSW	0	0	2.5	1.75	0	0	0	4.25
SW	0	0	1	1.25	0.75	0	0	3
WSW	0	0.25	1.5	3	2	0.75	0	7.5
W	0	0.5	1.75	3.5	7.25	1.5	0.25	14.75
WNW	0	0	6.25	2.25	4.25	0	0	12.75
NW	0	0.25	1.75	1.5	0.75	0	0	4.25
NNW	0	0	1	2.25	4.75	0.25	0	8.25
TOTAL	0	2.75	26.5	26.5	24.75	4	0.5	85

Stability Class D

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	13.75	22	11.75	3.25	0	51.75
NNE	0	2	6.25	18.5	29.5	16.75	5.25	78.25
NE	0	1.25	6.75	1.25	11	0.5	0	20.75
ENE	0.25	1.75	10.5	5	6.75	1.25	0	25.5
E	0	1.5	1	3.25	3.25	2.25	0.25	11.5
ESE	0	2.75	2	5.25	0.5	0	0	10.5
SE	0	1.75	3.25	0.75	1.75	0	0	7.5
SSE	0.25	1.5	5.75	7.75	2.5	4.25	3.25	25.25
S	0.25	2	6	11.25	10.25	0.75	0	30.5
SSW	0	3.5	28	18.75	1	0	0	51.25
SW	1.25	4	10.75	4.5	0.25	0	0	20.75
WSW	0	11.25	21	7.75	3.5	3	0.25	46.75
W	0	6	28.25	14.25	2.75	0.75	0.75	52.75
WNW	0.25	4	21	18	16.5	0	0	59.75
NW	0.25	2.75	10	14.75	11.25	0	0	39
NNW	0.25	2.75	21.5	30.75	24.25	2	0	81.5
TOTAL	2.75	49.75	195.75	183.75	136.75	34.75	9.75	613.25

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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	4.25	12.75	11.5	6	0	0	34.5
NNE	0.25	3	15	5.5	2.75	0	0	26.5
NE	0	2.75	7.25	0.75	0.75	0	0	11.5
ENE	0	2.75	3.75	0.5	0	0	0	7
E	0.25	2.75	4	2.25	1	0.75	0.25	11.25
ESE	0.25	4.5	6.5	1.25	3.5	0.5	0.25	16.75
SE	0	3	8.25	3.75	1.5	0.75	2.25	19.5
SSE	0	3	11.25	7.25	0.5	4.75	0	26.75
S	0.25	2.75	12	6.75	0.5	4.25	0	26.5
SSW	0	9.5	49	14	0.5	0	0	73
SW	0	8.75	14.75	10	7.25	2	0.25	43
WSW	0	6.75	17.75	25	7	1.5	0	58
W	1	3.75	16.25	43.75	7.25	1.5	0.25	73.75
WNW	0	3.75	39.25	47.5	7.5	0	0	98
NW	0.25	7.25	30	23.25	17.25	0.25	0	78.25
NNW	1.5	6.5	25.75	30.5	7.5	0	0	71.75
TOTAL	3.75	75	273.5	233.5	70.75	16.25	3.25	676

Stability Class F

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0.5	1.5	4.75	0	0	0	0	6.75
NNE	0	1.25	3	0.25	0	0	0	4.5
NE	0	0.75	4.75	0.25	0	0	0	5.75
ENE	0.25	1.5	4.5	0.5	0	0	0	6.75
E	0	1.5	2.75	0.25	0	0	0	4.5
ESE	0	1.75	2	0	0	0	0	3.75
SE	0	0.25	5	1.25	0	0	0	6.5
SSE	0	3	12.5	4.25	2	1	0	22.75
S	0	2.5	9	0.5	0	0.75	0	12.75
SSW	0.25	4	17	0.5	0	0	0	21.75
SW	0.25	4.75	20.25	2.5	0	0	0	27.75
WSW	0.5	6.75	24	3.75	0.25	0	0	35.25
W	0	4.75	16.75	9.5	1.5	0	0	32.5
WNW	1.5	3.25	14.5	4.25	0	0	0	23.5
NW	1.25	1.5	9.75	5.25	0.25	0	0	18
NNW	0	3.5	9	1.5	0	0	0	14
TOTAL	4.5	42.5	159.5	34.5	4	1.75	0	246.75

