

**ATTACHMENT 1 (continued)**

**ARERR, Appendix A**

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**ANNUAL REPORT ON THE METEOROLOGICAL MONITORING  
PROGRAM AT THE GINNA NUCLEAR POWER PLANT**

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Annual Report  
On the  
Meteorological Monitoring Program  
At the  
**Ginna Nuclear Power Plant**

**2018**

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Reviewed By: *[Signature]*

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1. Introduction

The purpose of the meteorological program being conducted at the Ginna Plant site is to provide information sufficient to assess the local weather conditions and to determine the degree of atmospheric dispersion of airborne radioactive effluent from the station.

The meteorological tower is 300 ft. high and is instrumented at three levels. Wind speed and direction, and ambient temperature are measured at 33 ft., 150 ft., and 250 ft. Differential temperatures, referenced to 33 ft., are measured at 150 ft. and 250 ft. Precipitation is measured at ground level.

Joint frequency stability wind rose tables of wind direction, wind speed, and stability are routinely tabulated from hourly measurements. The annual tables are included in this report.

Descriptions of the instruments and data computers are given in Section 3 (Data Acquisition) of this report. Data reduction and processing are described in Section 4 (Data Analysis). The results given in Section 5 of this report include X/Q and D/Q data results and site meteorology.

## 2. Summary

The Ginna Plant meteorological monitoring program produced 96,160 hours of valid data out of a possible 96,360 priority parameter hours during 2016, which represents an overall data recovery rate of 99.8%. Priority parameters are all parameters except precipitation.

The stability wind rose tables included in this report have been generated using the 33 ft. wind data with the 150-33 ft. differential temperature data, the 150 ft. wind data with the 150-33 ft differential temperature data and the 250 ft. wind data with the 250-33 ft. differential temperature data.

### 3. Data Acquisition

Wind speed and direction are measured with Climatronics F460 wind sensors. The wind speed sensors have a starting speed of 0.5 mph (0.22 mps), a range of 0 to 100 mph (0 to 44.7 mps), and a system accuracy of  $\pm 1.0$  mph at 100 mph ( $\pm 0.45$  mps at 44.7 mps). The wind direction sensors have a threshold speed of 0.5 mph (0.22 mps), a range of 0 to 540°, and a system accuracy of  $\pm 5^\circ$ .

Ambient and differential temperature are measured with the Climatronics 100093 system. Ambient temperature is measured within the range of -20 to 120°F (-28.9 to 48.9°C) with an accuracy of  $\pm 0.5^\circ\text{F}$  ( $\pm 0.3^\circ\text{C}$ ). Differential temperature is measured within the range of -10 to 20°F (-5.6 to 11.1°C) with an accuracy of  $\pm 0.18^\circ\text{F}$  ( $\pm 0.10^\circ\text{C}$ ). Precipitation is measured with a Climatronics tipping bucket rain gauge and is measured in increments of one one-hundredth of an inch with a system accuracy of  $\pm 0.01''$  ( $\pm 0.25\text{mm}$ ).

The meteorological data are collected and stored by Campbell Scientific CR3000 and CR850 data loggers. The data loggers measure the analog voltages of the instruments and record the digital equivalent within the range of 0 to +5 volts. Data are obtained from the Campbell Scientific CR850 by a direct dial telephone hookup to an in-house computer system.

Table 1

Instrument Locations

<u>Measurement</u>	<u>Sensor Type</u>	<u>Location</u>	<u>Elevation</u>
Wind Speed	Climatronics 100075 F460	Tower	250 ft.
Wind Direction	Climatronics 100076 F460	Tower	250 ft.
Differential Temperature	Climatronics 100093	Tower	250 ft.
Wind Speed	Climatronics 100075 F460	Tower	150 ft.
Wind Direction	Climatronics 100076 F460	Tower	150 ft.
Differential Temperature	Climatronics 100093	Tower	150 ft.
Wind Speed	Climatronics 100075 F460	Tower	33 ft.
Wind Direction	Climatronics 100076 F460	Tower	33 ft.
Ambient Temperature	Climatronics 100093	Tower	33 ft.
Precipitation	Climatronics 100097-1 Tipping Bucket Rain Gage	Meteorological shelter roof	Ground

Table 2

Data Loggers

<u>Measurement</u>	<u>Logger Type</u>	<u>Sampling Frequency</u>
Winds, Temperatures, and Precipitation	Campbell Scientific CR3000 (A & B) and CR850	1 sec.
Winds, Temperatures, and Precipitation	Johnson Yokogawa Corp. Digital Recorder	10 sec.

#### 4. Data Analysis

The meteorological data are collected via modem connection to a Campbell Scientific CR850 data logger. Data are sampled once per second. The data are then stored in the meteorological data base and hourly listings of the data are generated. The data listings are examined by qualified personnel and any apparent problems are brought to the attention of the Project Manager or Environmental Meteorologist and the Instrument Maintenance staff.

Hourly values of wind speed, wind direction, ambient temperature, differential temperature, and precipitation are obtained through measurements taken at the site. The standard deviation of wind direction ( $\sigma$ ) is derived. The wind direction variation is described in terms of the standard deviation of the direction about the mean direction. The MIDAS computer derives an hourly value of wind  $\sigma$ .

The data base files are edited approximately once a week. Missing values are replaced with back up data values, when available. Invalid data are deleted from the data base.

When an hourly value is missing or invalid, the numeral 999 is entered into the computer data file in the appropriate location.

A professional meteorologist reviews the data, calibration findings, equipment maintenance reports, and other information and determines which data are valid. Only the valid data are retained in the data base.

Joint frequency stability wind rose tables of hourly data measured at the site are generated. These tables indicate the prevailing wind direction, wind speed, and stability classes measured during the period of observation as well as the joint frequencies of occurrence of the wind direction, wind speed, and stability classes. The values are also used as input to the atmospheric transport and diffusion models. Wind direction, wind speed, and stability classes are given in Tables 3, 4, and 5.



Table 3

Wind Direction Classes

IF	348.75°	<	WD	≤	11.25°	THEN	Class is	N
IF	11.25°	<	WD	≤	33.75°	THEN	Class is	NNE
IF	33.75°	<	WD	≤	56.25°	THEN	Class is	NE
IF	56.25°	<	WD	≤	78.75°	THEN	Class is	ENE
IF	78.75°	<	WD	≤	101.25°	THEN	Class is	E
IF	101.25°	<	WD	≤	123.75°	THEN	Class is	ESE
IF	123.75°	<	WD	≤	146.25°	THEN	Class is	SE
IF	146.25°	<	WD	≤	168.75°	THEN	Class is	SSE
IF	168.75°	<	WD	≤	191.25°	THEN	Class is	S
IF	191.25°	<	WD	≤	213.75°	THEN	Class is	SSW
IF	213.75°	<	WD	≤	236.25°	THEN	Class is	SW
IF	236.25°	<	WD	≤	258.75°	THEN	Class is	WSW
IF	258.75°	<	WD	≤	281.25°	THEN	Class is	W
IF	281.25°	<	WD	≤	303.75°	THEN	Class is	WNW
IF	303.75°	<	WD	≤	326.25°	THEN	Class is	NW
IF	326.25°	<	WD	≤	348.75°	THEN	Class is	NNW

Table 4

Wind Speed Classes

IF		<	WS	≤	0.50 m/s	THEN	Class is	1
IF	0.50 m/s	<	WS	≤	1.0 m/s	THEN	Class is	2
IF	1.1 m/s	<	WS	≤	1.5 m/s	THEN	Class is	3
IF	1.6 m/s	<	WS	≤	2.0 m/s	THEN	Class is	4
IF	2.1 m/s	<	WS	≤	3.0 m/s	THEN	Class is	5
IF	3.1 m/s	<	WS	≤	4.0 m/s	THEN	Class is	6
IF	4.1 m/s	<	WS	≤	5.0 m/s	THEN	Class is	7
IF	5.1 m/s	<	WS	≤	6.0 m/s	THEN	Class is	8
IF	6.1 m/s	<	WS	≤	8.0 m/s	THEN	Class is	9
IF	8.1 m/s	<	WS	≤	10.0 m/s	THEN	Class is	10
IF	10.0 m/s	<	WS			THEN	Class is	11

