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April 23, 2024

ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555-001

Serial No. 24-147
LIC/AA/R0
Docket No. 50-395
License No. NPF-12

DOMINION ENERGY SOUTH CAROLINA, INC. (DESC)
VIRGIL C. SUMMER NUCLEAR STATION UNIT 1
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

Enclosed is the DESC Annual Radioactive Effluent Release Report as required by 10 CFR 50.36a, Section 6.9.1.8 of the Virgil C. Summer Nuclear Station Technical Specifications, and Section 1.6.2.1 of the Offsite Dose Calculation Manual (ODCM). Also enclosed for your review is a copy of Revision 32 of the ODCM. This submittal covers the period of January 1 through December 31, 2023.

If there are any questions, please call Ms. Alicia Auton at (803) 941-9523.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Haselden", written over a horizontal line.

Robin R. Haselden
Director, Nuclear Station Safety and Licensing
V. C. Summer Nuclear Station

Commitments contained in this letter: None

Enclosure : Annual Radioactive Effluent Release Report (includes Enclosure A: Meteorological Data Joint Frequency Distribution Tables and Enclosure B: ODCM, Revision 32)

cc: w/o Enclosures unless noted
G. J. Lindamood – Santee Cooper (w/Enclosures)
L. Dudes – NRC Region II
G. Miller – NRC Project Manager
NRC Resident Inspector (w/Enclosures)
ANI (w/Enclosures)
Robin Mack – SCDHEC-Bureau of Environmental Health Services (w/Enclosures)

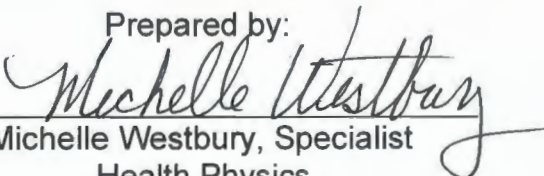


ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT VIRGIL C. SUMMER NUCLEAR STATION


FOR THE OPERATING PERIOD
JANUARY 1, 2023 - DECEMBER 31, 2023



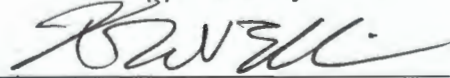
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ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

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VIRGIL C. SUMMER NUCLEAR STATION

Introduction

This report is being submitted as a summary of quantities of radioactive liquid and gaseous effluents and solid waste released from the Virgil C. Summer Nuclear Station. This report is submitted in fulfillment of the requirements in the V. C. Summer Nuclear Station Operating License Technical Specifications Section 6.9.1.8, Offsite Dose Calculation Manual (ODCM) Section 1.6.2 and 10CFR50.36(a) and follows the reporting details specified in USNRC Regulatory Guide 1.21⁽¹⁾.

Summary information of radioactive gaseous and liquid effluents is presented along with a summary of radioactive waste disposal as well as an evaluation of the radiological impact on man due to operation of the Virgil C. Summer Nuclear Station. Supplemental information including release limits also required by USNRC Regulatory Guide 1.21 is provided as Appendix A.

A. Supplemental Information

Regulatory limits for doses, dose rate and effluent concentration limits presented in Supplemental Information are from the Virgil C. Summer Nuclear Station ODCM and 40 CFR 190. Average energy (\bar{E}) is not applicable to the method for determining release rate limits for fission and activation gaseous effluents, therefore, it has been omitted. A compilation of required supplemental information is provided in Appendix A.

B. Gaseous Effluents

Gaseous effluents released from ground level are summarized in Tables 1 and 2. An elevated release pathway does not exist at Virgil C. Summer Nuclear Station. Cumulative doses are discussed in Section E.

The error for both liquid and gaseous release totals is estimated as twenty percent for radioactive radionuclides sampled and released in effluent pathways. Error was derived using root sum of squares methodology considering known sources of error including calibration of detectors and flow measurement equipment, sample preparation, and analysis counting error.

C. Liquid Effluents

Liquid effluents are summarized in Tables 3 and 4. Estimated total errors are expressed as in Section B above.

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D. Solid Waste Shipments

Solid waste shipments are summarized in Table 5. Curie content of radioactive waste packages is determined by dose rates and/or gamma spectroscopy analysis of samples. The total error for each type of curie content determination is conservatively estimated to be the sum of a 15% systematic error and a 20% photon response error for the detector used.

E. Radiological Impact on Man

Dose to the maximum exposed individual in the unrestricted area was calculated using measured plant gaseous effluents and meteorological data in accordance with the Offsite Dose Calculation Manual. The source term involved 1 Waste Gas Decay Tank (WGDT) releases, 5.90 days of 6-inch Reactor Building purge releases, 20.92 days of 36-inch Reactor Building purge releases and a continuous 12-month Main Plant vent release. Doses are summarized in Table 6. The total gaseous activities released are presented in Tables 1 and 2. The highest quarterly air doses at the station boundary resulting from the release of noble gases were $1.46\text{E-}04$ mrad for gamma during the second quarter and $5.29\text{E-}05$ mrad for beta during the second quarter. The maximum quarterly organ dose attributed to the releases, excluding Carbon-14, was $2.03\text{E-}02$ mrem during the second quarter. Cumulative annual dose was $1.46\text{E-}04$ mrad, $5.33\text{E-}05$ mrad and $2.03\text{E-}02$ mrem for gamma, beta, and organ dose, respectively. Discussion of the impact of Carbon-14 is included in Section K.

Measured plant liquid effluent data was used to calculate estimates of doses to individuals in accordance with the Offsite Dose Calculation Manual. The source term consisted of the isotopic contents of 212 Waste Monitor Tank batch releases, 45 Condensate Backwash Receiver Tank batch releases, 3 NaOH Sump batch releases, 9.2 days of Steam Generator Blowdown release and a continuous Turbine Building Sump release.

Doses are summarized in Table 6 and total liquid radioactivity released is described in Tables 3 and 4. The highest quarterly total body dose to the maximum exposed individual resulting from the release of radioactive liquid was $3.34\text{E-}03$ mrem during the first quarter. The highest organ dose was $3.39\text{E-}03$ mrem to the GI-LLI for the first quarter. Cumulative annual doses for the hypothetical maximum exposed individual were $6.74\text{E-}03$ mrem for the total body and $8.15\text{E-}3$ mrem for the GI-LLI, the maximum annual organ. The GI-LLI was the maximum exposed organ for all four quarters.

Dose rates and concentrations were below station limits as specified in Supplemental Information, Section II A, B, and C during all the effluent releases.

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Radiation exposure total dose to members of the public is limited by 40CFR190 and 10CFR72.104 to less than 25 mrem to the total body and all organs except the thyroid which is limited to 75 mrem. This dose limit applies to effluents as well as Independent Spent Fuel Storage Installation (ISFSI). Radiation exposure within the site boundary was assessed through calculation of gamma and beta air dose at 0.25 miles of the gaseous effluent release point and direct measurement of exposure using thermoluminescent dosimeters. Onsite air dose for this reporting period was $4.76\text{E-}04$ mrad gamma and $1.74\text{E-}04$ mrad beta, well below levels that can be distinguished above background. Quarterly thermoluminescent dosimetry (TLD) data from four onsite monitoring locations within 0.2 miles of the Reactor Building and eight locations at the site boundary were analyzed. Results from 2023 do not show a significant increase in dose rates above 2022 levels or historic operational average.

Radiation doses from radioactive effluents to workers at the Fairfield Hydro Station for this reporting period were calculated to be $6.91\text{E-}06$ and $2.52\text{E-}06$ mrad for gamma and beta, respectively.

Radiation doses from radioactive effluents to workers at the New Nuclear Site for this reporting period were calculated to be $5.94\text{E-}05$ and $2.17\text{E-}05$ mrad for gamma and beta, respectively.

The impact of Independent Spent Fuel Storage Installation (ISFSI) operation, located within the VCSNS Protected Area, which began cask storage on March 26, 2016, was assessed using six TLD locations monitoring the perimeter of the ISFSI site. The TLD locations were monitored for three quarters prior to fuel storage and continued to be monitored through 2023 during which fuel storage casks were stored. Analysis of monitoring results show a statistically significant increase in ISFSI perimeter dose as a result of fuel storage. The highest location closest to the storage casks shows an increase of 10.4 mrem/calendar quarter compared to pre-operation. Although the applicable limit for a member of the public applies to a real individual, a conservative analysis was used to demonstrate compliance with 40CFR190 and 10CFR72.104 by assuming an individual is located at the perimeter of the ISFSI Protected Area for 2000 hours per year. In this case, the hypothetical individual would have received 9.5 mrem.

Based on review of gaseous effluent dose calculations, analysis of onsite TLD monitoring including ISFSI perimeter monitoring, it can be concluded that total dose to any member of the public does not exceed the dose limits of 40CFR190 and 10CFR72.104.

Radiation doses from nearby uranium fuel cycle sources were not assessed. The ODCM, Sections 1.3.1 and B/1.3 establish a five (5) mile limit beyond which doses from nearby plants are insignificant. There are no uranium fuel cycle plants within a five (5) mile radius of Virgil C. Summer Nuclear Station.

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F. Abnormal Releases

None

G. Meteorology

The meteorological data for 2023 was collected and analyzed. An annual meteorological summary report of joint frequency distributions of wind direction and speed by atmospheric stability class for each quarter is included as Enclosure A.

The wind direction and wind speed data used were acquired from the 10-meter level of the primary monitoring tower. Stability was determined by the primary differential temperature (61 to 10 meter).

The combined annual data recovery for wind direction, wind speed and stability was 99.79%. Primary variable recovery rates were as follows: wind direction (10 m) – 99.82%, wind speed (10 m) – 99.82%, and differential temperature (61 - 10 m) – 99.76%.

H. Offsite Dose Calculation Manual

The Virgil C. Summer Nuclear Station ODCM was not revised in 2023.