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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	2	2.75	0	0	0	0	4.75
NNE	0.25	2.25	1.5	0.25	0	0	0	4.25
NE	0.25	2.25	1	0	0	0	0	3.5
ENE	0	1	0.75	0.5	0	0	0	2.25
E	0	1.25	0.75	0.5	0	0	0	2.5
ESE	0	3.25	2	0	0	0	0	5.25
SE	0	2.25	4	0	0	0	0	6.25
SSE	0	2.75	12.25	2.75	0	0	0	17.75
S	0	4.25	11.25	3	0	0	0	18.5
SSW	0.25	8	12.75	0	0	0	0	21
SW	0	5.75	22.75	4.25	0	0	0	32.75
WSW	0.75	7.25	19.5	0	0	0	0	27.5
W	1.25	3.75	22.5	1.5	0	0	0	29
WNW	0	5	11.75	1	0	0	0	17.75
NW	1	5	13.25	2.5	0	0	0	21.75
NNW	0.5	4.75	6.75	0	0	0	0	12
TOTAL	4.25	60.75	145.5	16.25	0	0	0	226.75



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**Second Quarter 2016**

Stability Class A

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0.5	0.75	1.5	1.5	3.5	0	0	7.75
NNE	0.25	0.5	1.5	5	4.5	0	0.25	12
NE	3	2	4.75	1	0	0	0	10.75
ENE	1.25	3	0.75	0.5	0	0	0	5.5
E	1.25	0.75	0.75	0	0	0	0	2.75
ESE	0.5	0.5	0.25	0	0	0	0	1.25
SE	1.5	2.75	1.75	0	0	0	0	6
SSE	0.5	3	2.25	0.75	1.25	0	0	7.75
S	0.25	3.5	7	8.75	2.5	0	0	22
SSW	1	1.5	0.5	0	0	0	0	3
SW	0.25	0	0	0.25	0	0	0	0.5
WSW	0	0.75	0.25	1.5	0.25	0	0	2.75
W	0	0.25	0.5	2	0	0	0	2.75
WNW	0	4	3.75	0.5	0	0	0	8.25
NW	0	0.25	0.5	0.75	0.25	0	0	1.75
NNW	1	2.25	0.5	0	0.5	0	0	4.25
TOTAL	11.25	25.75	26.5	22.5	12.75	0	0.25	99

Stability Class B

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0.5	0	1	0	0	1.5
NNE	0	0.25	1	0.25	1.5	0.25	0	3.25
NE	0	0.5	2	0.5	0	0	0	3
ENE	0.25	0.5	0.25	0	0	0	0	1
E	0	0.75	0.75	0	0	0	0	1.5
ESE	0	0.5	0.5	0	0	0	0	1
SE	0	0.5	0.25	0	0	0	0	0.75
SSE	0.75	1	1.5	1	0.25	0	0	4.5
S	0.5	1	2	1	0.75	0	0	5.25
SSW	0	0.25	1	0.25	0	0	0	1.5
SW	0	0.25	0.25	0	0	0	0	0.5
WSW	0	0.25	0	0.5	0	0	0	0.75
W	0	0	0.25	0	0	0	0	0.25
WNW	0	0.5	0.25	2.25	0	0	0	3
NW	0	0	0.25	0.25	0	0	0	0.5
NNW	0.25	0.25	0	0.25	0	0	0	0.75
TOTAL	1.75	6.5	10.75	6.25	3.5	0.25	0	29