Table 5

Atmospheric Stability Classes

Class	Differential Temperature Interval (in °C/100m) <sup>(1)</sup>	Differential Temperature Interval (in °F over the 150-33ft. range) <sup>(2)</sup>	Differential Temperature Interval (in °F over the 250-33ft. range) <sup>(2)</sup>
Extremely Unstable	$\Delta T \leq -1.9$	$\Delta T \leq -1.2$	$\Delta T \leq -2.3$
Moderately Unstable	$-1.9 < \Delta T \leq -1.7$	$-1.2 < \Delta T \leq -1.1$	$-2.3 < \Delta T \leq -2.1$
Slightly Unstable	$-1.7 < \Delta T \leq -1.5$	$-1.1 < \Delta T \leq -1.0$	$-2.1 < \Delta T \leq -1.8$
Neutral	$-1.5 < \Delta T \leq -0.5$	$-1.0 < \Delta T \leq -0.3$	$-1.8 < \Delta T \leq -0.6$
Slightly Stable	$-0.5 < \Delta T \leq 1.5$	$-0.3 < \Delta T \leq 1.0$	$-0.6 < \Delta T \leq 1.8$
Moderately Stable	$1.5 < \Delta T \leq 4.0$	$1.0 < \Delta T \leq 2.6$	$1.8 < \Delta T \leq 4.8$
Extremely Stable	$4.0 < \Delta T$	$2.6 < \Delta T$	$4.8 < \Delta T$

<sup>(1)</sup> from ANSI/ANS 2.5<sup>(2)</sup> ANSI/ANS 2.5 intervals scaled for instrument heights on the Ginna meteorological tower

## 5. Results

### 5.1 X/Q and D/Q

The ground and mixed mode values for X/Q and D/Q can be found in tables 4-9.

The following program was used to calculate X/Q and D/Q values:

1. XOQDOQ: Computer Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations (NUREG/CR-2919).

The program is based on the theory that material released to the atmosphere will be normally distributed (Gaussian) about the plume centerline. A straight-line trajectory is assumed between the point of release and all receptors.

The program implements the assumptions outlined in Section C of NRC Regulatory Guide 1.111. In evaluating routine releases from nuclear power plants, it primarily is designed to calculate annual relative effluent concentrations, X/Q values and annual average relative deposition, D/Q values.

DIRECTION	804m	1609m	2416m	3218m	4022m	4827m	5632m	6436m	7240m	8045m
D/Q										
N	3.33E-09	1.59E-09	9.32E-10	6.08E-10	4.30E-10	3.22E-10	2.51E-10	2.01E-10	1.65E-10	1.38E-10
NNE	1.73E-09	8.13E-10	4.79E-10	3.16E-10	2.25E-10	1.69E-10	1.33E-10	1.07E-10	8.78E-11	7.36E-11
NE	2.67E-09	1.22E-09	7.10E-10	4.62E-10	3.27E-10	2.45E-10	1.91E-10	1.53E-10	1.26E-10	1.05E-10
ENE	4.10E-09	2.06E-09	1.23E-09	8.01E-10	5.65E-10	4.22E-10	3.29E-10	2.64E-10	2.17E-10	1.81E-10
E	4.01E-09	2.14E-09	1.29E-09	8.46E-10	5.97E-10	4.46E-10	3.49E-10	2.79E-10	2.31E-10	1.92E-10
ESE	8.37E-09	4.34E-09	2.04E-09	1.31E-09	9.25E-10	6.80E-10	5.18E-10	4.25E-10	3.55E-10	3.07E-10
SE	9.07E-09	3.05E-09	1.56E-09	9.63E-10	6.56E-10	4.81E-10	4.21E-10	3.36E-10	3.03E-10	2.68E-10
SSE	3.68E-09	1.18E-09	6.42E-10	4.02E-10	2.92E-10	2.15E-10	1.95E-10	2.07E-10	1.60E-10	1.35E-10
S	2.36E-09	8.90E-10	4.62E-10	2.93E-10	2.18E-10	1.83E-10	1.56E-10	1.43E-10	1.23E-10	1.02E-10
SSW	1.32E-09	5.75E-10	3.33E-10	2.13E-10	1.49E-10	1.10E-10	8.94E-11	8.79E-11	8.42E-11	7.56E-11
SW	4.44E-09	1.68E-09	8.69E-10	5.59E-10	3.83E-10	3.02E-10	2.47E-10	1.98E-10	1.76E-10	1.61E-10
WSW	4.19E-09	1.63E-09	8.63E-10	5.59E-10	3.83E-10	2.89E-10	2.26E-10	1.85E-10	1.62E-10	1.42E-10
W	2.11E-09	9.66E-10	5.40E-10	3.54E-10	2.51E-10	1.89E-10	1.48E-10	1.19E-10	9.78E-11	8.21E-11
WNW	6.02E-10	3.97E-10	2.55E-10	1.73E-10	1.25E-10	9.50E-11	7.48E-11	6.04E-11	4.98E-11	4.17E-11
NW	1.12E-09	6.46E-10	4.05E-10	2.74E-10	1.98E-10	1.50E-10	1.18E-10	9.55E-11	7.87E-11	6.60E-11
NNW	3.34E-09	1.70E-09	1.02E-09	6.69E-10	4.74E-10	3.55E-10	2.77E-10	2.23E-10	1.83E-10	1.53E-10

DIRECTION	804m	1609m	2416m	3218m	4022m	4827m	5632m	6436m	7240m	8045m
X/Q										
N	1.46E-07	1.38E-07	1.18E-07	9.67E-08	8.02E-08	6.76E-08	5.81E-08	5.06E-08	4.47E-08	3.99E-08
NNE	7.04E-08	7.30E-08	6.72E-08	5.75E-08	4.89E-08	4.21E-08	3.67E-08	3.23E-08	2.88E-08	2.60E-08
NE	1.06E-07	1.06E-07	9.65E-08	8.19E-08	6.94E-08	5.95E-08	5.17E-08	4.55E-08	4.05E-08	3.63E-08
ENE	1.42E-07	1.32E-07	1.09E-07	8.76E-08	7.18E-08	6.01E-08	5.12E-08	4.44E-08	3.90E-08	3.47E-08
E	1.46E-07	1.27E-07	1.00E-07	7.91E-08	6.42E-08	5.34E-08	4.75E-08	4.10E-08	3.74E-08	3.18E-08
ESE	1.86E-07	1.97E-07	1.03E-07	8.25E-08	7.83E-08	6.71E-08	5.06E-08	4.91E-08	4.40E-08	3.94E-08
SE	1.54E-07	9.26E-08	7.23E-08	5.62E-08	4.61E-08	4.31E-08	3.77E-08	3.35E-08	3.14E-08	2.84E-08
SSE	1.15E-07	7.04E-08	5.73E-08	5.18E-08	4.31E-08	3.57E-08	3.11E-08	2.97E-08	2.39E-08	2.10E-08
S	6.41E-08	7.44E-08	4.83E-08	4.44E-08	3.75E-08	3.61E-08	3.16E-08	2.79E-08	2.41E-08	2.08E-08
SSW	3.97E-08	3.53E-08	4.12E-08	3.76E-08	3.04E-08	2.59E-08	2.29E-08	2.15E-08	1.94E-08	1.73E-08
SW	7.08E-08	5.50E-08	4.59E-08	4.40E-08	3.49E-08	3.30E-08	3.08E-08	2.65E-08	2.35E-08	2.20E-08
WSW	8.07E-08	7.40E-08	5.70E-08	5.90E-08	4.48E-08	4.06E-08	3.41E-08	3.05E-08	2.88E-08	2.58E-08
W	7.18E-08	8.28E-08	6.37E-08	5.59E-08	4.87E-08	4.27E-08	3.79E-08	3.39E-08	3.06E-08	2.79E-08
WNW	2.08E-08	3.60E-08	3.55E-08	3.16E-08	2.76E-08	2.43E-08	2.16E-08	1.93E-08	1.75E-08	1.59E-08
NW	3.33E-08	4.83E-08	4.57E-08	3.93E-08	3.34E-08	2.87E-08	2.50E-08	2.20E-08	1.96E-08	1.76E-08
NNW	1.19E-07	1.12E-07	9.20E-08	7.38E-08	6.02E-08	5.01E-08	4.26E-08	3.68E-08	3.23E-08	2.87E-08