I. Offsite Dose Calculation Manual Reportable Incidents

The Turbine Building Sump Effluent Line Radiation Monitor RM-L8, required by ODCM Control 1.1.1.1, has been out of service since February 2, 2021 at 1145. The out of service condition was the result of spurious high rad alarms on the monitor. A replacement radiation monitor has been procured and installed. Final testing is in progress as the last step to returning RM-L8 to service. Compensatory actions are being implemented while RM-L8 is out of service in accordance with the ODCM.

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J. Major Changes to Radioactive Waste Treatment Systems

During 2023, there were no major changes to the Radioactive Waste Treatment System.

K. Carbon-14 Gaseous Effluents

Carbon-14 production and release estimates were calculated using EPRI Report 1021106⁽²⁾, "Estimation of Carbon-14 in Nuclear Plant Gaseous Effluents". This calculation uses active core coolant mass, average neutron flux by energy and reactor coolant nitrogen concentrations to determine Carbon-14 generation based upon an effective full power year. The estimated generation for VC Summer Nuclear station for 2023 was 8.85 curies.

Public dose estimates were performed using Regulatory Guide 1.109⁽³⁾ methodology. Carbon dioxide is assumed to make up 20% of the Carbon-14 gaseous emissions from the station based upon available references and on-site testing. Carbon-14 is the highest dose contributor of all radionuclides released in gaseous effluents. Annual dose resulting from Carbon-14 releases in gaseous effluents is estimated to be 1.57E-01 mrem total body and 7.87E-01 mrem to the maximum organ (bone).

References

1. Regulatory Guide 1.21, *"Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents From Light Water Cooled Nuclear Power Plants"*, Revision 1, US Nuclear Regulatory Commission, Washington D.C., 1974.
2. EPRI Report 1021106, *"Estimation of Carbon-14 in Nuclear Power Plant Gaseous Effluents"*, Electric Power Research Institute, Palo Alto, CA, 2010.
3. Regulatory Guide 1.109, *"Calculation of Annual Doses to Man from Routine Releases of Reactor effluents for the Purpose of Demonstrating compliance with 10 CFR50, Appendix I"*, US Nuclear Regulatory Commission, Washington D.C., 1976.

APPENDIX A
ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
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SUPPLEMENTAL INFORMATION

I. Regulatory Dose Limits:

A. Fission and Activation Gases:

The air dose to an individual due to noble gases released in gaseous effluents shall be limited to less than or equal to 5 mrad for gamma radiation and 10 mrad for beta radiation during any calendar quarter and 10 mrad for gamma radiation and 20 mrad for beta radiation during any calendar year (ODCM, Section 1.2.3.1).

B. Iodines, Particulates (half-lives > 8 days) and Tritium:

The dose to an individual from radioiodine, tritium and radioactive materials in particulate form with half-lives greater than 8 days in gaseous effluents shall be limited to less than or equal to 7.5 mrem to any organ during any calendar quarter and 15 mrem to any organ during any calendar year (ODCM, Section 1.2.4.1).

C. Liquid Effluents:

The dose or dose commitment to an individual from radioactive materials in liquid effluents released shall be limited to less than or equal to 1.5 mrem to the total body and 5 mrem to any organ during any calendar quarter and 3 mrem to the total body and 10 mrem to any organ during any calendar year (ODCM, Section 1.1.3.1).

D. All Sources:

The annual dose equivalent shall not exceed 25 mrem to the whole body, 75 mrem to the thyroid and 25 mrem to any other organ (40 CFR 190).

II. Dose Rate and Effluent Concentration Limits:

A. Fission and Activation Gases

The dose rate in unrestricted areas due to radioactive materials released in gaseous effluents shall be limited to less than or equal to 500 mrem/year to the total body and less than or equal to 3000 mrem/year to the skin (ODCM, Section 1.2.2.1).

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B. Iodines, Particulates (half-lives > 8 days) and Tritium:

The dose rate in unrestricted areas due to radioactive materials in effluents shall be limited to less than or equal to 1500 mrem/year to any organ (ODCM, Section 1.2.2.1).

C. Liquid Effluents:

The concentration of radioactive materials released from the site shall be limited to 10 times the concentrations specified in 10 CFR 20, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2E-04 $\mu\text{Ci/ml}$ total activity (ODCM, Section 1.1.2.1).

III. Average Energy:

Not Applicable

IV. Measurements and Approximations of Total Radioactivity:

- A. Fission and activation gases: Gamma spectrometry (HPGe)
- B. Iodines: Gamma spectrometry (HPGe)
- C. Particulates: Gamma spectrometry (HPGe), beta proportional counting, alpha proportional counting
- D. Tritium: Liquid scintillation
- E. Liquid effluents: Gamma spectrometry (HPGe), liquid scintillation (H-3), beta proportional counting, alpha proportional counting.

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V. Batch Releases:

A. Gaseous:

1. Number of batch releases: 1
2. Total time period for batch releases: 575 min
3. Maximum time period for a batch release: 575 min
4. Average time period for a batch release: 575 min
5. Minimum time period for a batch release: 575 min

B. Liquid:

1. Number of batch releases:

63	For first quarter, 2023
162	For second quarter, 2023
42	For third quarter, 2023
35	For fourth quarter, 2023

2. Total time period for batch releases:

4.74E+03	min. for first quarter, 2023
1.18E+04	min. for second quarter, 2023
3.07E+03	min. for third quarter, 2023
2.55E+03	min. for fourth quarter 2023

3. Maximum time period for a batch release:

9.50E+01	min. for second quarter, 2023
1.20E+02	min. for second quarter, 2023
8.60E+01	min. for third quarter, 2023
9.80E+01	min. for fourth quarter, 2023

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4. Average time period for batch releases:

7.53E+01	min. for first quarter, 2023
7.26E+01	min. for second quarter, 2023
7.30E+01	min. for third quarter, 2023
7.29E+01	min. for fourth quarter, 2023
5. Minimum time period for a batch release:

6.20E+01	min. for first quarter, 2023
1.00E+00	min. for second quarter, 2023
6.00E+01	min. for third quarter, 2023
1.00E+00	min. for fourth quarter, 2023
6. Average stream flow during periods of release of effluent into a flowing stream:

6.05E+06	gpm for first quarter, 2023
5.17E+06	gpm for second quarter, 2023
6.68E+06	gpm for third quarter, 2023
4.46E+06	gpm for fourth quarter, 2023

VI. Abnormal Releases:

A. Gaseous:

1. Number of releases: 0
2. Total activity released: 0

B. Liquid:

1. Number of releases: 0
2. Total activity released: 0

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TABLE 1

Gaseous Effluents-Summation of All Releases

Type of Effluent	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Error %
<u>A. Fission & Activation Gases</u>						
1. Total Release	Curies	1.10E-03	8.61E-02	0.00E+00	0.00E+00	2.00E+01
2. Average Release Rate for Period	μCi/sec	1.42E-04	1.10E-02	0.00E+00	0.00E+00	
3. Percent of Applicable Limit	%	1.06E-05	2.92E-03	0.00E+00	0.00E+00	
<u>B. Iodines</u>						
1. Total Iodine-131	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E+01
2. Average Release Rate for Period	μCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3. Percent of Applicable Limit	%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
<u>C. Particulates</u>						
1. Total Particulates (Half-lives > 8 days)	Curies	0.00E+00	2.44E-06	0.00E+00	0.00E+00	2.50E+01
2. Average Release Rate for Period	μCi/sec	0.00E+00	3.11E-07	0.00E+00	0.00E+00	
3. Percent of Applicable Limit	%	0.00E+00	1.02E-05	0.00E+00	0.00E+00	
4. Gross Alpha Activity	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>D. Tritium</u>						
1. Total Release	Curies	1.90E-03	3.56E+01	0.00E+00	0.00E+00	2.00E+01
2. Average Release Rate for Period	μCi/sec	2.45E-04	4.53E+00	0.00E+00	0.00E+00	
3. Percent of Applicable Limit	%	1.44E-05	2.70E-01	0.00E+00	0.00E+00	
<u>E. Carbon-14</u>						
1. Total Release	Curies	2.18E+00	2.21E+00	2.23E+00	2.23E+00	N/A
2. Average Release Rate for Period	μCi/sec	2.81E-01	2.81E-01	2.81E-01	2.81E-01	

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TABLE 2

Gaseous Effluents-Ground Level Releases

Nuclides Released	Units	Continuous Mode				Batch Mode			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
1. Fission and Activation Gases									
Ar-41	Curies	2.35E-04	7.83E-02	0.00E+00	0.00E+00	1.05E-06	0.00E+00	0.00E+00	0.00E+00
Kr-85M	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.65E-06	0.00E+00	0.00E+00	0.00E+00
Kr-88	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.24E-07	0.00E+00	0.00E+00	0.00E+00
Xe-131m	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.90E-06	0.00E+00	0.00E+00	0.00E+00
Xe-133	Curies	2.00E-05	7.81E-03	0.00E+00	0.00E+00	7.34E-04	0.00E+00	0.00E+00	0.00E+00
Xe-133m	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E-05	0.00E+00	0.00E+00	0.00E+00
Xe-135	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.54E-05	0.00E+00	0.00E+00	0.00E+00
Total for Period	Curies	2.55E-04	8.61E-02	0.00E+00	0.00E+00	8.46E-04	0.00E+00	0.00E+00	0.00E+00
2. Iodines									
I-133	Curies	0.00E+00	1.25E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total for Period	Curies	0.00E+00	1.25E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3. Particulates									
As-76	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Br-82	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-58	Curies	0.00E+00	1.56E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-95	Curies	0.00E+00	8.81E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total for Period	Curies	0.00E+00	2.44E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4. Tritium									
H-3	Curies	1.90E-03	3.56E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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TABLE 3