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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	0.25	0	2.25	1	3	0.25	0	6.75
NNE	0	0.5	6	6.5	1.75	0	0	14.75
NE	0	2	11.75	5	1	0	0	19.75
ENE	0	0.5	3.25	1.5	0	0	0	5.25
E	0	1.25	2.75	0.5	0	0	0	4.5
ESE	0	0.75	0.25	0.25	0	0	0	1.25
SE	0.25	0.5	0.75	0.25	0	0	0	1.75
SSE	1.5	3.75	2.5	3.75	0.25	0	0	11.75
S	0.25	2.25	5.5	4	0.5	0	0	12.5
SSW	0	1	2.75	0	0	0	0	3.75
SW	0	0.75	0.75	1	0	0	0	2.5
WSW	0	0.75	0.5	0.25	0	0	0	1.5
W	0	0	1.5	1	0	0	0	2.5
WNW	0	0.5	0.25	2	0	0	0	2.75
NW	0	0.25	0.5	0.75	0	0	0	1.5
NNW	0.25	0	1.75	0.5	0.5	0	0	3
TOTAL	2.5	14.75	43	28.25	7	0.25	0	95.75

Stability Class D

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	1	3.75	11.75	5.75	1.75	0	0	24
NNE	0.25	1	11.5	34.5	31.25	5.25	0	83.75
NE	0	1	7.5	3.75	0.25	0	0	12.5
ENE	0.75	0.5	2.75	3.25	0	0	0	7.25
E	0.75	0.25	1.75	1.5	0	0	0	4.25
ESE	0.75	0.75	1.5	3.5	0.25	0	0	6.75
SE	1.25	1.75	1	0.25	0	0	0	4.25
SSE	2.75	8.5	5.5	6.5	1.25	0	0	24.5
S	3.5	5	5.5	6.5	0.25	0	0	20.75
SSW	0.75	1	2.75	0.25	0	0	0	4.75
SW	0.75	0.75	1.75	3	0	0	0	6.25
WSW	0.25	0	3.5	0	0	0	0	3.75
W	0.25	0.25	2.5	0.75	0	0	0	3.75
WNW	0.25	2.25	1.25	1.75	0.5	0	0	6
NW	2	0.25	2	1.75	0.25	0	0	6.25
NNW	2.5	8.75	2.5	1	2	0	0	16.75
TOTAL	17.75	35.75	65	74	37.75	5.25	0	235.5

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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	0.5	1	0.25	0	0.5	0	0	2.25
NNE	0	0.5	1.25	8	4.5	0.5	0	14.75
NE	0	0.25	2.25	1.75	0	0	0	4.25
ENE	0	0	1	0.25	0	0	0	1.25
E	0	0.5	1	0.25	0	0	0	1.75
ESE	0	0.75	0.5	0.5	0	0	0	1.75
SE	0	0	0.25	0.25	0	0	0	0.5
SSE	2.75	1.25	7	3.75	0	0	0	14.75
S	1.5	1.5	1.5	1	0.5	0	0	6
SSW	0	0.25	1.5	0	0	0	0	1.75
SW	0	2.5	2.5	0.25	0	0	0	5.25
WSW	0	1.5	4.25	0.25	0.25	0	0	6.25
W	0	0.25	3.75	2	0	0	0	6
WNW	2.25	1.75	3.5	1.5	0	0	0	9
NW	2	2.75	2	2	2	0	0	10.75
NNW	2.25	7	1	2.25	0.25	0	0	12.75
TOTAL	11.25	21.75	33.5	24	8	0.5	0	99