DIRECTION	804m	1609m	2416m	3218m	4022m	4827m	5632m	6436m	7240m	8045m
D/Q										
N	1.80E-08	5.75E-09	2.88E-09	1.75E-09	1.19E-09	8.63E-10	6.57E-10	5.19E-10	4.21E-10	3.50E-10
NNE	1.02E-08	3.26E-09	1.64E-09	1.00E-09	6.79E-10	4.93E-10	3.76E-10	2.97E-10	2.41E-10	2.00E-10
NE	1.51E-08	4.81E-09	2.41E-09	1.47E-09	9.94E-10	7.21E-10	5.50E-10	4.34E-10	3.53E-10	2.93E-10
ENE	1.68E-08	5.33E-09	2.67E-09	1.62E-09	1.10E-09	7.96E-10	6.07E-10	4.79E-10	3.89E-10	3.23E-10
E	1.56E-08	4.94E-09	2.47E-09	1.50E-09	1.02E-09	7.38E-10	5.65E-10	4.47E-10	3.66E-10	3.04E-10
ESE	2.03E-08	6.46E-09	3.22E-09	1.95E-09	1.32E-09	9.59E-10	7.31E-10	5.78E-10	4.79E-10	4.07E-10
SE	1.31E-08	4.10E-09	2.05E-09	1.24E-09	8.40E-10	6.44E-10	5.08E-10	4.03E-10	3.26E-10	2.70E-10
SSE	5.96E-09	1.87E-09	9.32E-10	5.79E-10	4.44E-10	3.24E-10	2.46E-10	1.94E-10	1.57E-10	1.30E-10
S	4.08E-09	1.29E-09	6.41E-10	3.97E-10	3.30E-10	2.40E-10	1.83E-10	1.44E-10	1.16E-10	9.63E-11
SSW	2.71E-09	9.27E-10	4.61E-10	3.24E-10	2.44E-10	1.81E-10	1.38E-10	1.09E-10	8.79E-11	7.27E-11
SW	7.41E-09	2.44E-09	1.22E-09	7.39E-10	5.00E-10	4.09E-10	3.15E-10	2.48E-10	2.01E-10	1.66E-10
WSW	9.16E-09	2.94E-09	1.47E-09	8.89E-10	6.02E-10	4.38E-10	3.36E-10	2.67E-10	2.19E-10	1.84E-10
W	9.03E-09	2.87E-09	1.42E-09	8.63E-10	5.86E-10	4.26E-10	3.26E-10	2.59E-10	2.11E-10	1.76E-10
WNW	3.91E-09	1.28E-09	6.53E-10	4.00E-10	2.72E-10	1.98E-10	1.51E-10	1.20E-10	9.80E-11	8.18E-11
NW	5.11E-09	1.70E-09	8.69E-10	5.33E-10	3.62E-10	2.64E-10	2.02E-10	1.60E-10	1.30E-10	1.08E-10
NNW	1.32E-08	4.23E-09	2.12E-09	1.29E-09	8.75E-10	6.35E-10	4.84E-10	3.82E-10	3.10E-10	2.57E-10

DIRECTION	804m	1609m	2416m	3218m	4022m	4827m	5632m	6436m	7240m	8045m
X/Q										
N	1.63E-06	6.06E-07	3.48E-07	2.35E-07	1.73E-07	1.35E-07	1.10E-07	9.18E-08	7.84E-08	6.81E-08
NNE	1.07E-06	4.01E-07	2.34E-07	1.60E-07	1.19E-07	9.38E-08	7.68E-08	6.46E-08	5.54E-08	4.84E-08
NE	1.51E-06	5.64E-07	3.26E-07	2.21E-07	1.64E-07	1.29E-07	1.05E-07	8.76E-08	7.50E-08	6.52E-08
ENE	1.34E-06	4.96E-07	2.83E-07	1.91E-07	1.41E-07	1.10E-07	8.89E-08	7.42E-08	6.33E-08	5.50E-08
E	1.16E-06	4.27E-07	2.45E-07	1.65E-07	1.22E-07	9.49E-08	7.83E-08	6.53E-08	5.67E-08	4.83E-08
ESE	9.91E-07	4.00E-07	2.10E-07	1.44E-07	1.14E-07	9.14E-08	7.09E-08	6.24E-08	5.38E-08	4.69E-08
SE	5.01E-07	1.96E-07	1.26E-07	9.07E-08	7.06E-08	6.09E-08	5.06E-08	4.28E-08	3.72E-08	3.22E-08
SSE	4.23E-07	1.63E-07	1.01E-07	7.61E-08	5.75E-08	4.48E-08	3.64E-08	3.01E-08	2.54E-08	2.18E-08
S	3.05E-07	1.60E-07	8.90E-08	7.00E-08	5.36E-08	4.39E-08	3.52E-08	2.90E-08	2.44E-08	2.10E-08
SSW	2.03E-07	9.80E-08	7.73E-08	5.94E-08	4.42E-08	3.50E-08	2.87E-08	2.40E-08	2.03E-08	1.75E-08
SW	3.06E-07	1.50E-07	9.71E-08	7.74E-08	5.70E-08	4.79E-08	4.01E-08	3.33E-08	2.83E-08	2.46E-08
WSW	6.16E-07	2.62E-07	1.55E-07	1.22E-07	8.84E-08	7.31E-08	5.93E-08	5.06E-08	4.51E-08	3.93E-08
W	1.10E-06	4.34E-07	2.53E-07	1.78E-07	1.36E-07	1.09E-07	9.03E-08	7.68E-08	6.66E-08	5.87E-08
WNW	5.42E-07	2.17E-07	1.34E-07	9.50E-08	7.28E-08	5.86E-08	4.88E-08	4.16E-08	3.61E-08	3.19E-08
NW	6.31E-07	2.51E-07	1.51E-07	1.05E-07	7.91E-08	6.28E-08	5.16E-08	4.36E-08	3.76E-08	3.29E-08
NNW	1.11E-06	4.13E-07	2.37E-07	1.60E-07	1.18E-07	9.21E-08	7.47E-08	6.24E-08	5.33E-08	4.63E-08

Table 10

## D/Q AIR EJECTOR 2018

DIRECTION	804m	1609m	2416m	3218m	4022m	4827m	5632m	6436m	7240m	8045m
D/Q										
N	2.01E-08	6.33E-09	3.16E-09	1.92E-09	1.30E-09	9.38E-10	7.14E-10	5.62E-10	4.55E-10	3.76E-10
NNE	1.20E-08	3.77E-09	1.88E-09	1.14E-09	7.71E-10	5.59E-10	4.25E-10	3.35E-10	2.71E-10	2.24E-10
NE	1.72E-08	5.41E-09	2.70E-09	1.64E-09	1.11E-09	8.01E-10	6.09E-10	4.80E-10	3.89E-10	3.22E-10
ENE	1.86E-08	5.88E-09	2.93E-09	1.78E-09	1.20E-09	8.70E-10	6.62E-10	5.21E-10	4.22E-10	3.49E-10
E	1.72E-08	5.42E-09	2.70E-09	1.64E-09	1.11E-09	8.04E-10	6.11E-10	4.81E-10	3.90E-10	3.22E-10
ESE	2.17E-08	6.84E-09	3.41E-09	2.07E-09	1.40E-09	1.01E-09	7.70E-10	6.07E-10	4.91E-10	4.06E-10
SE	1.41E-08	4.44E-09	2.22E-09	1.34E-09	9.08E-10	6.58E-10	5.01E-10	3.94E-10	3.19E-10	2.64E-10
SSE	6.73E-09	2.12E-09	1.06E-09	6.42E-10	4.34E-10	3.15E-10	2.39E-10	1.88E-10	1.53E-10	1.26E-10
S	4.92E-09	1.55E-09	7.74E-10	4.69E-10	3.17E-10	2.30E-10	1.75E-10	1.38E-10	1.12E-10	9.22E-11
SSW	3.67E-09	1.16E-09	5.77E-10	3.50E-10	2.37E-10	1.71E-10	1.30E-10	1.03E-10	8.31E-11	6.87E-11
SW	8.59E-09	2.71E-09	1.35E-09	8.19E-10	5.54E-10	4.01E-10	3.05E-10	2.40E-10	1.95E-10	1.61E-10
WSW	1.09E-08	3.43E-09	1.71E-09	1.04E-09	7.01E-10	5.08E-10	3.86E-10	3.04E-10	2.46E-10	2.04E-10
W	1.20E-08	3.77E-09	1.88E-09	1.14E-09	7.71E-10	5.59E-10	4.25E-10	3.35E-10	2.71E-10	2.24E-10
WNW	5.86E-09	1.85E-09	9.21E-10	5.59E-10	3.78E-10	2.74E-10	2.08E-10	1.64E-10	1.33E-10	1.10E-10
NW	7.23E-09	2.28E-09	1.14E-09	6.89E-10	4.66E-10	3.38E-10	2.57E-10	2.02E-10	1.64E-10	1.35E-10
NNW	1.51E-08	4.77E-09	2.38E-09	1.44E-09	9.75E-10	7.06E-10	5.37E-10	4.23E-10	3.43E-10	2.83E-10