Liquid Effluents-Summation of All Releases

Type of Effluent	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Error %
<u>A. Fission & Activation Products</u>						
1. Total Release (not including Tritium, Gases, and Alpha)	Curies	1.62E-03	7.02E-03	4.27E-04	1.16E-04	2.00E+01
2. Average Diluted Concentration During Period	µCi/ml	1.05E-12	5.54E-11	5.42E-12	2.45E-12	
3. Percent of Applicable Limit	%	3.23E-02	1.40E-01	8.53E-03	2.33E-03	
<u>B. Tritium</u>						
1. Total Release	Curies	4.20E+02	1.34E+02	7.88E+01	1.54E+02	2.00E+01
2. Average Diluted Concentration During Period	µCi/ml	2.72E-07	1.05E-06	1.00E-06	3.25E-06	
3. Percent of Applicable Limit	%	2.72E-02	1.05E-01	1.00E-01	3.25E-01	
<u>C. Dissolved and Entrained Gases</u>						
1. Total Release	Curies	1.51E-03	1.31E-03	1.60E-05	7.43E-05	2.00E+01
2. Average Diluted Concentration During Period	µCi/ses	9.80E-13	1.03E-11	2.04E-13	1.56E-12	
3. Percent of Applicable Limit	%	4.90E-07	5.16E-06	1.02E-07	7.81E-07	
<u>D. Gross Alpha Radioactivity</u>						
1. Total Release	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<u>E. Waste Volume Released (Pre-Dilution)</u>						
	Liters	1.10E+07	7.75E+07	1.42E+07	1.49E+07	3.00E+00
<u>F. Volume of Dilution Water Used</u>						
	Liters	1.54E+12	1.27E+11	7.86E+10	4.75E+10	4.30E+00

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TABLE 4

Liquid Effluents

Nuclides Released	Units	Continuous Mode				Batch Mode			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
Ag-110m	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.10E-06	0.00E+00	0.00E+00
Co-58	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.77E-06	6.56E-04	4.53E-05	1.12E-05
Co-60	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-03	3.26E-03	3.41E-04	6.26E-05
Cr-51	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-03	0.00E+00	0.00E+00
Cs-137	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E-08	0.00E+00	1.97E-08
H-3	Curies	5.57E-03	2.42E-02	0.00E+00	0.00E+00	4.20E+02	1.34E+02	7.88E+01	1.54E+02
Kr-85M	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-06	0.00E+00	0.00E+00
Mn-54	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.16E-05	2.18E-04	1.13E-05	0.00E+00
Nb-95	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-05	8.35E-04	7.64E-06	1.38E-06
Ni-63	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.04E-05
Sb-124	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.83E-06	0.00E+00	0.00E+00
Sb-125	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E-04	1.79E-04	2.01E-05	0.00E+00
Te-123M	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.15E-07	0.00E+00	6.72E-07
Xe-133	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-03	1.07E-03	1.60E-05	7.25E-05
Xe-133m	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44E-05	1.99E-05	0.00E+00	0.00E+00
Xe-135	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.27E-04	2.20E-04	0.00E+00	1.77E-06
Zn-65	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.31E-06	6.37E-06	0.00E+00	0.00E+00
Zr-95	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.87E-04	1.42E-06	0.00E+00
<hr/>									
Total for Period	Curies	5.57E-03	2.42E-02	0.00E+00	0.00E+00	4.20E+02	1.34E+02	7.88E+01	1.54E+02

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

January - December 2023

Virgil C. Summer Nuclear Station

Dominion Energy

Table 5

SOLID WASTE SHIPMENTS

1. Solid Waste Shipped Offsite for Burial or Disposal (Not irradiated fuel)

Type of Waste	Unit	2023 Total	Est. Total Error, %
a. Spent resins, filters, sludge, evaporator bottoms, etc.	m ³ Ci	5.71E+01 9.81E+01	2.5E+01
b. Dry compressible waste, metals, contaminated equipment, etc.	m ³ Ci	2.98E+02 1.94E-01	2.5E+01
c. Irradiated components, control rods, etc.	m ³ Ci	0.00E+00 0.00E+00	N/A
d. Other waste, oil, etc.	m ³ Ci	0.00E+00 0.00E+00	N/A

2. Estimate of major nuclide composition for the year (by type of waste) for concentrations above 1.0%

a.

Ni-63	51.88 %	5.09E+01 Ci
Fe-55	25.64%	2.52E+01 Ci
Co-60	10.14%	9.95E+00 Ci
H-3	4.38%	4.30E+00 Ci
C-14	2.92%	2.86E+00 Ci
Mn-54	1.89%	1.86E+00 Ci
Sb-125	1.56%	1.53E+00 Ci

b.

Fe-55	49.72 %	9.64E-02 Ci
Co-60	27.21%	5.28E-02 Ci
Ni-63	15.13%	2.93E-02 Ci
Sb-125	1.96%	3.81E-03 Ci
Nb-95	1.59%	3.08E-03 Ci
C-14	1.41%	2.73E-03 Ci
Mn-54	1.04%	2.02E-03 Ci

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
January - December 2023

Virgil C. Summer Nuclear Station
Dominion Energy

Table 5
SOLID WASTE SHIPMENTS

c.

None	N/A	N/A
------	-----	-----

d.

None	N/A	N/A
------	-----	-----

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
4	Hittman Transport	Energy Solutions, LLC -Barnwell Processing Facility Barnwell, SC
6	Landstar	Alaron Nuclear Services Wampum, PA
2	Specialty Transport, Inc	Unitech Services Group, Inc

Notes:

- Four** shipments by Hittman Transport containing (4) 8-120 High Integrity Containers of Dewatered Resin and/or Charcoal shipped to the Barnwell Processing Facility prior to being disposed of at the Barnwell Burial Site.
- Six** shipments by Landstar to the Alaron processing facility located in Wampum, PA. Shipments consisted of: (8) 20-foot Sealands of Dry Active Waste; (20) B-25/Metal Boxes of Gross Dewatered Resin and DAW.
- Two** shipments by Specialty Transport to Unitech Services facility located in Oak Ridge, Tn. Shipments consisted of (1) 20-foot sealand of Green is Clean DAW for processing and (1) intermodal of Green is Clean DAW for processing.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

JANUARY – DECEMBER 2023

Virgil C. Summer Nuclear Station

TABLE 6

Gaseous Effluents

	Parameter	Location	Dose	Dose Limit	% of Limit
<u>Qtr 1</u>	Gamma Air Dose (mrad)	1.61 km ENE	5.29E-07	5.00E+00	0.00
	Beta Air Dose (mrad)	1.61 km ENE	3.62E-07	1.00E+01	0.00
	Total Body Dose (mrem)	1.61 km ENE	4.96E-07	5.00E+00	0.00
	Skin Dose (mrem)	1.61 km ENE	7.91E-07	7.50E+00	0.00
	Max Organ Dose (mrem)	1.77 km E	1.08E-06	7.50E+00	0.00
	Child – Liver				
<u>Qtr 2</u>	Gamma Air Dose (mrad)	1.61 km ENE	1.46E-04	5.00E+00	0.00
	Beta Air Dose (mrad)	1.61 km ENE	5.29E-05	1.00E+01	0.00
	Total Body Dose (mrem)	1.61 km ENE	1.39E-04	5.00E+00	0.00
	Skin Dose (mrem)	1.61 km ENE	2.03E-04	7.50E+00	0.00
	Max Organ Dose (mrem)	1.77 km E	2.03E-02	7.50E+00	0.27
	Child – Thyroid				
<u>Qtr 3</u>	Gamma Air Dose (mrad)	1.61 km ENE	0.00E+00	5.00E+00	0.00
	Beta Air Dose (mrad)	1.61 km ENE	0.00E+00	1.00E+01	0.00
	Total Body Dose (mrem)	1.61 km ENE	0.00E+00	5.00E+00	0.00
	Skin Dose (mrem)	1.61 km ENE	0.00E+00	7.50E+00	0.00
	Max Organ Dose (mrem)	1.77 km E	0.00E+00	7.50E+00	0.00
	None – None				
<u>Qtr 4</u>	Gamma Air Dose (mrad)	1.61 km ENE	0.00E+00	5.00E+00	0.00
	Beta Air Dose (mrad)	1.61 km ENE	0.00E+00	1.00E+01	0.00
	Total Body Dose (mrem)	1.61 km ENE	0.00E+00	5.00E+00	0.00
	Skin Dose (mrem)	1.61 km ENE	0.00E+00	7.50E+00	0.00
	Max Organ Dose (mrem)	1.77 km E	0.00E+00	7.50E+00	0.00
	None – None				
<u>Year</u>	Gamma Air Dose (mrad)	1.61 km ENE	1.46E-04	1.00E+01	0.00
	Beta Air Dose (mrad)	1.61 km ENE	5.33E-05	2.00E+01	0.00
	Total Body Dose (mrem)	1.61 km ENE	1.39E-04	1.00E+01	0.00
	Skin Dose (mrem)	1.61 km ENE	2.04E-04	1.50E+01	0.00
	Max Organ Dose (mrem)	1.77 km E	2.03E-02	1.50E+01	0.14
	Child - Thyroid				

(* Includes dose from all nuclides excluding Carbon-14. See Section K for C-14)

Liquid Effluents

	Parameter	Max Receptor	Dose	Dose Limit	% of Limit
<u>Qtr 1</u>	Max Organ Dose (mrem)	Adult - Gi-LLi	3.39E-03	5.00E+00	0.07
	Total Body Dose (mrem)	Adult - Total Body	3.34E-03	1.50E+00	0.22
<u>Qtr 2</u>	Max Organ Dose (mrem)	Adult - Gi-LLi	2.40E-03	5.00E+00	0.05
	Total Body Dose (mrem)	Adult - Total Body	1.05E-03	1.50E+00	0.07
<u>Qtr 3</u>	Max Organ Dose (mrem)	Adult - Gi-LLi	4.91E-04	5.00E+00	0.01
	Total Body Dose (mrem)	Adult - Total Body	4.80E-04	1.50E+00	0.03
<u>Qtr 4</u>	Max Organ Dose (mrem)	Adult - Gi-LLi	1.87E-03	5.00E+00	0.04
	Total Body Dose (mrem)	Adult - Total Body	1.87E-03	1.50E+00	0.12
<u>Year</u>	Max Organ Dose (mrem)	Adult - Gi-LLi	8.15E-03	1.00E+01	0.08
	Total Body Dose (mrem)	Adult - Total Body	6.74E-03	3.00E+00	0.22