Stability Class F

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0.75	9.25	28.5	19.5	12.75	0.75	0	71.5
NNE	1.25	10.25	58.5	99.25	71.5	10.25	0	251
NE	0.25	16	63	17.5	0.25	0	0	97
ENE	0.75	15	44.75	4	0	0	0	64.5
E	0.75	24	30	4.5	0	0	0	59.25
ESE	0.75	32.5	21.25	0.25	0	0	0	54.75
SE	0.5	19.25	43	1.5	0.25	0	0	64.5
SSE	1.75	18.5	58.25	39.25	1	0	0	118.75
S	1.25	22.25	70.5	50.5	5.75	0	0	150.25
SSW	0.5	23	40.25	9	0	0	0	72.75
SW	0.25	20.75	24	4	0.5	0	0	49.5
WSW	0	21.5	47.25	17.75	5.5	0	0	92
W	0.5	12	74.25	51.25	3	0	0	141
WNW	1.25	15.75	41	41	5.25	0	0	104.25
NW	0.75	12.75	20.5	29.25	5.5	0.5	0	69.25
NNW	1	14.25	29.5	31.25	3.5	0	0	79.5
TOTAL	12.25	287	694.5	419.75	114.75	11.5	0	1539.75

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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	0	0	0	0	0	0	0
NNE	0	0	0	0	0.25	0	0	0.25
NE	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0
E	0	0.25	0	0	0	0	0	0.25
ESE	0	0.5	0	0	0	0	0	0.5
SE	0	0	0.75	0	0	0	0	0.75
SSE	0	2.25	0.75	0	0	0	0	3
S	0	0.5	0	0	0	0	0	0.5
SSW	0	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0	0
WSW	2	0	0	0	0	0	0	2
W	0.25	0	0.5	0	0	0	0	0.75
WNW	0.5	0	0	0	0	0	0	0.5
NW	0.5	0	0	0	0	0	0	0.5
NNW	0	0	0	0	0	0	0	0
TOTAL	3.25	3.5	2	0	0.25	0	0	9

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**Third Quarter 2016**

Stability Class A

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0.25	1	0	0	0	0	1.25
NNE	0	0.5	0.25	3.25	1	0	0	5
NE	0	1.5	3.25	0	0	0	0	4.75
ENE	0	1.5	1	0	0	0	0	2.5
E	0	1.75	0.25	0	0	0	0	2
ESE	0.25	2.5	1.5	0.25	0	0	0	4.5
SE	0	0.75	1	0.5	0	0	0	2.25
SSE	0	1	1.5	1.5	0.5	0	0	4.5
S	0	2.25	6.75	4.5	0	0	0	13.5
SSW	0	3.75	13.25	7.25	0	0	0	24.25
SW	0.5	5.75	11.75	1.75	0	0	0	19.75
WSW	0	6.5	12.25	1.5	0	0	0	20.25
W	0	4.5	18.5	2.25	0	0	0	25.25
WNW	0	2.75	10	1.75	0	0	0	14.5
NW	0	1.25	1.5	0.75	0	0	0	3.5
NNW	0	1	2.75	3.25	0	0	0	7
TOTAL	0.75	37.5	86.5	28.5	1.5	0	0	154.75

Stability Class B

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0.5	1.25	0	0	0	0	1.75
NNE	0	0.75	2	0	0	0	0	2.75
NE	0	1.25	3	0	0	0	0	4.25
ENE	0	1.5	4.5	0	0	0	0	6
E	0	1.25	1.5	0.25	0	0	0	3
ESE	0	2.5	4	0	0	0	0	6.5
SE	0	0.25	0.25	0.25	0	0	0	0.75
SSE	0	0.25	1.75	0.25	0	0	0	2.25
S	0	0.75	16	17.75	2.5	0	0	37
SSW	0	4.75	20	4.75	0	0	0	29.5
SW	0	3.75	3.25	0.5	0	0	0	7.5
WSW	0	3	10.75	4.25	0.75	0	0	18.75
W	0	2.25	13.75	2.25	0	0	0	18.25
WNW	0	0.5	8	1.25	0	0	0	9.75
NW	0	0.25	2	1	0	0	0	3.25
NNW	0	0.25	1.25	1.75	0	0	0	3.25
TOTAL	0	23.75	93.25	34.25	3.25	0	0	154.5