DIRECTION	804m	1609m	2416m	3218m	4022m	4827m	5632m	6436m	7240m	8045m
X/Q										
N	2.45E-06	8.41E-07	4.61E-07	3.03E-07	2.20E-07	1.69E-07	1.36E-07	1.13E-07	9.54E-08	8.24E-08
NNE	1.77E-06	6.16E-07	3.42E-07	2.26E-07	1.65E-07	1.28E-07	1.03E-07	8.55E-08	7.26E-08	6.29E-08
NE	2.23E-06	7.73E-07	4.26E-07	2.80E-07	2.04E-07	1.57E-07	1.26E-07	1.05E-07	8.89E-08	7.68E-08
ENE	2.04E-06	6.99E-07	3.81E-07	2.49E-07	1.80E-07	1.38E-07	1.11E-07	9.15E-08	7.74E-08	6.67E-08
E	1.79E-06	6.13E-07	3.34E-07	2.18E-07	1.57E-07	1.21E-07	9.67E-08	7.99E-08	6.75E-08	5.82E-08
ESE	1.50E-06	5.05E-07	2.75E-07	1.79E-07	1.29E-07	9.93E-08	7.96E-08	6.57E-08	5.56E-08	4.79E-08
SE	9.66E-07	3.20E-07	1.75E-07	1.14E-07	8.28E-08	6.37E-08	5.11E-08	4.23E-08	3.58E-08	3.09E-08
SSE	6.92E-07	2.31E-07	1.25E-07	8.10E-08	5.82E-08	4.46E-08	3.56E-08	2.93E-08	2.48E-08	2.13E-08
S	6.36E-07	2.14E-07	1.16E-07	7.58E-08	5.47E-08	4.20E-08	3.36E-08	2.78E-08	2.35E-08	2.03E-08
SSW	5.32E-07	1.77E-07	9.63E-08	6.28E-08	4.53E-08	3.48E-08	2.79E-08	2.30E-08	1.95E-08	1.68E-08
SW	7.50E-07	2.48E-07	1.35E-07	8.81E-08	6.37E-08	4.89E-08	3.92E-08	3.25E-08	2.75E-08	2.37E-08
WSW	1.29E-06	4.38E-07	2.43E-07	1.61E-07	1.17E-07	9.08E-08	7.33E-08	6.10E-08	5.19E-08	4.49E-08
W	2.32E-06	8.11E-07	4.54E-07	3.03E-07	2.22E-07	1.72E-07	1.39E-07	1.16E-07	9.90E-08	8.58E-08
WNW	1.33E-06	4.64E-07	2.59E-07	1.72E-07	1.26E-07	9.77E-08	7.90E-08	6.57E-08	5.60E-08	4.85E-08
NW	1.32E-06	4.55E-07	2.52E-07	1.67E-07	1.21E-07	9.36E-08	7.54E-08	6.26E-08	5.32E-08	4.60E-08
NNW	1.76E-06	5.99E-07	3.28E-07	2.15E-07	1.55E-07	1.20E-07	9.59E-08	7.93E-08	6.72E-08	5.79E-08

Direction	Distance to Nearset Residence (m)	Air Ejector		Containment Vent		Plant Vent	
		X/Q (sec/m <sup>3</sup> )	D/Q (m <sup>-2</sup> )	X/Q (sec/m <sup>3</sup> )	D/Q (m <sup>-2</sup> )	X/Q (sec/m <sup>3</sup> )	D/Q (m <sup>-2</sup> )
E	1170	9.95E-07	9.31E-09	6.71E-07	8.46E-09	1.40E-07	2.95E-09
ESE	1660	4.82E-07	6.48E-09	3.81E-07	6.12E-09	1.88E-07	4.12E-09
SE	840	8.99E-07	1.31E-08	4.70E-07	1.22E-08	1.44E-07	8.52E-09
SSE	610	1.08E-06	1.05E-08	5.71E-07	9.21E-09	1.09E-07	4.87E-09
S	1500	2.37E-07	1.75E-09	1.69E-07	1.45E-09	7.43E-08	9.95E-10
SSW	620	8.14E-07	5.57E-09	2.91E-07	4.02E-09	4.64E-08	1.71E-09
SW	740	8.62E-07	9.83E-09	3.45E-07	8.46E-09	7.44E-08	4.93E-09
WSW	1470	5.00E-07	3.99E-09	2.87E-07	3.43E-09	7.14E-08	1.88E-09
W	2420	4.52E-07	1.87E-09	2.52E-07	1.41E-09	6.36E-08	5.38E-10

Direction	Distance to Nearest Milk Producing Animal (m)	Air Ejector		Containment Vent		Plant Vent	
		X/Q (sec/m <sup>3</sup> )	D/Q (m <sup>-2</sup> )	X/Q (sec/m <sup>3</sup> )	D/Q (m <sup>-2</sup> )	X/Q (sec/m <sup>3</sup> )	D/Q (m <sup>-2</sup> )
SE	8270	2.98E-08	2.51E-10	3.09E-08	2.57E-10	2.73E-08	2.56E-10

## 5.2 Instrument Maintenance

In March, at the Primary Tower, the 150' backup wind direction went out and was fixed on April 24<sup>th</sup>.

In April, at the Primary Tower, the 150' and 250' wind speed and direction froze for a day.

In May, a calibration of the Primary Tower and Backup Tower was performed. Also in May, at the Primary Tower, the 33' temperature was reading too low and was fixed on June 6<sup>th</sup>.

In November, a calibration of the Primary Tower and Backup Tower was performed.

No other problems were encountered with the equipment, and at the end of the year, no problems were evident at the site.

5.3 Data Recovery

The record of data recovery for the year is summarized in Table 12.

**Table 12**

Ginna Site  
Data Recovery Summary  
2018

<u>Measurement</u>	<u>Elevation</u>	<u>Recovered Hours</u>	<u>Recovered Percent</u>	<u>Lost Hours</u>	<u>Percent Changed</u>
Wind Speed	33 ft.	8752	99.9	8	0.1
Wind Speed	150 ft.	8752	99.9	8	0.3
Wind Speed	250 ft.	8650	98.7	110	1.3
Wind Direction	33 ft.	8752	99.9	8	0.2
Wind Direction	150 ft.	8752	99.9	8	0.1
Wind Direction	250 ft.	8752	99.8	18	2.6
Ambient Temperature	33 ft.	8752	99.9	8	2.0
Ambient Temperature	150 ft.	8752	99.9	8	0.1
Ambient Temperature	250 ft.	8752	99.9	8	0.1
Differential Temperature	150-33 ft.	8752	99.9	8	2.3
Differential Temperature	250-33 ft.	8752	99.9	8	3.1
Precipitation	10 ft.	8752	99.8	8	0.2
<b>AVERAGE*</b>			99.8		

\* average of priority parameters (all except precipitation)

	<u>Valid Hours</u>	<u>Recovered Percent</u>	<u>Lost Hours</u>
Lower Level Joint Frequency %	8752	99.9	8
Middle Level Joint Frequency %	8752	99.9	8
Upper Level Joint Frequency %	8650	98.7	110

#### 5.4 Stability Wind Rose Data

The annual stability wind roses are given at the end of this report. Wind speed classes have been altered to reflect the sensor threshold.