NOTE: See Section E for max organ for each quarter

ENCLOSURE A
ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
JANUARY - DECEMBER 2023
VIRGIL C. SUMMER NUCLEAR STATION

METEOROLOGICAL DATA
JOINT FREQUENCY DISTRIBUTION
TABLES

Quarterly Summaries

Annual Summary

WGDT Batch Releases

Quarterly Summaries

Joint Frequency Distribution**Hours at Each Wind Speed and Direction****Total Period****All Hours**

Period of Record =

01/01/2023 01:00 - 04/01/2023 00:00

Elevation: Speed: SP10T1 Direction: DR61T1 Lapse: DT61T1

Stability Class: A Delta Temperature Extremely Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	4	20	7	3	0	0	34
NNE	4	17	8	10	1	1	41
NE	1	4	2	0	0	0	7
ENE	1	6	1	0	1	0	9
E	0	3	4	0	0	0	7
ESE	0	1	2	0	0	0	3
SE	0	1	2	0	0	0	3
SSE	0	0	1	0	0	0	1
S	1	0	2	1	0	0	4
SSW	1	6	15	3	0	0	25
SW	2	18	18	0	0	0	38
WSW	9	26	4	0	0	0	39
W	6	23	1	0	0	0	30
WNW	4	12	2	0	0	0	18
NW	4	11	9	0	0	0	24
NNW	1	10	9	7	0	0	27
Total	38	158	87	24	2	1	310

Calm Hours not Included above for:	Total Period	All Hours	4
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	2
Number of Valid Hours for this Table:	Total Period	All Hours	310
Total Hours for the Period:			2160

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

All Hours

Period of Record = **Total Period**
01/01/2023 01:00 - 04/01/2023 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR61T1 **Lapse:** DT61T1

Stability Class: B **Delta Temperature** Moderately Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	4	7	4	9	0	0	24
NNE	0	7	12	11	0	0	30
NE	0	3	9	3	1	0	16
ENE	0	1	3	4	1	0	9
E	1	6	3	1	0	0	11
ESE	0	4	2	0	0	0	6
SE	0	3	0	0	0	0	3
SSE	0	9	1	0	0	0	10
S	0	8	2	2	0	0	12
SSW	0	7	11	2	0	0	20
SW	6	13	8	0	0	0	27
WSW	7	9	1	0	0	0	17
W	6	7	0	0	0	0	13
WNW	2	2	0	0	0	0	4
NW	1	5	2	0	0	0	8
NNW	3	8	3	5	0	0	19
Total	30	99	61	37	2	0	229

Calm Hours not Included above for:	Total Period	All Hours	4
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	2
Number of Valid Hours for this Table:	Total Period	All Hours	229
Total Hours for the Period:			2160

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 01/01/2023 01:00 - 04/01/2023 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR61T1 **Lapse:** DT61T1

Stability Class: C **Delta Temperature** Slightly Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	3	1	3	1	0	0	8
NNE	3	4	4	3	1	0	15
NE	1	4	14	8	1	0	28
ENE	3	4	15	0	0	0	22
E	0	6	1	0	0	0	7
ESE	0	1	0	0	0	0	1
SE	0	4	1	0	0	0	5
SSE	3	8	1	0	0	0	12
S	2	5	4	0	0	0	11
SSW	7	7	3	0	0	0	17
SW	4	10	6	0	0	0	20
WSW	5	9	2	0	0	0	16
W	8	5	1	0	0	0	14
WNW	5	3	0	0	0	0	8
NW	2	6	5	0	0	0	13
NNW	0	6	12	2	0	0	20
Total	46	83	72	14	2	0	217

Calm Hours not Included above for:	Total Period	All Hours	4
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	2
Number of Valid Hours for this Table:	Total Period	All Hours	217
Total Hours for the Period:			2160

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Total Period				All Hours			
Period of Record =		01/01/2023 01:00 - 04/01/2023 00:00					
Elevation:	Speed:	SP10T1	Direction:	DR61T1	Lapse:	DT61T1	
Stability Class:	D	Delta Temperature		Neutral			
Wind Speed (mph)							
Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	6	10	0	1	0	0	17
NNE	3	5	4	2	1	0	15
NE	7	8	10	4	0	0	29
ENE	6	12	9	1	0	0	28
E	2	11	5	0	0	0	18
ESE	3	14	3	0	0	0	20
SE	5	6	5	0	0	0	16
SSE	10	9	4	1	0	0	24
S	9	26	14	4	1	0	54
SSW	11	32	26	1	0	0	70
SW	32	54	32	1	0	0	119
WSW	36	48	9	0	0	0	93
W	34	35	1	0	0	0	70
WNW	11	6	0	0	0	0	17
NW	13	24	1	0	0	0	38
NNW	6	15	16	3	0	0	40
Total	194	315	139	18	2	0	668
Calm Hours not Included above for:		Total Period			All Hours		4
Variable Direction Hours for:		Total Period			All Hours		0
Invalid Hours for:		Total Period			All Hours		2
Number of Valid Hours for this Table:		Total Period			All Hours		668
Total Hours for the Period:							2160

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Total Period**All Hours**

Period of Record =

01/01/2023 01:00 - 04/01/2023 00:00

Elevation: Speed: SP10T1 Direction: DR61T1 Lapse: DT61T1

Stability Class: E Delta Temperature Slightly Stable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	4	3	3	0	0	0	10
NNE	5	4	2	1	0	0	12
NE	3	6	2	0	0	0	11
ENE	1	4	1	0	0	0	6
E	6	7	0	0	0	0	13
ESE	4	5	1	0	0	0	10
SE	9	10	0	0	0	0	19
SSE	11	12	1	0	0	0	24
S	10	35	1	0	0	0	46
SSW	9	22	2	0	0	0	33
SW	30	48	3	0	0	0	81
WSW	43	22	0	0	0	0	65
W	17	17	0	0	0	0	34
WNW	4	4	0	0	0	0	8
NW	12	7	0	0	0	0	19
NNW	6	12	1	1	0	0	20
Total	174	218	17	2	0	0	411

Calm Hours not Included above for:	Total Period	All Hours	4
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	2
Number of Valid Hours for this Table:	Total Period	All Hours	411
Total Hours for the Period:			2160

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Total Period**All Hours**

Period of Record =

01/01/2023 01:00 - 04/01/2023 00:00

Elevation:

Speed:

SP10T1

Direction:

DR61T1

Lapse:

DT61T1

Stability Class:

F

Delta Temperature

Moderately Stable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	4	0	0	0	0	0	4
NNE	0	1	0	0	0	0	1
NE	2	0	0	0	0	0	2
ENE	4	2	0	0	0	0	6
E	1	0	0	0	0	0	1
ESE	3	1	0	0	0	0	4
SE	8	7	0	0	0	0	15
SSE	11	18	0	0	0	0	29
S	10	17	0	0	0	0	27
SSW	8	7	0	0	0	0	15
SW	12	4	0	0	0	0	16
WSW	16	3	0	0	0	0	19
W	14	5	0	0	0	0	19
WNW	5	0	0	0	0	0	5
NW	3	0	0	0	0	0	3
NNW	6	0	0	0	0	0	6
Total	107	65	0	0	0	0	172

Calm Hours not Included above for:

Total Period

All Hours

4

Variable Direction Hours for:

Total Period

All Hours

0

Invalid Hours for:

Total Period

All Hours

2

Number of Valid Hours for this Table:

Total Period

All Hours

172

Total Hours for the Period:

2160

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 01/01/2023 01:00 - 04/01/2023 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR61T1 **Lapse:** DT61T1

Stability Class: G **Delta Temperature** **Extremely Stable**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	6	0	0	0	0	0	6
NNE	1	0	0	0	0	0	1
NE	2	0	0	0	0	0	2
ENE	7	0	0	0	0	0	7
E	1	2	0	0	0	0	3
ESE	2	0	0	0	0	0	2
SE	3	0	0	0	0	0	3
SSE	5	2	0	0	0	0	7
S	10	2	0	0	0	0	12
SSW	19	1	0	0	0	0	20
SW	17	2	0	0	0	0	19
WSW	18	4	0	0	0	0	22
W	17	0	0	0	0	0	17
WNW	6	1	0	0	0	0	7
NW	14	0	0	0	0	0	14
NNW	5	0	0	0	0	0	5
Total	133	14	0	0	0	0	147

Calm Hours not Included above for:	Total Period	All Hours	4
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	2
Number of Valid Hours for this Table:	Total Period	All Hours	147
Total Hours for the Period:			2160

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** 01/01/2023 01:00 - 04/01/2023 00:00 **All Hours**

Elevation: Speed: SP10T1 Direction: DR61T1 Lapse: DT61T1

Stability Class: ALL Delta Temperature

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	31	41	17	14	0	0	103
NNE	16	38	30	27	3	1	115
NE	16	25	37	15	2	0	95
ENE	22	29	29	5	2	0	87
E	11	35	13	1	0	0	60
ESE	12	26	8	0	0	0	46
SE	25	31	8	0	0	0	64
SSE	40	58	8	1	0	0	107
S	42	93	23	7	1	0	166
SSW	55	82	57	6	0	0	200
SW	103	149	67	1	0	0	320
WSW	134	121	16	0	0	0	271
W	102	92	3	0	0	0	197
WNW	37	28	2	0	0	0	67
NW	49	53	17	0	0	0	119
NNW	27	51	41	18	0	0	137
Total	722	952	376	95	8	1	2154

Calm Hours not Included above for:	Total Period	All Hours	4
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	2
Number of Valid Hours for this Table:	Total Period	All Hours	2154
Total Hours for the Period:			2160