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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	2.5	4.75	1	0	0	0	8.25
NNE	0	1.5	7.5	1.5	0	0	0	10.5
NE	0	2.25	4.5	0	0	0	0	6.75
ENE	0	2	4.25	0	0	0	0	6.25
E	0	2.25	8	0	0	0	0	10.25
ESE	0	2.5	5.75	0.25	0	0	0	8.5
SE	0	2.75	7.5	2	0	0	0	12.25
SSE	0	1.75	20	18.75	1.25	0	0	41.75
S	0	6.25	27.75	21.25	3.75	0	0	59
SSW	0	12.75	22.75	2.75	0	0	0	38.25
SW	0	4	0.75	0	0	0	0	4.75
WSW	0	4.75	6	0.25	0	0	0	11
W	0	3.25	9.5	0	0	0	0	12.75
WNW	0	1.75	14.25	0.75	0	0	0	16.75
NW	0	0.75	5.75	4.75	0	0.25	0	11.5
NNW	0	2	6.75	3	0	0	0	11.75
TOTAL	0	53	155.75	56.25	5	0.25	0	270.25

Stability Class D

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	3.5	0.5	0	0	0	5
NNE	0	0.75	3.25	5.5	6	0	0	15.5
NE	0	1	1.75	0	0	0	0	2.75
ENE	0	1	0.75	0	0	0	0	1.75
E	0	0.75	4	0	0	0	0	4.75
ESE	0	0.5	3.25	0.25	0	0	0	4
SE	0.5	1.5	11	0.25	0	0	0	13.25
SSE	0	2	19	21.75	6.25	0	0	49
S	0	4.5	14	9	1	0	0	28.5
SSW	0	5.5	4.5	1.25	0	0	0	11.25
SW	0	3	1.25	0	0	0	0	4.25
WSW	0	2.5	2	0	0	0	0	4.5
W	0	3	4.5	0	0	0	0	7.5
WNW	0	3	7	0	0	0	0	10
NW	0	1.75	3.5	1	0	0	0	6.25
NNW	0	1	3.25	1	0	0	0	5.25
TOTAL	0.5	32.75	86.5	40.5	13.25	0	0	173.5

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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	0.5	0	2.25	0	0	0	2.75
NNE	0	0.25	0.25	3.5	4	0	0	8
NE	0	0.5	2.25	0.5	0	0	0	3.25
ENE	0	0.5	0.5	0	0	0	0	1
E	0	0	1.5	0	0	0	0	1.5
ESE	0	0.5	1.75	0	0	0	0	2.25
SE	0	0.75	1.25	0	0	0	0	2
SSE	0	1	3.75	5	4.75	0	0	14.5
S	0	2	5.25	1.75	0.5	0	0	9.5
SSW	0	1.75	8.5	1.25	0	0	0	11.5
SW	0	0.5	0.5	0	0	0	0	1
WSW	0	2.25	1.5	1.0	0	0	0	3.75
W	0	1.5	2	1	0	0	0	4.5
WNW	0	1.5	5.25	0.25	0	0	0	7
NW	0	2	2	0.25	0	0	0	4.25
NNW	0	1.75	1.25	0.5	0	0	0	3.5
TOTAL	0	17.25	37.5	16.25	9.25	0	0	80.25