For the year, winds measured at 33 ft. most frequently came from the south (10.93%) and most frequently fell into the 2.1-3.0 m/s wind speed class (21.35%). Calms (wind speeds at or below the sensor threshold) were measured 0.00% of the time and speeds greater than 10.0 m/s were measured (2.59%) of the time. Winds measured at 150 ft. most frequently came from the west northwest (11.07%) and most frequently fell into the 6.1-8.0 m/s wind speed class (19.98%). Calms were measured 0.00% of the time and speeds greater than 10.0 m/s were measured (11.25%) of the time. Winds measured at 250 ft. most frequently came from the west northwest (11.56%) and most frequently fell into the 6.1-8.1 m/s wind speed class (22.69%). Calms were measured 0.00% of the time and speeds greater than 10.0 m/s were measured (16.38%) of the time.

Stability based on the 150-33 ft. differential temperature most frequently fell into the neutral classification (36.88%) and stability based on the 250-33 ft. differential temperature most frequently fell into the neutral classification (45.74%).

5.5 Precipitation

**Table 13**  
Precipitation Totals (Inches) - 2018  
Ginna Site

<u>Month</u>	<u>Total</u>
January	2.70
February	1.49
March	2.34
April	3.11
May	1.78
June	2.46
July	2.71
August	3.86
September	2.81
October	4.72
November	5.28
December	2.27
 TOTAL:	 35.53*

\*Indicates some precipitation missing.

2018

## Joint Frequency Tables

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

All Stabilities

Elevations:: Winds 33ft      Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	13	19	38	55	29	23	10	1	0	0	188
NNE	0	5	26	49	101	54	41	40	26	6	2	350
NE	0	9	34	46	53	49	44	61	78	39	44	457
ENE	1	11	57	75	165	89	70	48	62	26	32	636
E	1	8	40	54	166	110	45	16	9	7	2	458
ESE	0	11	24	18	69	36	12	0	0	0	0	170
SE	0	7	27	23	63	62	36	11	5	0	0	234
SSE	0	14	35	40	101	99	103	66	51	12	0	521
S	1	14	57	91	160	209	151	136	118	18	2	957
SSW	0	22	83	157	292	210	110	29	22	1	0	926
SW	0	23	58	118	222	168	103	61	16	2	2	773
WSW	0	10	25	42	125	154	159	121	173	45	19	873
W	0	10	30	27	90	126	177	174	150	21	8	813
WNW	0	11	25	50	111	99	92	128	219	100	106	941
NW	0	5	16	38	64	47	36	48	53	31	10	348
NNW	0	7	31	18	32	15	3	1	0	0	0	107
Tot	3	180	587	884	1869	1556	1205	950	983	308	227	8752

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 8752  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760



Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class A Extremely Unstable based on Lapse Rate

Elevations:: Winds 33ft Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	1	8	15	8	3	1	1	0	0	37
NNE	0	0	0	2	12	9	10	13	12	6	0	64
NE	0	0	0	0	5	21	23	31	56	26	35	197
ENE	0	0	0	0	12	26	23	24	27	21	23	156
E	0	0	0	0	2	1	3	6	3	2	1	18
ESE	0	0	0	0	0	4	1	0	0	0	0	5
SE	0	0	0	0	2	3	6	3	1	0	0	15
SSE	0	0	0	0	0	12	12	4	5	0	0	33
S	0	2	0	0	3	5	3	8	2	0	0	23
SSW	0	0	1	1	6	8	9	1	2	0	0	28
SW	0	0	0	1	4	16	10	5	0	0	0	36
WSW	0	0	0	0	1	4	10	6	5	0	0	26
W	0	0	0	0	2	3	13	8	1	0	0	27
WNW	0	0	1	9	31	38	42	40	68	23	12	264
NW	0	0	1	8	28	12	12	16	20	22	1	120
NNW	0	0	2	4	10	2	1	0	0	0	0	19
Tot	0	2	6	33	133	172	181	166	203	100	72	1068

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 1068  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class B Moderately Unstable based on Lapse Rate

Elevations:: Winds 33ft Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	0	3	5	2	7	7	0	0	0	24
NNE	0	0	0	3	16	11	4	5	3	0	0	42
NE	0	0	0	2	13	9	6	11	12	8	7	68
ENE	0	0	0	2	11	5	12	7	9	0	5	51
E	0	0	1	1	4	5	2	1	1	5	1	21
ESE	0	0	0	0	3	4	1	0	0	0	0	8
SE	0	0	0	0	0	4	8	1	0	0	0	13
SSE	0	0	1	0	3	7	5	5	3	0	0	24
S	0	0	1	3	5	11	7	5	1	0	0	33
SSW	0	0	1	0	5	8	6	1	1	0	0	22
SW	0	0	1	1	5	11	7	5	2	0	0	32
WSW	0	0	0	0	4	6	14	10	3	2	2	41
W	0	0	0	0	5	5	11	10	7	2	0	40
WNW	0	0	1	4	9	11	3	6	22	13	18	87
NW	0	0	2	5	3	4	3	4	7	6	5	39
NNW	0	0	3	2	1	3	1	0	0	0	0	10
Tot	0	0	11	26	92	106	97	78	71	36	38	555

Hours of Calm . . . . .	0
Hours of Variable Direction . . . . .	0
Hours of Valid Data . . . . .	555
Hours of Missing Data . . . . .	8
Hours in Period . . . . .	8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class C Slightly Unstable based on Lapse Rate

Elevations:: Winds 33ft Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	1	3	2	5	2	1	0	0	0	14
NNE	0	0	2	5	10	10	6	1	1	0	0	35
NE	0	0	0	3	2	1	1	4	4	2	1	18
ENE	0	0	1	2	9	6	4	3	5	0	0	30
E	0	0	0	1	3	3	2	2	1	0	0	12
ESE	0	0	0	1	2	2	0	0	0	0	0	5
SE	0	0	0	1	1	2	2	0	0	0	0	6
SSE	0	0	0	0	7	2	8	1	1	1	0	20
S	0	0	2	1	8	6	6	6	2	1	0	32
SSW	0	0	2	0	1	5	7	0	2	0	0	17
SW	0	0	0	2	3	2	8	2	0	0	0	17
WSW	0	0	0	1	3	3	4	9	8	2	4	34
W	0	0	0	0	3	3	6	4	6	0	0	22
WNW	0	1	1	2	9	2	2	5	12	6	14	54
NW	0	0	1	1	1	7	7	1	2	0	4	24
NNW	0	0	2	1	7	4	0	0	0	0	0	14
Tot	0	1	12	24	71	63	65	39	44	12	23	354

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 354  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class D Neutral based on Lapse Rate

Elevations:: Winds 33ft Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	2	11	12	29	12	10	1	0	0	0	77
NNE	0	0	7	15	48	18	17	18	8	0	2	133
NE	0	1	9	14	19	10	13	14	5	3	1	89
ENE	0	1	10	6	28	28	17	12	11	4	4	121
E	0	1	7	6	60	70	20	5	4	0	0	173
ESE	0	7	3	9	33	24	10	0	0	0	0	86
SE	0	0	13	8	38	42	16	5	1	0	0	123
SSE	0	4	9	17	50	50	59	38	33	11	0	271
S	0	1	10	22	40	61	58	36	68	9	2	307
SSW	0	4	12	20	37	57	27	9	7	1	0	174
SW	0	5	8	19	44	52	34	28	5	2	0	197
WSW	0	2	4	10	40	77	90	71	123	37	13	467
W	0	3	8	5	37	63	92	123	114	17	6	468
WNW	0	3	4	14	24	24	28	57	103	57	62	376
NW	0	3	2	10	26	23	12	24	24	3	0	127
NNW	0	3	9	8	11	6	1	1	0	0	0	39
Tot	0	40	126	195	564	617	504	442	506	144	90	3228

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 3228  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class E Slightly Stable based on Lapse Rate