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Total Period**All Hours**

Period of Record =

04/01/2023 01:00 - 07/01/2023 00:00

Elevation: Speed: SP10T1 Direction: DR61T1 Lapse: DT61T1

Stability Class: A Delta Temperature Extremely Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	10	15	5	0	5	2	37
NNE	7	23	11	20	1	3	65
NE	6	19	39	25	3	0	92
ENE	2	19	19	1	0	0	41
E	2	6	5	0	0	0	13
ESE	0	5	3	0	0	0	8
SE	0	3	3	0	0	0	6
SSE	0	5	2	0	0	0	7
S	0	4	11	0	0	0	15
SSW	1	20	10	0	0	0	31
SW	11	48	4	0	0	0	63
WSW	21	79	10	0	0	0	110
W	11	45	10	0	0	0	66
WNW	8	13	1	0	0	0	22
NW	3	4	0	0	0	0	7
NNW	5	6	5	0	0	0	16
Total	87	314	138	46	9	5	599

Calm Hours not Included above for:	Total Period	All Hours	1
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	13
Number of Valid Hours for this Table:	Total Period	All Hours	599
Total Hours for the Period:			2184

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** 04/01/2023 01:00 - 07/01/2023 00:00 **All Hours**

Elevation: Speed: SP10T1 Direction: DR61T1 Lapse: DT61T1

Stability Class: B Delta Temperature Moderately Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	2	2	6	1	1	0	12
NNE	1	0	20	15	3	0	39
NE	0	3	31	17	0	0	51
ENE	0	7	16	2	0	0	25
E	0	5	7	0	0	0	12
ESE	0	7	3	0	0	0	10
SE	0	7	1	0	0	0	8
SSE	1	12	0	0	0	0	13
S	1	10	1	0	0	0	12
SSW	0	16	0	0	0	0	16
SW	4	17	2	0	0	0	23
WSW	3	5	0	0	0	0	8
W	3	7	4	0	0	0	14
WNW	3	2	0	0	0	0	5
NW	3	0	0	0	0	0	3
NNW	0	1	2	0	0	0	3
Total	21	101	93	35	4	0	254

Calm Hours not Included above for:	Total Period	All Hours	1
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	13
Number of Valid Hours for this Table:	Total Period	All Hours	254
Total Hours for the Period:			2184

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

All Hours**Total Period**

Period of Record =

04/01/2023 01:00 - 07/01/2023 00:00

Elevation: Speed: SP10T1 Direction: DR61T1 Lapse: DT61T1

Stability Class: C Delta Temperature Slightly Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	1	4	4	9	3	0	21
NNE	1	4	15	9	0	0	29
NE	0	17	29	14	0	0	60
ENE	2	29	19	2	0	0	52
E	0	6	7	0	0	0	13
ESE	0	3	0	0	0	0	3
SE	0	2	0	0	0	0	2
SSE	3	8	0	0	0	0	11
S	3	8	0	0	0	0	11
SSW	6	5	2	0	0	0	13
SW	2	12	2	0	0	0	16
WSW	3	4	0	0	0	0	7
W	2	1	2	0	0	0	5
WNW	0	0	0	0	0	0	0
NW	1	2	0	0	0	0	3
NNW	0	1	2	0	0	0	3
Total	24	106	82	34	3	0	249

Calm Hours not Included above for:	Total Period	All Hours	1
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	13
Number of Valid Hours for this Table:	Total Period	All Hours	249
Total Hours for the Period:			2184

Joint Frequency Distribution**Hours at Each Wind Speed and Direction**

Period of Record = **Total Period** **All Hours**
 04/01/2023 01:00 - 07/01/2023 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR61T1 **Lapse:** DT61T1

Stability Class: D **Delta Temperature** **Neutral**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	0	5	0	4	0	0	9
NNE	2	11	7	9	2	0	31
NE	0	17	26	15	0	0	58
ENE	1	32	9	0	0	0	42
E	5	22	7	0	0	0	34
ESE	4	7	1	0	0	0	12
SE	5	6	3	0	0	0	14
SSE	3	12	3	0	0	0	18
S	5	37	3	0	0	0	45
SSW	9	25	8	0	0	0	42
SW	24	25	5	0	0	0	54
WSW	25	16	1	0	0	0	42
W	20	20	2	0	0	0	42
WNW	13	3	1	0	0	0	17
NW	9	4	0	0	0	0	13
NNW	6	3	4	0	1	0	14
Total	131	245	80	28	3	0	487

Calm Hours not Included above for:	Total Period	All Hours	1
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	13
Number of Valid Hours for this Table:	Total Period	All Hours	487
Total Hours for the Period:			2184

Joint Frequency Distribution**Hours at Each Wind Speed and Direction**

Period of Record =		Total Period					All Hours
		04/01/2023 01:00 - 07/01/2023 00:00					
Elevation:	Speed:	SP10T1	Direction:	DR61T1	Lapse:	DT61T1	
Stability Class:	E	Delta Temperature		Slightly Stable			
		Wind Speed (mph)					
Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	3	3	0	0	0	0	6
NNE	7	3	1	0	0	0	11
NE	4	7	0	0	0	0	11
ENE	7	11	0	0	0	0	18
E	3	8	0	0	0	0	11
ESE	6	6	1	0	0	0	13
SE	5	8	0	0	0	0	13
SSE	5	20	0	0	0	0	25
S	5	11	0	0	0	0	16
SSW	11	10	0	0	0	0	21
SW	35	22	2	0	0	0	59
WSW	43	29	0	0	0	0	72
W	37	7	0	0	0	0	44
WNW	10	5	0	0	0	0	15
NW	8	1	0	0	0	0	9
NNW	3	9	0	0	0	0	12
Total	192	160	4	0	0	0	356
Calm Hours not Included above for:		Total Period			All Hours		1
Variable Direction Hours for:		Total Period			All Hours		0
Invalid Hours for:		Total Period			All Hours		13
Number of Valid Hours for this Table:		Total Period			All Hours		356
Total Hours for the Period:							2184

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 04/01/2023 01:00 - 07/01/2023 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR61T1 **Lapse:** DT61T1

Stability Class: F **Delta Temperature** **Moderately Stable**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	8	0	0	0	0	0	8
NNE	7	0	0	0	0	0	7
NE	1	1	0	0	0	0	2
ENE	3	0	0	0	0	0	3
E	4	0	0	0	0	0	4
ESE	2	3	0	0	0	0	5
SE	2	3	0	0	0	0	5
SSE	2	9	0	0	0	0	11
S	3	8	0	0	0	0	11
SSW	9	5	1	0	0	0	15
SW	17	5	0	0	0	0	22
WSW	14	1	0	0	0	0	15
W	14	4	0	0	0	0	18
WNW	10	0	0	0	0	0	10
NW	6	1	0	0	0	0	7
NNW	5	0	0	0	0	0	5
Total	107	40	1	0	0	0	148

Calm Hours not Included above for:	Total Period	All Hours	1
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	13
Number of Valid Hours for this Table:	Total Period	All Hours	148
Total Hours for the Period:			2184

Joint Frequency Distribution**Hours at Each Wind Speed and Direction**

Period of Record = **Total Period** **All Hours**
 04/01/2023 01:00 - 07/01/2023 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR61T1 **Lapse:** DT61T1

Stability Class: G **Delta Temperature** **Extremely Stable**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	5	0	0	0	0	0	5
NNE	8	0	0	0	0	0	8
NE	2	0	0	0	0	0	2
ENE	2	0	0	0	0	0	2
E	2	0	0	0	0	0	2
ESE	1	0	0	0	0	0	1
SE	2	2	0	0	0	0	4
SSE	3	2	0	0	0	0	5
S	1	4	0	0	0	0	5
SSW	5	5	0	0	0	0	10
SW	10	1	0	0	0	0	11
WSW	7	0	0	0	0	0	7
W	2	0	0	0	0	0	2
WNW	4	0	0	0	0	0	4
NW	4	0	0	0	0	0	4
NNW	5	0	0	0	0	0	5
Total	63	14	0	0	0	0	77

Calm Hours not Included above for:	Total Period	All Hours	1
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	13
Number of Valid Hours for this Table:	Total Period	All Hours	77
Total Hours for the Period:			2184

Joint Frequency Distribution**Hours at Each Wind Speed and Direction**

Period of Record = **Total Period** **All Hours**
 04/01/2023 01:00 - 07/01/2023 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR61T1 **Lapse:** DT61T1

Stability Class: ALL **Delta Temperature**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	29	29	15	14	9	2	98
NNE	33	41	54	53	6	3	190
NE	13	64	125	71	3	0	276
ENE	17	98	63	5	0	0	183
E	16	47	26	0	0	0	89
ESE	13	31	8	0	0	0	52
SE	14	31	7	0	0	0	52
SSE	17	68	5	0	0	0	90
S	18	82	15	0	0	0	115
SSW	41	86	21	0	0	0	148
SW	103	130	15	0	0	0	248
WSW	116	134	11	0	0	0	261
W	89	84	18	0	0	0	191
WNW	48	23	2	0	0	0	73
NW	34	12	0	0	0	0	46
NNW	24	20	13	0	1	0	58
Total	625	980	398	143	19	5	2170
<hr/>							
Calm Hours not Included above for:	Total Period		All Hours				1
Variable Direction Hours for:	Total Period		All Hours				0
Invalid Hours for:	Total Period		All Hours				13
Number of Valid Hours for this Table:	Total Period		All Hours				2170
Total Hours for the Period:							2184