Stability Class F

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	3.25	7.5	23	0.5	0	0	34.25
NNE	0	5	26.75	30.5	21	3.75	0	87
NE	0	8.75	26	3.5	0	0	0	38.25
ENE	0	5	10	12.25	0	0	0	27.25
E	0	11.25	6.5	1	0	0	0	18.75
ESE	0.25	10.5	8.25	4.5	0	0	0	23.5
SE	0	7.25	14	8.75	0.75	0.5	0	31.25
SSE	0.5	6.25	27.25	31.5	11.5	0.25	0	77.25
S	0.75	11.25	51.25	48.25	6	0.25	0	117.75
SSW	0.25	16.75	39	6	0.25	0	0	62.25
SW	0.75	18.5	16	1.75	0	0	0	37
WSW	0.25	13.75	52.5	14.25	1.5	0	0	82.25
W	0.25	14.5	50.5	26.25	5	0	0	96.5
WNW	0.5	10.5	51.75	15.25	0.25	0	0	78.25
NW	0.25	6.25	20.5	8.25	0	0	0	35.25
NNW	0.75	4.5	14	15.25	0	0	0	34.5
TOTAL	4.5	153.25	421.75	250.25	46.75	4.75	0	881.25

APPENDIX A  
Kewaunee Power Station 2016 Meteorological Data:

Stability Class G

TABLE 1

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0.25	5.75	8.25	1.75	0	0	0	16
NNE	0.75	1.25	6.5	7.75	0	0	0	16.25
NE	0.25	2.25	2.75	0	0	0	0	5.25
ENE	0.75	2.75	1.5	0	0	0	0	5
E	1	0.75	0.25	0	0	0	0	2
ESE	0.25	2	0.25	0	0	0	0	2.5
SE	0.25	2.75	2	0	0	0	0	5
SSE	0.25	5.75	6.25	3	0	0.25	0.25	15.75
S	0.25	5.75	9	5	0.25	0	0	20.25
SSW	0.25	4.5	16.5	0.25	0	0	0	21.5
SW	0	12.75	5.5	0.25	0.25	0	0	18.75
WSW	0.25	11.25	14	0.5	0	0	0	26
W	0.25	8.25	46	2.5	0	0	0	57
WNW	0.5	9.5	21.5	4	0	0	0	35.5
NW	0.5	15.25	13.5	1.75	0.75	0	0	31.75
NNW	0	7.75	15.25	2	0.25	0	0	25.25
TOTAL	5.75	98.25	169	28.75	1.5	0.25	0.25	303.75

TABLE 2

Frequency

TABLE 3



APPENDIX A  
Kewaunee Power Station 2016 Meteorological Data

**Fourth Quarter 2016**

Stability Class A

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0.25	0	0	0	0.25
NNE	0	0	0	0	0	0	0	0
NE	0	0.25	0	0	0	0	0	0.25
ENE	0	0	0.25	0	0	0	0	0.25
E	0	0	1.5	0	0	0	0	1.5
ESE	0	0.5	0.75	0	1.25	0.5	0	3
SE	0	0	0	0	0.25	0.25	0	0.5
SSE	0	0	0	0	0.25	0	0	0.25
S	0	0	0	1.5	0.25	0	0	1.75
SSW	0	0.75	0.25	0.75	0.75	0	0	2.5
SW	0	0	0.25	3	4.5	0	0	7.75
WSW	0	0	2.25	7.25	5.5	0	0	15
W	0	0.5	4.25	15.75	2.25	0	0	22.75
WNW	0	0	3	6.5	2.75	0	0	12.25
NW	0	0	2.75	4.25	0	0	0	7
NNW	0	0	1.5	3	0	0	0	4.5
TOTAL	0	2	16.75	42.25	17.75	0.75	0	79.5

Stability Class B

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0.25	0	0	0	0.25
NNE	0	0	0	0.25	0	0	0	0.25
NE	0	0	0.25	0	0	0	0	0.25
ENE	0	0	0	0	0	0	0	0
E	0	0	0.25	0	0	0	0	0.25
ESE	0	0.25	0	0	1.5	0	0	1.75
SE	0	0.25	0	0	0	0	0	0.25
SSE	0	0	0	0	0.25	0	0	0.25
S	0	0	0	1.25	0.5	0	0	1.75
SSW	0	0	0	2.25	0	0	0	2.25
SW	0	0	0.75	1	0.75	0	0	2.5
WSW	0	0	2	2	0.75	0	0	4.75
W	0	0.25	3.75	3	1.5	0	0	8.5
WNW	0	0	0.5	1	0.25	0	0	1.75
NW	0	0	0	2	0.25	0	0	2.25
NNW	0	0	1	1	1	0	0	3
TOTAL	0	0.75	8.5	14	6.75	0	0	30