Elevations:: Winds 33ft Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	9	5	8	4	1	1	0	0	0	0	28
NNE	0	4	9	14	13	6	3	2	2	0	0	53
NE	0	2	10	7	10	7	1	1	1	0	0	39
ENE	0	4	14	12	41	15	13	1	7	0	0	107
E	0	2	10	15	44	19	9	2	0	0	0	101
ESE	0	1	8	4	20	2	0	0	0	0	0	35
SE	0	2	6	6	17	8	1	2	2	0	0	44
SSE	0	3	17	10	16	24	15	13	9	0	0	107
S	0	3	24	27	45	101	71	81	45	8	0	405
SSW	0	5	20	28	93	95	56	17	9	0	0	323
SW	0	13	36	34	102	69	35	17	9	0	2	317
WSW	0	7	11	18	59	51	37	24	34	4	0	245
W	0	2	12	12	27	38	45	20	19	2	2	179
WNW	0	5	14	7	26	17	12	18	11	1	0	111
NW	0	1	8	7	2	0	2	3	0	0	0	23
NNW	0	3	11	2	3	0	0	0	0	0	0	19
Tot	0	66	215	211	522	453	301	201	148	15	4	2136

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 2136  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class F Moderately Stable based on Lapse Rate

Elevations:: Winds 33ft Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	1	0	2	0	0	0	0	0	0	0	3
NNE	0	0	6	5	2	0	1	1	0	0	0	15
NE	0	3	4	1	2	0	0	0	0	0	0	10
ENE	0	1	10	12	20	4	0	0	1	1	0	49
E	0	3	11	17	22	9	6	0	0	0	0	68
ESE	0	1	4	3	8	0	0	0	0	0	0	16
SE	0	3	7	5	4	2	2	0	1	0	0	24
SSE	0	1	2	10	13	4	2	4	0	0	0	36
S	0	3	4	17	29	15	5	0	0	0	0	73
SSW	0	3	12	33	68	22	4	1	1	0	0	144
SW	0	2	8	34	37	4	3	4	0	0	0	92
WSW	0	1	8	7	16	12	2	0	0	0	0	46
W	0	5	7	4	12	12	4	6	1	0	0	51
WNW	0	2	2	7	6	3	3	1	1	0	0	25
NW	0	1	0	5	2	0	0	0	0	0	0	8
NNW	0	0	3	0	0	0	0	0	0	0	0	3
Tot	0	30	88	162	241	87	32	17	5	1	0	663

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 663  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class G Extremely Stable based on Lapse Rate

Elevations:: Winds 33ft Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	1	1	2	0	1	0	0	0	0	0	5
NNE	0	1	2	5	0	0	0	0	0	0	0	8
NE	0	3	11	19	2	1	0	0	0	0	0	36
ENE	1	5	22	41	44	5	1	1	2	0	0	122
E	1	2	11	14	31	3	3	0	0	0	0	65
ESE	0	2	9	1	3	0	0	0	0	0	0	15
SE	0	2	1	3	1	1	1	0	0	0	0	9
SSE	0	6	6	3	12	0	2	1	0	0	0	30
S	1	5	16	21	30	10	1	0	0	0	0	84
SSW	0	10	35	75	82	15	1	0	0	0	0	218
SW	0	3	5	27	27	14	6	0	0	0	0	82
WSW	0	0	2	6	2	1	2	1	0	0	0	14
W	0	0	3	6	4	2	6	3	2	0	0	26
WNW	0	0	2	7	6	4	2	1	2	0	0	24
NW	0	0	2	2	2	1	0	0	0	0	0	7
NNW	0	1	1	1	0	0	0	0	0	0	0	3
Tot	3	41	129	233	246	58	25	7	6	0	0	748

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 748  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

All Stabilities

Elevations:: Winds 150ft      Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	16	18	34	26	11	14	26	38	37	220
NNE	0	3	8	16	39	31	22	8	18	13	6	164
NE	1	3	16	20	36	42	34	35	77	52	68	384
ENE	0	2	20	23	64	87	65	65	80	39	41	486
E	0	10	14	35	87	156	123	73	27	6	4	535
ESE	0	6	16	18	54	70	66	26	6	0	0	262
SE	0	1	15	22	72	78	77	40	16	2	0	323
SSE	0	3	9	16	73	80	92	127	181	69	26	676
S	0	7	18	25	50	98	122	159	275	114	30	898
SSW	0	6	10	12	66	69	113	132	112	13	2	535
SW	0	3	12	15	66	97	161	172	197	36	8	767
WSW	0	3	8	27	47	87	125	137	218	115	66	833
W	0	4	12	16	47	52	88	118	230	124	78	769
WNW	0	1	14	15	40	81	77	77	172	174	318	969
NW	0	7	10	21	56	48	31	29	63	96	269	630
NNW	0	4	5	15	46	30	27	31	51	60	32	301
Tot	1	63	203	314	877	1132	1234	1243	1749	951	985	8752

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 8752  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760



Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class A Extremely Unstable based on Lapse Rate

Elevations:: Winds 150ft Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	0	0	2	3	2	1	4	4	9	25
NNE	0	0	0	0	3	6	5	1	8	6	4	33
NE	0	0	0	0	3	13	11	16	47	34	53	177
ENE	0	0	0	0	5	19	20	25	45	27	32	173
E	0	0	0	0	5	7	13	6	1	0	0	32
ESE	0	0	0	0	0	1	1	0	0	0	0	2
SE	0	0	0	0	2	0	7	3	2	0	0	14
SSE	0	1	0	0	0	2	14	10	6	5	0	38
S	0	1	0	0	0	4	3	3	8	2	0	21
SSW	0	0	1	0	4	5	6	7	1	0	2	26
SW	0	0	0	1	1	7	4	11	7	2	0	33
WSW	0	0	0	1	0	2	4	5	13	4	1	30
W	0	0	0	0	1	2	2	2	9	2	0	18
WNW	0	0	0	0	5	14	16	24	46	35	55	195
NW	0	0	0	2	25	20	9	9	21	40	72	198
NNW	0	0	0	0	11	10	1	5	13	10	3	53
Tot	0	2	1	4	67	115	118	128	231	171	231	1068

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 1068  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class B Moderately Unstable based on Lapse Rate

Elevations:: Winds 150ft      Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5- 1.0	1.1- 1.5	1.6- 2.0	2.1- 3.0	3.1- 4.0	4.1- 5.0	5.1- 6.0	6.1- 8.0	8.1- 10.0	>10.00	
N	0	0	1	0	2	3	1	0	2	6	10	25
NNE	0	0	0	1	12	9	1	1	3	0	0	27
NE	0	0	0	1	12	3	7	3	18	8	10	62
ENE	0	0	0	0	9	4	7	8	9	1	3	41
E	0	0	0	0	6	9	10	7	1	0	2	35
ESE	0	0	0	0	2	1	3	0	0	0	0	6
SE	0	0	0	0	1	3	4	5	3	0	0	16
SSE	0	0	0	1	2	6	2	4	9	2	0	26
S	0	0	2	1	2	6	7	3	7	1	0	29
SSW	0	0	0	0	2	3	7	5	0	1	0	18
SW	0	0	0	1	2	4	9	8	10	1	1	36
WSW	0	0	0	0	1	4	3	8	12	4	3	35
W	0	0	0	0	4	1	3	7	12	3	2	32
WNW	0	0	0	0	2	7	6	6	10	15	33	79
NW	0	0	1	4	5	4	1	1	4	4	38	62
NNW	0	0	0	1	4	2	0	2	4	6	7	26
Tot	0	0	4	10	68	69	71	68	104	52	109	555

Hours of Calm . . . . .	0
Hours of Variable Direction . . . . .	0
Hours of Valid Data . . . . .	555
Hours of Missing Data . . . . .	8
Hours in Period . . . . .	8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class C Slightly Unstable based on Lapse Rate