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Total Period**All Hours**

Period of Record =

07/01/2023 01:00 - 10/01/2023 00:00

Elevation: Speed: SP10T1 Direction: DR61T1 Lapse: DT61T1

Stability Class: A Delta Temperature Extremely Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	23	23	7	2	1	0	56
NNE	19	44	9	19	13	0	104
NE	25	30	16	8	0	0	79
ENE	0	21	21	2	0	0	44
E	1	7	4	0	0	0	12
ESE	3	7	2	0	0	0	12
SE	1	5	0	0	0	0	6
SSE	2	7	8	0	0	0	17
S	2	12	3	0	0	0	17
SSW	0	16	2	0	0	0	18
SW	11	26	1	0	0	0	38
WSW	28	55	1	0	0	0	84
W	18	34	0	0	0	0	52
WNW	28	24	0	0	0	0	52
NW	7	14	0	0	0	0	21
NNW	9	21	5	3	0	0	38
Total	177	346	79	34	14	0	650
<hr/>							
Calm Hours not Included above for:	Total Period		All Hours		0		
Variable Direction Hours for:	Total Period		All Hours		0		
Invalid Hours for:	Total Period		All Hours		3		
Number of Valid Hours for this Table:	Total Period		All Hours		650		
Total Hours for the Period:					2208		

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

All Hours**Total Period**

Period of Record =

07/01/2023 01:00 - 10/01/2023 00:00

Elevation: Speed: SP10T1 Direction: DR61T1 Lapse: DT61T1

Stability Class: B Delta Temperature Moderately Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	2	5	1	2	0	0	10
NNE	2	8	8	5	0	0	23
NE	2	6	25	4	0	0	37
ENE	2	4	6	0	0	0	12
E	0	8	1	0	0	0	9
ESE	0	3	0	0	0	0	3
SE	2	1	2	0	0	0	5
SSE	1	14	1	0	0	0	16
S	2	4	1	0	0	0	7
SSW	3	19	0	0	0	0	22
SW	6	14	0	0	0	0	20
WSW	9	4	0	0	0	0	13
W	5	2	0	0	0	0	7
WNW	6	1	1	0	0	0	8
NW	4	2	0	0	0	0	6
NNW	1	2	1	2	0	0	6
Total	47	97	47	13	0	0	204

Calm Hours not Included above for:	Total Period	All Hours	0
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	3
Number of Valid Hours for this Table:	Total Period	All Hours	204
Total Hours for the Period:			2208

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record =		Total Period			All Hours		
		07/01/2023 01:00 - 10/01/2023 00:00					
Elevation:	Speed:	SP10T1	Direction:	DR61T1	Lapse:	DT61T1	
Stability Class:	C	Delta Temperature		Slightly Unstable			
Wind Speed (mph)							
Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	1	3	3	0	0	0	7
NNE	2	6	6	2	0	0	16
NE	0	6	12	1	0	0	19
ENE	1	6	17	0	0	0	24
E	0	3	1	0	0	0	4
ESE	1	5	3	0	0	0	9
SE	2	7	0	0	0	0	9
SSE	2	11	0	0	0	0	13
S	1	11	0	0	0	0	12
SSW	7	6	1	0	0	0	14
SW	6	7	0	0	0	0	13
WSW	9	4	0	0	0	0	13
W	4	1	0	0	0	0	5
WNW	5	2	0	0	0	0	7
NW	1	1	2	0	0	0	4
NNW	3	1	4	0	0	0	8
Total	45	80	49	3	0	0	177
Calm Hours not Included above for:		Total Period			All Hours		0
Variable Direction Hours for:		Total Period			All Hours		0
Invalid Hours for:		Total Period			All Hours		3
Number of Valid Hours for this Table:		Total Period			All Hours		177
Total Hours for the Period:							2208

Joint Frequency Distribution**Hours at Each Wind Speed and Direction**

Total Period				All Hours			
Period of Record =		07/01/2023 01:00 - 10/01/2023 00:00					
Elevation:	Speed:	SP10T1	Direction:	DR61T1	Lapse:	DT61T1	
Stability Class:	D	Delta Temperature		Neutral			
Wind Speed (mph)							
Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	9	6	4	1	0	0	20
NNE	1	9	5	2	0	0	17
NE	5	9	12	0	0	0	26
ENE	4	19	4	0	0	0	27
E	3	26	9	0	0	0	38
ESE	1	21	2	0	0	0	24
SE	7	17	1	0	0	0	25
SSE	5	17	3	0	0	0	25
S	11	27	0	0	0	0	38
SSW	16	26	4	0	0	0	46
SW	38	25	0	0	0	0	63
WSW	31	18	1	0	0	0	50
W	26	5	0	0	0	0	31
WNW	20	1	0	0	0	0	21
NW	20	10	0	0	0	0	30
NNW	7	6	1	0	0	0	14
Total	204	242	46	3	0	0	495
Calm Hours not Included above for:		Total Period			All Hours		0
Variable Direction Hours for:		Total Period			All Hours		0
Invalid Hours for:		Total Period			All Hours		3
Number of Valid Hours for this Table:		Total Period			All Hours		495
Total Hours for the Period:							2208

Joint Frequency Distribution**Hours at Each Wind Speed and Direction****Total Period****All Hours**

Period of Record =

07/01/2023 01:00 - 10/01/2023 00:00

Elevation: Speed: SP10T1 Direction: DR61T1 Lapse: DT61T1

Stability Class: E Delta Temperature Slightly Stable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	3	4	0	0	0	0	7
NNE	3	1	0	0	0	0	4
NE	2	1	1	0	0	0	4
ENE	4	1	0	0	0	0	5
E	6	3	0	0	0	0	9
ESE	9	8	0	0	0	0	17
SE	9	13	2	0	0	0	24
SSE	15	28	0	0	0	0	43
S	28	32	1	0	0	0	61
SSW	28	19	1	0	0	0	48
SW	34	12	1	0	0	0	47
WSW	66	5	0	0	0	0	71
W	35	1	0	0	0	0	36
WNW	16	0	0	0	0	0	16
NW	14	2	0	0	0	0	16
NNW	10	4	0	0	0	0	14
Total	282	134	6	0	0	0	422

Calm Hours not Included above for:	Total Period	All Hours	0
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	3
Number of Valid Hours for this Table:	Total Period	All Hours	422
Total Hours for the Period:			2208

Joint Frequency Distribution**Hours at Each Wind Speed and Direction**

Period of Record = **Total Period** **All Hours**
 07/01/2023 01:00 - 10/01/2023 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR61T1 **Lapse:** DT61T1

Stability Class: F **Delta Temperature** **Moderately Stable**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	10	1	0	0	0	0	11
NNE	9	0	0	0	0	0	9
NE	4	0	0	0	0	0	4
ENE	2	0	0	0	0	0	2
E	6	0	0	0	0	0	6
ESE	2	0	0	0	0	0	2
SE	3	4	1	0	0	0	8
SSE	7	11	0	0	0	0	18
S	11	7	0	0	0	0	18
SSW	12	5	0	0	0	0	17
SW	16	4	0	0	0	0	20
WSW	25	2	0	0	0	0	27
W	26	0	0	0	0	0	26
WNW	12	0	0	0	0	0	12
NW	7	0	0	0	0	0	7
NNW	17	0	0	0	0	0	17
Total	169	34	1	0	0	0	204

Calm Hours not Included above for:	Total Period	All Hours	0
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	3
Number of Valid Hours for this Table:	Total Period	All Hours	204
Total Hours for the Period:			2208

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** 07/01/2023 01:00 - 10/01/2023 00:00 **All Hours**

Elevation: Speed: SP10T1 Direction: DR61T1 Lapse: DT61T1

Stability Class: G Delta Temperature Extremely Stable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	4	0	0	0	0	0	4
NNE	5	0	0	0	0	0	5
NE	2	0	0	0	0	0	2
ENE	0	0	0	0	0	0	0
E	1	0	0	0	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	2	1	0	0	0	0	3
SSW	9	0	0	0	0	0	9
SW	5	0	0	0	0	0	5
WSW	6	0	0	0	0	0	6
W	5	0	0	0	0	0	5
WNW	5	0	1	0	0	0	6
NW	0	0	0	0	0	0	0
NNW	7	0	0	0	0	0	7
Total	51	1	1	0	0	0	53

Calm Hours not Included above for:	Total Period	All Hours	0
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	3
Number of Valid Hours for this Table:	Total Period	All Hours	53
Total Hours for the Period:			2208

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record =		Total Period					All Hours
		07/01/2023 01:00 - 10/01/2023 00:00					
Elevation:	Speed:	SP10T1	Direction:	DR61T1	Lapse:	DT61T1	
Stability Class:	ALL	Delta Temperature					
Wind Speed (mph)							
Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	52	42	15	5	1	0	115
NNE	41	68	28	28	13	0	178
NE	40	52	66	13	0	0	171
ENE	13	51	48	2	0	0	114
E	17	47	15	0	0	0	79
ESE	16	44	7	0	0	0	67
SE	24	47	6	0	0	0	77
SSE	32	88	12	0	0	0	132
S	57	94	5	0	0	0	156
SSW	75	91	8	0	0	0	174
SW	116	88	2	0	0	0	206
WSW	174	88	2	0	0	0	264
W	119	43	0	0	0	0	162
WNW	92	28	2	0	0	0	122
NW	53	29	2	0	0	0	84
NNW	54	34	11	5	0	0	104
Total	975	934	229	53	14	0	2205
Calm Hours not Included above for:		Total Period			All Hours		0
Variable Direction Hours for:		Total Period			All Hours		0
Invalid Hours for:		Total Period			All Hours		3
Number of Valid Hours for this Table:		Total Period			All Hours		2205
Total Hours for the Period:							2208

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 10/01/2023 01:00 - 01/01/2024 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: A **Delta Temperature** **Extremely Unstable**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	17	21	9	5	6	0	58
NNE	4	14	7	5	0	0	30
NE	1	22	29	8	0	0	60
ENE	1	20	12	4	0	0	37
E	0	3	3	0	0	0	6
ESE	0	0	3	0	0	0	3
SE	0	0	1	0	0	0	1
SSE	0	0	0	0	0	0	0
S	0	1	0	0	0	0	1
SSW	0	5	3	0	0	0	8
SW	4	32	6	0	0	0	42
WSW	7	22	2	0	0	0	31
W	7	24	1	0	0	0	32
WNW	4	14	0	0	0	0	18
NW	3	10	6	0	0	0	19
NNW	15	14	11	13	3	0	56
Total	63	202	93	35	9	0	402