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Kewaunee Power Station 2016 Meteorological Data

Stability Class C

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0.5	0.25	0	0	0.75
NNE	0	0	0.25	0.25	0	0	0	0.5
NE	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0
E	0	0.5	0.25	0	0	0	0	0.75
ESE	0	0	0.25	0	0.75	0	0	1
SE	0	0	0.25	0	0.25	0	0	0.5
SSE	0	0	0	0	0.75	0.25	0.25	1.25
S	0	0	0.25	1	1.75	0.5	0	3.5
SSW	0	0	0	0.5	0.25	0	0	0.75
SW	0	0	1.25	0.5	0.25	0	0	2
WSW	0	0	2.75	0.75	0.5	0	0	4
W	0	0.5	3.5	3.5	0.75	0	0	8.25
WNW	0	0	1.5	1.5	1	0	0	4
NW	0	0	0.25	1	0	0	0	1.25
NNW	0	0	1.75	1.5	0.5	0	0	3.75
TOTAL	0	1	12.25	11	7	0.75	0.25	32.25

Stability Class D

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	3	4	0.75	0	0	7.75
NNE	0	0	2.75	5	1.25	0	0	9
NE	0	0.25	2	0	0	0	0	2.25
ENE	0	0.25	1	0	0	0	0	1.25
E	0	0.25	1.25	5.5	0.75	0	0	7.75
ESE	0	0.75	0.75	6	5.75	1.75	0	15
SE	0	0	0.5	5	12	3.5	0.25	21.25
SSE	0	0	0.5	0.25	7.75	3.75	2.25	14.5
S	0	0	3.25	5.25	4	1	0	13.5
SSW	0	0.25	5	3.75	0.5	0	0	9.5
SW	0	0.75	9.75	4.5	0.5	0	0	15.5
WSW	0	2.75	8.25	5.5	3.75	0	0	20.25
W	0	1.25	10	10.75	8.25	0	0	30.25
WNW	0	1.25	4.5	14.5	10	0	0	30.25
NW	0	0.25	6.75	6.75	1	1.25	0.25	16.25
NNW	0	0.75	6.75	5.5	2.25	0	0	15.25
TOTAL	0	8.75	66	82.25	58.5	11.25	2.75	229.5

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**Kewaunee Power Station 2016 Meteorological Data**

Stability Class E

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0.25	1.25	13	7.25	1	0	0.25	23
NNE	0	0.5	5.75	4.5	2.25	0	0	13
NE	0.25	0.25	4.5	0	0	0	0	5
ENE	0	0.5	7.75	2.25	0.25	0	0	10.75
E	0	0.75	1	0.6	3.75	0	0	11.5
ESE	0	0	4.75	3.5	4.5	3	0.25	16
SE	0	0.25	1.25	5.75	0.75	8.25	0	20.5
SSE	0	0.75	4.75	7.25	9.25	13.25	1.5	36.75
S	0.75	0.75	12.5	21	19.5	13.5	0	58
SSW	0.25	0.6	23.5	17.5	2.5	0	0	49.75
SW	0.25	8.5	23	12	12.25	0.2	0	58
WSW	0.25	7.75	20.5	21.25	23	2.75	0	75.5
W	0.25	6.25	47.75	45.75	24.5	0	0	124.5
WNW	0	3.75	31.75	47.5	14	0	0	97
NW	0	2.75	13.5	16	10.5	2.25	0	45
NNW	0.25	3.75	18.75	19.75	11.25	0	0	53.75
TOTAL	2.5	43.75	234	237.25	143.5	17.35	2	698