Elevations:: Winds 150ft Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	0	4	5	1	0	3	4	4	1	22
NNE	0	0	1	1	3	1	4	3	2	1	0	16
NE	0	0	0	2	2	2	0	2	3	3	2	16
ENE	0	0	0	3	5	3	1	2	5	2	0	21
E	0	0	0	1	6	4	4	3	2	0	0	20
ESE	0	0	0	1	0	2	2	1	0	0	0	6
SE	0	0	0	0	1	3	1	1	1	0	0	7
SSE	0	0	0	0	2	9	0	7	3	0	1	22
S	0	0	0	2	3	8	2	0	11	2	1	29
SSW	0	0	0	0	2	3	3	4	3	1	0	16
SW	0	0	2	1	3	1	0	5	6	1	0	19
WSW	0	0	0	0	3	1	3	2	9	6	7	31
W	0	0	0	0	0	0	2	2	7	3	2	16
WNW	0	0	0	2	1	8	3	0	6	7	18	45
NW	0	0	0	4	1	2	0	0	3	7	26	43
NNW	0	0	1	0	5	0	3	2	10	3	1	25
Tot	0	0	4	21	42	48	28	37	75	40	59	354

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 354  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class D Neutral based on Lapse Rate

Elevations:: Winds 150ft Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	4	3	11	14	7	8	11	22	12	92
NNE	0	0	0	6	11	10	8	1	4	6	2	48
NE	0	1	8	7	8	16	11	10	8	5	3	77
ENE	0	0	6	7	19	20	14	13	11	8	6	104
E	0	1	2	4	18	36	33	27	18	4	0	143
ESE	0	2	2	5	18	24	36	14	3	0	0	104
SE	0	0	8	8	29	37	38	22	7	2	0	151
SSE	0	0	2	6	25	35	42	58	98	40	19	325
S	0	3	4	7	21	24	42	39	69	42	18	269
SSW	0	0	4	5	25	19	28	35	13	6	0	135
SW	0	0	2	3	21	19	36	38	51	13	3	186
WSW	0	1	2	5	15	22	52	62	111	67	48	385
W	0	1	5	2	9	11	37	61	150	103	65	444
WNW	0	0	2	6	9	15	24	25	59	82	180	402
NW	0	1	2	3	10	11	10	13	26	38	127	241
NNW	0	1	3	4	11	6	11	16	19	37	14	122
Tot	0	11	56	81	260	319	429	442	658	475	497	3228

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 3228  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class E Slightly Stable based on Lapse Rate

Elevations:: Winds 150ft Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	7	5	9	4	1	2	4	1	3	36
NNE	0	2	4	5	6	3	2	2	1	0	0	25
NE	1	0	4	4	6	5	5	2	1	2	0	30
ENE	0	2	4	5	12	19	10	8	8	1	0	69
E	0	4	4	11	17	32	27	19	3	0	0	117
ESE	0	1	3	4	8	15	12	7	2	0	0	52
SE	0	0	3	4	17	15	9	4	2	0	0	54
SSE	0	1	4	5	24	12	17	28	43	22	6	162
S	0	1	6	7	8	39	35	66	160	67	11	400
SSW	0	1	1	3	16	15	37	49	72	3	0	197
SW	0	2	2	6	20	31	60	75	90	18	4	308
WSW	0	0	2	10	15	29	40	43	63	33	7	242
W	0	1	3	7	14	23	23	33	40	10	9	163
WNW	0	0	5	3	18	18	16	13	43	28	23	167
NW	0	3	3	4	4	8	10	6	9	7	5	59
NNW	0	1	1	5	10	10	10	5	4	3	6	55
Tot	1	19	56	88	204	278	314	362	545	195	74	2136

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 2136  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class F Moderately Stable based on Lapse Rate

Elevations:: Winds 150ft Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	0	2	2	0	0	0	1	0	2	7
NNE	0	0	1	2	1	1	0	0	0	0	0	5
NE	0	1	1	3	3	0	0	0	0	0	0	8
ENE	0	0	2	3	2	10	7	1	0	0	0	25
E	0	1	3	11	9	31	16	9	0	1	1	82
ESE	0	1	8	2	10	12	5	3	0	0	0	41
SE	0	1	0	3	7	6	3	5	1	0	0	26
SSE	0	0	0	1	4	5	7	14	14	0	0	45
S	0	1	0	2	6	7	22	14	14	0	0	66
SSW	0	2	1	1	4	12	19	21	12	2	0	74
SW	0	1	2	2	7	20	34	25	11	1	0	103
WSW	0	1	2	5	5	19	11	14	6	1	0	64
W	0	1	2	4	10	8	11	12	4	1	0	53
WNW	0	0	3	1	3	9	9	5	4	5	4	43
NW	0	1	0	3	2	2	1	0	0	0	1	10
NNW	0	1	0	3	2	1	2	0	0	1	1	11
Tot	0	12	25	48	77	143	147	123	67	12	9	663

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 663  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class G Extremely Stable based on Lapse Rate

Elevations:: Winds 150ft Stability 150ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	4	4	3	1	0	0	0	1	0	13
NNE	0	1	2	1	3	1	2	0	0	0	0	10
NE	0	1	3	3	2	3	0	2	0	0	0	14
ENE	0	0	8	5	12	12	6	8	2	0	0	53
E	0	4	5	8	26	37	20	2	2	1	1	106
ESE	0	2	3	6	16	15	7	1	1	0	0	51
SE	0	0	4	7	15	14	15	0	0	0	0	55
SSE	0	1	3	3	16	11	10	6	8	0	0	58
S	0	1	6	6	10	10	11	34	6	0	0	84
SSW	0	3	3	3	13	12	13	11	11	0	0	69
SW	0	0	4	1	12	15	18	10	22	0	0	82
WSW	0	1	2	6	8	10	12	3	4	0	0	46
W	0	1	2	3	9	7	10	1	8	2	0	43
WNW	0	1	4	3	2	10	3	4	4	2	5	38
NW	0	2	4	1	9	1	0	0	0	0	0	17
NNW	0	1	0	2	3	1	0	1	1	0	0	9
Tot	0	19	57	62	159	160	127	83	69	6	6	748

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 748  
 Hours of Missing Data . . . . . 8  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

All Stabilities

Elevations:: Winds 250ft      Stability 250ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5- 1.0	1.1- 1.5	1.6- 2.0	2.1- 3.0	3.1- 4.0	4.1- 5.0	5.1- 6.0	6.1- 8.0	8.1- 10.0	>10.00	
N	1	2	14	12	26	28	23	7	26	26	36	201
NNE	0	6	9	14	36	24	16	10	15	12	8	150
NE	2	5	9	15	34	48	32	32	72	43	70	362
ENE	0	6	15	22	73	87	92	89	70	48	36	538
E	1	3	12	26	82	89	74	58	47	12	1	405
ESE	0	4	8	14	44	38	51	57	35	4	0	255
SE	0	4	10	16	49	55	53	70	74	7	4	342
SSE	0	6	10	13	25	50	67	70	210	129	103	683
S	0	5	15	13	33	64	72	87	205	183	103	780
SSW	0	3	17	4	44	63	61	80	156	89	14	531
SW	1	2	9	19	45	55	72	118	311	144	18	794
WSW	0	5	11	11	45	51	85	145	293	172	111	929
W	0	5	10	13	37	50	64	88	206	159	149	781
WNW	0	6	12	11	46	50	63	62	140	169	441	1000
NW	0	7	11	12	61	42	31	38	66	74	289	631
NNW	0	3	6	12	35	28	26	27	37	60	34	268
Tot	5	72	178	227	715	822	882	1038	1963	1331	1417	8650

Hours of Calm . . . . . 0  
Hours of Variable Direction . . . . . 0  
Hours of Valid Data . . . . . 8650  
Hours of Missing Data . . . . . 110  
Hours in Period . . . . . 8760



Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class A Extremely Unstable based on Lapse Rate

Elevations:: Winds 250ft      Stability 250ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	0	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0	0	1	2	0	3
NE	0	0	0	0	0	0	0	2	1	2	5	10
ENE	0	0	0	0	0	0	2	7	10	15	8	42
E	0	0	0	0	0	1	0	0	0	0	0	1
ESE	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	2	0	0	2
SSE	0	1	0	0	0	0	0	2	2	1	0	6
S	0	0	0	0	0	0	0	0	1	1	0	2
SSW	0	0	0	0	0	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0	0	2	0	0	2
W	0	0	0	0	0	0	0	0	1	0	4	5
WNW	0	0	0	0	1	2	5	4	12	8	16	48
NW	0	0	0	0	7	13	4	2	7	15	12	60
NNW	0	0	0	0	3	3	3	2	0	6	1	18
Tot	0	1	0	0	11	19	14	19	39	50	46	199