Calm Hours not Included above for:	Total Period	All Hours	1
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	402
Total Hours for the Period:			2208

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = Total Period All Hours
10/01/2023 01:00 - 01/01/2024 00:00

Elevation: Speed: SP10T1 Direction: DR10T1 Lapse: DT61T1

Stability Class: B Delta Temperature Moderately Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	2	13	5	3	3	0	26
NNE	3	4	27	5	1	0	40
NE	3	11	32	11	0	0	57
ENE	0	4	11	1	0	0	16
E	2	5	3	0	0	0	10
ESE	1	2	7	0	0	0	10
SE	1	1	0	0	0	0	2
SSE	0	0	0	0	0	0	0
S	2	6	0	0	0	0	8
SSW	4	7	1	0	0	0	12
SW	4	10	0	0	0	0	14
WSW	1	7	0	0	0	0	8
W	4	6	0	0	0	0	10
WNW	5	0	0	0	0	0	5
NW	2	4	0	1	0	0	7
NNW	2	2	3	4	2	0	13
Total	36	82	89	25	6	0	238

Calm Hours not Included above for:	Total Period	All Hours	1
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	238
Total Hours for the Period:			2208

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 10/01/2023 01:00 - 01/01/2024 00:00

Elevation: **Speed:** SP10T1 **Direction:** DRI0T1 **Lapse:** DT61T1

Stability Class: C **Delta Temperature** **Slightly Unstable**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	5	4	0	0	0	0	9
NNE	2	5	10	2	2	0	21
NE	1	8	31	1	0	0	41
ENE	0	4	30	0	0	0	34
E	1	7	6	0	0	0	14
ESE	2	3	8	0	0	0	13
SE	0	1	1	0	0	0	2
SSE	0	3	0	0	0	0	3
S	3	5	1	0	0	0	9
SSW	3	8	1	0	0	0	12
SW	4	6	0	0	0	0	10
WSW	3	8	0	0	0	0	11
W	3	4	0	0	0	0	7
WNW	1	0	0	0	0	0	1
NW	1	4	3	0	0	0	8
NNW	3	5	3	0	0	0	11
Total	32	75	94	3	2	0	206

Calm Hours not Included above for:	Total Period	All Hours	1
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	206
Total Hours for the Period:			2208

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = 10/01/2023 01:00 - 01/01/2024 00:00

Elevation: Speed: SP10T1 Direction: DR10T1 Lapse: DT61T1

Stability Class: D Delta Temperature Neutral

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	5	8	6	0	0	0	19
NNE	4	10	6	3	0	0	23
NE	1	19	22	1	0	0	43
ENE	2	34	19	0	0	0	55
E	6	32	14	0	0	0	52
ESE	1	18	4	0	0	0	23
SE	4	11	6	0	0	0	21
SSE	3	11	2	0	0	0	16
S	4	7	10	0	0	0	21
SSW	9	31	7	0	0	0	47
SW	15	29	1	0	0	0	45
WSW	16	22	0	0	0	0	38
W	18	11	0	0	0	0	29
WNW	21	9	1	0	0	0	31
NW	6	17	1	0	0	0	24
NNW	5	7	3	0	0	0	15
Total	120	276	102	4	0	0	502

Calm Hours not Included above for:	Total Period	All Hours	1
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	502
Total Hours for the Period:			2208

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record =

Total Period

All Hours

10/01/2023 01:00 - 01/01/2024 00:00

Elevation:

Speed:

SP10T1

Direction:

DR10T1

Lapse:

DT61T1

Stability Class:

E

Delta Temperature

Slightly Stable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	7	8	0	0	0	0	15
NNE	6	3	1	0	0	0	10
NE	2	5	1	0	0	0	8
ENE	4	3	0	0	0	0	7
E	2	11	1	0	0	0	14
ESE	3	4	0	0	0	0	7
SE	5	5	0	0	0	0	10
SSE	9	8	0	0	0	0	17
S	7	15	0	0	0	0	22
SSW	15	37	0	0	0	0	52
SW	37	15	0	0	0	0	52
WSW	25	14	0	0	0	0	39
W	22	11	0	0	0	0	33
WNW	24	4	0	0	0	0	28
NW	15	9	0	0	0	0	24
NNW	5	7	0	0	0	0	12
Total	188	159	3	0	0	0	350

Calm Hours not Included above for:

Total Period

All Hours

1

Variable Direction Hours for:

Total Period

All Hours

0

Invalid Hours for:

Total Period

All Hours

0

Number of Valid Hours for this Table:

Total Period

All Hours

350

Total Hours for the Period:

2208

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 10/01/2023 01:00 - 01/01/2024 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: F **Delta Temperature** **Moderately Stable**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	3	0	0	0	0	0	3
NNE	4	1	0	0	0	0	5
NE	0	0	0	0	0	0	0
ENE	1	1	0	0	0	0	2
E	4	0	0	0	0	0	4
ESE	3	0	0	0	0	0	3
SE	5	4	0	0	0	0	9
SSE	9	15	0	0	0	0	24
S	14	9	0	0	0	0	23
SSW	37	13	0	0	0	0	50
SW	22	3	0	0	0	0	25
WSW	23	2	0	0	0	0	25
W	21	7	0	0	0	0	28
WNW	24	2	0	0	0	0	26
NW	6	3	0	0	0	0	9
NNW	7	1	0	0	0	0	8
Total	183	61	0	0	0	0	244

Calm Hours not Included above for:	Total Period	All Hours	1
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	244
Total Hours for the Period:			2208

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 10/01/2023 01:00 - 01/01/2024 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: G **Delta Temperature** **Extremely Stable**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	2	0	0	0	0	0	2
NNE	0	0	0	0	0	0	0
NE	2	0	0	0	0	0	2
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	3	4	0	0	0	0	7
S	17	2	0	0	0	0	19
SSW	26	2	0	0	0	0	28
SW	42	1	0	0	0	0	43
WSW	79	3	0	0	0	0	82
W	56	1	0	0	0	0	57
WNW	17	0	0	0	0	0	17
NW	3	0	0	0	0	0	3
NNW	5	0	0	0	0	0	5
Total	252	13	0	0	0	0	265

Calm Hours not Included above for:	Total Period	All Hours	1
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	265
Total Hours for the Period:			2208

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 10/01/2023 01:00 - 01/01/2024 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: ALL **Delta Temperature**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	41	54	20	8	9	0	132
NNE	23	37	51	15	3	0	129
NE	10	65	115	21	0	0	211
ENE	8	66	72	5	0	0	151
E	15	58	27	0	0	0	100
ESE	10	27	22	0	0	0	59
SE	15	22	8	0	0	0	45
SSE	24	41	2	0	0	0	67
S	47	45	11	0	0	0	103
SSW	94	103	12	0	0	0	209
SW	128	96	7	0	0	0	231
WSW	154	78	2	0	0	0	234
W	131	64	1	0	0	0	196
WNW	96	29	1	0	0	0	126
NW	36	47	10	1	0	0	94
NNW	42	36	20	17	5	0	120
Total	874	868	381	67	17	0	2207
<hr/>							
Calm Hours not Included above for:	Total Period		All Hours				
Variable Direction Hours for:	Total Period		All Hours				
Invalid Hours for:	Total Period		All Hours				
Number of Valid Hours for this Table:	Total Period		All Hours				
Total Hours for the Period:							

Annual Summary

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = 01/01/2023 01:00 - 01/01/2024 00:00

Elevation: Speed: SP10T1 Direction: DR10T1 Lapse: DT61T1

Stability Class: A Delta Temperature Extremely Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	65	81	28	10	12	2	198
NNE	40	102	39	57	15	4	257
NE	20	79	89	39	3	0	230
ENE	5	55	46	6	1	0	113
E	2	17	17	0	0	0	36
ESE	2	14	7	0	0	0	23
SE	1	7	8	0	0	0	16
SSE	0	10	9	0	0	0	19
S	2	21	18	1	0	0	42
SSW	1	59	34	3	0	0	97
SW	37	140	25	0	0	0	202
WSW	43	142	15	0	0	0	200
W	31	116	14	0	0	0	161
WNW	35	62	1	0	0	0	98
NW	35	52	20	0	0	0	107
NNW	46	63	27	23	3	0	162
Total	365	1020	397	139	34	6	1961

Calm Hours not Included above for:	Total Period	All Hours	6
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	18
Number of Valid Hours for this Table:	Total Period	All Hours	1961
Total Hours for the Period:			8760

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 01/01/2023 01:00 - 01/01/2024 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: B **Delta Temperature** Moderately Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	9	22	16	15	4	0	66
NNE	8	24	70	37	4	0	143
NE	6	23	93	35	1	0	158
ENE	1	21	32	5	1	0	60
E	3	18	17	1	0	0	39
ESE	3	15	12	0	0	0	30
SE	3	10	3	0	0	0	16
SSE	2	33	2	0	0	0	37
S	4	33	4	2	0	0	43
SSW	6	57	15	2	0	0	80
SW	26	49	7	0	0	0	82
WSW	10	18	1	0	0	0	29
W	16	21	4	0	0	0	41
WNW	12	6	1	0	0	0	19
NW	12	16	4	1	0	0	33
NNW	13	13	9	12	2	0	49
Total	134	379	290	110	12	0	925

Calm Hours not Included above for:	Total Period	All Hours	6
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	18
Number of Valid Hours for this Table:	Total Period	All Hours	925
Total Hours for the Period:			8760

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 01/01/2023 01:00 - 01/01/2024 00:00
Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: C **Delta Temperature** Slightly Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	9	14	9	10	3	0	45
NNE	10	20	35	19	3	0	87
NE	5	41	95	21	1	0	163
ENE	2	38	71	2	0	0	113
E	1	24	16	0	0	0	41
ESE	3	8	11	0	0	0	22
SE	2	12	2	0	0	0	16
SSE	7	32	1	0	0	0	40
S	15	26	4	0	0	0	45
SSW	18	35	12	0	0	0	65
SW	19	33	4	0	0	0	56
WSW	15	22	1	0	0	0	38
W	16	11	4	0	0	0	31
WNW	7	4	0	0	0	0	11
NW	9	14	13	0	0	0	36
NNW	9	10	19	2	0	0	40
Total	147	344	297	54	7	0	849