Stability Class F

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1.75	22	12.25	0.5	0	0	36.5
NNE	0.25	0.5	12	22.75	4	0.25	0	39.75
NE	0	1	13	0	0	0	0	14
ENE	0	3	13.75	6.25	0.25	0	0	23.25
E	0	5.5	5	4	1.75	0	0	16.25
ESE	0	2.5	2.25	0.25	0	0.5	0.25	5.75
SE	0	2	5.25	7.5	2.5	1.75	0	19
SSE	0	3.5	12	21.5	10	1.25	0	48.25
S	0.25	5.75	31.25	50.25	16.5	1.5	0	105.5
SSW	0	12.25	63.75	35	0.75	0	0	111.75
SW	0	13.5	27.5	18.5	1.25	0.75	0	61.5
WSW	0.25	19.5	34	42.5	7.5	0	0	103.75
W	0.25	9	61.75	26	2.5	0	0	99.5
WNW	0.5	12.75	49.25	15.25	0	0	0	77.75
NW	0	8	34.25	13.75	1.5	0	0	57.5
NNW	0	8	50	28.25	1	0	0	87.25
TOTAL	1.5	108.5	437	304	50	6	0.25	907.25

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**Kewaunee Power Station 2016 Meteorological Data**

Stability Class G

Wind Direction	Wind Speed							TOTAL
	CALM	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1.25	4.4	8.0	10.0	0	0.25	5.5
NNE	0.25	0.25	0.5	0.0	0	0	0	1
NE	0	0	0	0	0	0	0	0
ENE	0	0	0.25	0	0	0	0	0.25
E	0.25	0.25	0	0	0	0	0	0.5
ESE	0	1	0.25	0	0	0	0	1.25
SE	0	0.25	1.25	0	0	0	0	1.5
SSE	0	1.0	6.5	7.4	0	0	0	13
S	0.25	5.25	2.75	0.75	0	0.25	0	9.25
SSW	0	13.5	12.75	1.25	0	0	0	27.5
SW	0.25	9.75	20.25	1.75	0	0	0	32
WSW	0	8.25	27.5	11.25	0	0	0	47
W	0.5	3.75	18.75	5.75	0	0	0	28.75
WNW	0	6.5	14.75	0.25	0	0	0	21.5
NW	0	0.5	17	3.75	0	0	0	25.75
NNW	0.25	3.25	0.0	0.5	0	0	0	7
<b>TOTAL</b>	<b>1.75</b>	<b>60.75</b>	<b>129.5</b>	<b>29.25</b>	<b>0</b>	<b>0.25</b>	<b>0.25</b>	<b>221.75</b>

Direction

Direction	0	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1.25	4.4	8.0	10.0	0	0.25	5.5
NNE	0.25	0.25	0.5	0.0	0	0	0	1
NE	0	0	0	0	0	0	0	0
ENE	0	0	0.25	0	0	0	0	0.25
E	0.25	0.25	0	0	0	0	0	0.5
ESE	0	1	0.25	0	0	0	0	1.25
SE	0	0.25	1.25	0	0	0	0	1.5
SSE	0	1.0	6.5	7.4	0	0	0	13
S	0.25	5.25	2.75	0.75	0	0.25	0	9.25
SSW	0	13.5	12.75	1.25	0	0	0	27.5
SW	0.25	9.75	20.25	1.75	0	0	0	32
WSW	0	8.25	27.5	11.25	0	0	0	47
W	0.5	3.75	18.75	5.75	0	0	0	28.75
WNW	0	6.5	14.75	0.25	0	0	0	21.5
NW	0	0.5	17	3.75	0	0	0	25.75
NNW	0.25	3.25	0.0	0.5	0	0	0	7
<b>TOTAL</b>	<b>1.75</b>	<b>60.75</b>	<b>129.5</b>	<b>29.25</b>	<b>0</b>	<b>0.25</b>	<b>0.25</b>	<b>221.75</b>

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