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 199  
 Hours of Missing Data . . . . . 110  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class B Moderately Unstable based on Lapse Rate

Elevations:: Winds 250ft      Stability 250ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	0	0	0	1	0	0	0	0	1	2
NNE	0	0	0	0	0	0	0	0	1	2	1	4
NE	0	0	0	0	0	0	1	6	11	10	13	41
ENE	0	0	0	0	0	4	3	4	9	6	1	27
E	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	1	0	0	1
SSE	0	1	0	0	0	0	2	2	4	1	1	11
S	0	0	0	0	0	0	0	0	2	0	0	2
SSW	0	0	0	0	0	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0	1	0	0	0	1
WSW	0	0	0	0	0	0	0	1	4	0	0	5
W	0	0	0	0	0	0	0	0	0	0	0	0
WNW	0	0	0	0	2	0	1	1	2	4	7	17
NW	0	0	0	0	5	4	3	2	4	2	9	29
NNW	0	0	0	0	2	2	0	0	0	0	0	4
Tot	0	1	0	0	9	11	10	17	38	25	33	144

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 144  
 Hours of Missing Data . . . . . 110  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class C Slightly Unstable based on Lapse Rate

Elevations:: Winds 250ft Stability 250ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	0	0	0	3	4	0	4	1	9	21
NNE	0	0	0	0	0	2	1	0	4	0	3	10
NE	0	0	0	0	0	5	3	6	18	15	15	62
ENE	0	0	0	0	4	8	12	16	8	6	12	66
E	0	0	0	0	2	3	1	1	0	1	1	9
ESE	0	0	0	0	0	0	0	2	0	0	0	2
SE	0	0	0	0	0	0	1	6	3	0	0	10
SSE	0	0	0	0	0	1	8	4	5	3	1	22
S	0	0	0	0	0	1	2	2	7	2	0	14
SSW	0	0	0	0	1	2	1	6	3	0	0	13
SW	0	0	0	0	0	3	5	4	5	1	0	18
WSW	0	0	0	0	0	0	2	0	4	2	1	9
W	0	0	0	0	0	2	0	0	3	0	2	7
WNW	0	0	0	0	0	3	1	1	8	12	24	49
NW	0	0	0	2	4	2	1	1	5	10	38	63
NNW	0	0	0	0	2	4	1	3	3	7	3	23
Tot	0	0	0	2	13	39	43	52	80	60	109	398

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 398  
 Hours of Missing Data . . . . . 110  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class D Neutral based on Lapse Rate

Elevations:: Winds 250ft Stability 250ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	0	3	5	15	15	12	7	16	23	25	121
NNE	0	3	4	7	26	13	14	8	8	7	3	93
NE	0	1	2	6	19	29	19	12	38	14	33	173
ENE	0	2	10	9	22	30	38	30	30	17	13	201
E	0	0	0	3	24	33	28	21	23	5	0	137
ESE	0	0	1	4	8	17	21	34	22	2	0	109
SE	0	1	3	5	21	23	28	37	41	3	2	164
SSE	0	0	4	4	13	29	26	31	89	65	63	324
S	0	0	3	5	12	22	27	35	69	37	25	235
SSW	0	1	3	2	14	26	27	29	43	9	9	163
SW	0	0	2	6	12	17	25	42	86	36	6	232
WSW	0	0	1	1	14	15	28	62	132	113	86	452
W	0	1	1	5	9	14	16	55	133	137	112	483
WNW	0	1	4	1	11	18	21	26	58	95	316	551
NW	0	2	5	4	16	9	13	20	39	43	212	363
NNW	0	0	2	3	15	10	15	14	25	43	29	156
Tot	0	12	48	70	251	320	358	463	852	649	934	3957

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 3957  
 Hours of Missing Data . . . . . 110  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class E Slightly Stable based on Lapse Rate

Elevations:: Winds 250ft Stability 250ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	1	1	7	2	6	4	4	0	4	2	0	31
NNE	0	0	1	6	6	7	1	2	1	1	0	25
NE	1	2	6	4	8	8	2	4	2	2	4	43
ENE	0	2	1	5	14	24	17	18	11	4	1	97
E	1	2	4	6	18	24	21	19	19	3	0	117
ESE	0	0	4	2	13	10	12	13	11	0	0	65
SE	0	1	2	5	17	17	12	11	11	3	1	80
SSE	0	2	3	5	8	9	16	20	81	48	36	228
S	0	0	6	3	12	15	15	27	79	109	74	340
SSW	0	0	6	0	9	17	17	22	65	49	2	187
SW	0	1	4	6	17	16	21	38	141	72	12	328
WSW	0	1	5	4	16	18	37	52	109	44	24	310
W	0	2	3	7	18	19	25	24	49	18	29	194
WNW	0	2	2	5	17	17	28	16	46	35	48	216
NW	0	2	1	5	16	8	5	12	9	4	11	73
NNW	0	3	2	4	6	6	5	7	8	3	1	45
Tot	3	21	57	69	201	219	238	285	646	397	243	2379

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 2379  
 Hours of Missing Data . . . . . 110  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class F Moderately Stable based on Lapse Rate

Elevations:: Winds 250ft Stability 250ft

Wind Direction Sector	Wind Speed Range (m/s)										Total	
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0		>10.00
N	0	0	1	1	3	3	2	0	1	0	1	12
NNE	0	1	2	0	3	1	0	0	0	0	0	7
NE	0	1	1	2	2	5	5	2	1	0	0	19
ENE	0	2	3	4	17	13	9	4	0	0	1	53
E	0	0	4	5	21	11	16	16	5	1	0	79
ESE	0	3	0	2	13	5	10	6	1	2	0	42
SE	0	2	0	4	3	5	6	7	11	0	0	38
SSE	0	1	1	0	1	5	5	8	17	8	0	46
S	0	2	2	2	4	11	11	13	25	24	4	98
SSW	0	0	1	2	9	4	9	13	25	20	3	86
SW	1	0	0	4	8	10	11	20	57	19	0	130
WSW	0	2	4	1	9	6	14	20	35	3	0	94
W	0	2	2	0	8	11	17	7	14	3	1	65
WNW	0	2	1	4	10	6	2	6	13	12	18	74
NW	0	2	1	0	8	2	3	0	2	0	7	25
NNW	0	0	0	3	4	2	0	0	0	0	0	9
Tot	1	20	23	34	123	100	120	122	207	92	35	877

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 877  
 Hours of Missing Data . . . . . 110  
 Hours in Period . . . . . 8760

Joint Frequency Distribution

Site:: Ginna Primary

Period:: Months Jan - Dec for years 2018 - 2018

Stability Class G Extremely Stable based on Lapse Rate

Elevations:: Winds 250ft Stability 250ft

Wind Direction Sector	Wind Speed Range (m/s)											Total
	<0.50	0.5-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	6.1-8.0	8.1-10.0	>10.00	
N	0	1	3	4	2	2	1	0	1	0	0	14
NNE	0	2	2	1	1	1	0	0	0	0	1	8
NE	1	1	0	3	5	1	2	0	1	0	0	14
ENE	0	0	1	4	16	8	11	10	2	0	0	52
E	0	1	4	12	17	17	8	1	0	2	0	62
ESE	0	1	3	6	10	6	8	2	1	0	0	37
SE	0	0	5	2	8	10	6	9	5	1	1	47
SSE	0	1	2	4	3	6	10	3	12	3	2	46
S	0	3	4	3	5	15	17	10	22	10	0	89
SSW	0	2	7	0	11	14	7	10	20	11	0	82
SW	0	1	3	3	8	9	10	13	22	16	0	85
WSW	0	2	1	5	6	12	4	10	7	10	0	57
W	0	0	4	1	2	4	6	2	6	1	1	27
WNW	0	1	5	1	5	4	5	8	1	3	12	45
NW	0	1	4	1	5	4	2	1	0	0	0	18
NNW	0	0	2	2	3	1	2	1	1	1	0	13
Tot	1	17	50	52	107	114	99	80	101	58	17	696

Hours of Calm . . . . . 0  
 Hours of Variable Direction . . . . . 0  
 Hours of Valid Data . . . . . 696  
 Hours of Missing Data . . . . . 110  
 Hours in Period . . . . . 8760