Calm Hours not Included above for:	Total Period	All Hours	6
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	18
Number of Valid Hours for this Table:	Total Period	All Hours	849
Total Hours for the Period:			8760

Joint Frequency Distribution**Hours at Each Wind Speed and Direction**

Period of Record = **Total Period** **All Hours**
 01/01/2023 01:00 - 01/01/2024 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: D **Delta Temperature** **Neutral**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	23	32	12	5	0	0	72
NNE	15	39	23	17	3	0	97
NE	13	55	71	19	0	0	158
ENE	10	96	35	1	0	0	142
E	12	97	37	0	0	0	146
ESE	14	45	8	0	0	0	67
SE	12	37	17	0	0	0	66
SSE	25	68	13	0	0	0	106
S	35	90	26	4	1	0	156
SSW	59	153	61	3	0	0	276
SW	116	106	26	0	0	0	248
WSW	90	82	7	0	0	0	179
W	91	75	4	0	0	0	170
WNW	72	22	2	0	0	0	96
NW	40	59	4	0	0	0	103
NNW	22	22	21	4	1	0	70
Total	649	1078	367	53	5	0	2152
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Calm Hours not Included above for:	Total Period		All Hours				
Variable Direction Hours for:	Total Period		All Hours				
Invalid Hours for:	Total Period		All Hours				
Number of Valid Hours for this Table:	Total Period		All Hours				
Total Hours for the Period:							

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 01/01/2023 01:00 - 01/01/2024 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: E **Delta Temperature** Slightly Stable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	12	16	4	0	0	0	32
NNE	17	27	1	1	0	0	46
NE	10	21	5	0	0	0	36
ENE	16	13	0	0	0	0	29
E	7	30	2	0	0	0	39
ESE	12	19	2	0	0	0	33
SE	27	44	1	0	0	0	72
SSE	58	77	2	0	0	0	137
S	70	92	1	0	0	0	163
SSW	94	130	6	0	0	0	230
SW	168	57	4	0	0	0	229
WSW	133	49	0	0	0	0	182
W	91	41	0	0	0	0	132
WNW	64	11	0	0	0	0	75
NW	40	26	0	0	0	0	66
NNW	17	18	2	1	0	0	38
Total	836	671	30	2	0	0	1539

Calm Hours not Included above for:	Total Period	All Hours	6
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	18
Number of Valid Hours for this Table:	Total Period	All Hours	1539
Total Hours for the Period:			8760

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

All Hours

Period of Record = **Total Period**
 01/01/2023 01:00 - 01/01/2024 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: F **Delta Temperature** Moderately Stable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	10	0	0	0	0	0	10
NNE	9	2	0	0	0	0	11
NE	2	1	0	0	0	0	3
ENE	2	1	0	0	0	0	3
E	8	2	0	0	0	0	10
ESE	5	0	0	0	0	0	5
SE	8	24	0	0	0	0	32
SSE	42	76	1	0	0	0	119
S	50	32	1	0	0	0	83
SSW	89	26	0	0	0	0	115
SW	79	9	0	0	0	0	88
WSW	80	5	0	0	0	0	85
W	77	14	0	0	0	0	91
WNW	54	2	0	0	0	0	56
NW	33	4	0	0	0	0	37
NNW	18	2	0	0	0	0	20
Total	566	200	2	0	0	0	768

Calm Hours not Included above for:	Total Period	All Hours	6
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	18
Number of Valid Hours for this Table:	Total Period	All Hours	768
Total Hours for the Period:			8760

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 01/01/2023 01:00 - 01/01/2024 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: G **Delta Temperature** **Extremely Stable**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	4	0	0	0	0	0	4
NNE	2	0	0	0	0	0	2
NE	3	0	0	0	0	0	3
ENE	0	0	0	0	0	0	0
E	1	0	0	0	0	0	1
ESE	2	0	0	0	0	0	2
SE	3	1	0	0	0	0	4
SSE	21	13	0	0	0	0	34
S	49	9	0	0	0	0	58
SSW	59	7	0	0	0	0	66
SW	90	6	0	0	0	0	96
WSW	126	3	0	0	0	0	129
W	96	3	0	0	0	0	99
WNW	27	0	1	0	0	0	28
NW	10	0	0	0	0	0	10
NNW	6	0	0	0	0	0	6
Total	499	42	1	0	0	0	542

Calm Hours not Included above for:	Total Period	All Hours	6
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	18
Number of Valid Hours for this Table:	Total Period	All Hours	542
Total Hours for the Period:			8760

Joint Frequency Distribution**Hours at Each Wind Speed and Direction**

Period of Record = **Total Period** **All Hours**
 01/01/2023 01:00 - 01/01/2024 00:00

Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: ALL **Delta Temperature**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	132	165	69	40	19	2	427
NNE	101	214	168	131	25	4	643
NE	59	220	353	114	5	0	751
ENE	36	224	184	14	2	0	460
E	34	188	89	1	0	0	312
ESE	41	101	40	0	0	0	182
SE	56	135	31	0	0	0	222
SSE	155	309	28	0	0	0	492
S	225	303	54	7	1	0	590
SSW	326	467	128	8	0	0	929
SW	535	400	66	0	0	0	1001
WSW	497	321	24	0	0	0	842
W	418	281	26	0	0	0	725
WNW	271	107	5	0	0	0	383
NW	179	171	41	1	0	0	392
NNW	131	128	78	42	6	0	385
Total	3196	3734	1384	358	58	6	8736

Calm Hours not Included above for:	Total Period	All Hours	6
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	18
Number of Valid Hours for this Table:	Total Period	All Hours	8736
Total Hours for the Period:			8760

WGDT Batch Release Periods

03/13/23 13:47 – 23:22

Joint Frequency Distribution**Hours at Each Wind Speed and Direction**

Period of Record = **Total Period** **All Hours**
 03/13/2023 12:00 - 03/13/2023 23:00

Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: A **Delta Temperature** **Extremely Unstable**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	0	0	0	0	0	0	0
NNE	1	1	0	0	0	0	2
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	1	0	0	0	0	1
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	1	0	0	0	0	0	1
NNW	0	1	0	0	0	0	1
Total	2	3	0	0	0	0	5

Calm Hours not Included above for:	Total Period	All Hours	0
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	5
Total Hours for the Period:			12

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** 03/13/2023 12:00 - 03/13/2023 23:00 **All Hours**

Elevation: Speed: SP10T1 Direction: DR10T1 Lapse: DT61T1

Stability Class: B Delta Temperature Moderately Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	0	0	0	1	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	1	0	0	0	0	1
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Total	0	1	0	1	0	0	2

Calm Hours not Included above for:	Total Period	All Hours	0
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	2
Total Hours for the Period:			12

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** 03/13/2023 12:00 - 03/13/2023 23:00 **All Hours**

Elevation: Speed: SP10T1 Direction: DR10T1 Lapse: DT61T1

Stability Class: C Delta Temperature Slightly Unstable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	1	0	0	0	0	0	1
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	1	0	0	0	1
Total	1	0	1	0	0	0	2

Calm Hours not Included above for:	Total Period	All Hours	0
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	2
Total Hours for the Period:			12

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

All Hours

Period of Record = **Total Period**
 03/13/2023 12:00 - 03/13/2023 23:00

Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: D **Delta Temperature** **Neutral**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	1	0	0	0	0	0	1
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	1	1	0	0	0	2
Total	1	1	1	0	0	0	3

Calm Hours not Included above for:	Total Period	All Hours	0
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	3
Total Hours for the Period:			12

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 03/13/2023 12:00 - 03/13/2023 23:00

Elevation: Speed: SP10T1 Direction: DR10T1 Lapse: DT61T1

Stability Class: E Delta Temperature Slightly Stable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Calm Hours not Included above for:	Total Period	All Hours	0
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	0
Total Hours for the Period:			12

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 03/13/2023 12:00 - 03/13/2023 23:00

Elevation: **Speed:** SP10T1 **Direction:** DR10T1 **Lapse:** DT61T1

Stability Class: F **Delta Temperature** **Moderately Stable**

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Calm Hours not Included above for:	Total Period	All Hours	0
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	0
Total Hours for the Period:			12

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Period of Record = **Total Period** **All Hours**
 03/13/2023 12:00 - 03/13/2023 23:00

Elevation: Speed: SP10T1 Direction: DR10T1 Lapse: DT61T1

Stability Class: G Delta Temperature Extremely Stable

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Calm Hours not Included above for:	Total Period	All Hours	0
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	0
Total Hours for the Period:			12

Joint Frequency Distribution

Hours at Each Wind Speed and Direction

Total Period **All Hours**
 Period of Record = 03/13/2023 12:00 - 03/13/2023 23:00

Elevation: Speed: SP10T1 Direction: DR10T1 Lapse: DT61T1

Stability Class: ALL Delta Temperature

Wind Speed (mph)

Wind Direction	0.8-3.9	4.0-7.9	8.0-12.9	13.0-18.9	19.0-23.9	> 24.0	Total
N	0	0	0	1	0	0	1
NNE	1	1	0	0	0	0	2
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	1	0	0	0	0	0	1
S	0	0	0	0	0	0	0
SSW	0	1	0	0	0	0	1
SW	1	1	0	0	0	0	2
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	1	0	0	0	0	0	1
NNW	0	2	2	0	0	0	4
Total	4	5	2	1	0	0	12

Calm Hours not Included above for:	Total Period	All Hours	0
Variable Direction Hours for:	Total Period	All Hours	0
Invalid Hours for:	Total Period	All Hours	0
Number of Valid Hours for this Table:	Total Period	All Hours	12
Total Hours for the Period:			12